THE BOMBING OF PAN AM FLIGHT 103: A CRITICAL LOOK AT AMERICAN AVIATION SECURITY

HEARINGS

BEFORE THE

GOVERNMENT ACTIVITIES AND TRANSPORTATION SUBCOMMITTEE

OF THE

COMMITTEE ON GOVERNMENT OPERATIONS HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

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THE BOMBING OF PAN AM FLIGHT 103: A CRITICAL LOOK AT AMERICAN AVIATION SECURITY

MONDAY, SEPTEMBER 25, 1989

House of Representatives,
Government Activities and
Transportation Subcommittee
of the Committee of Government Operations,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:30 a.m., in room 2154, Rayburn House Office Building, Hon. Cardiss Collins (chairwoman of the subcommittee) presiding.

Present: Representatives Cardiss Collins, Major R. Owens, Barbara Boxer, Howard C. Nielson, and C. Christopher Cox.

Also present: Representative John Conyers, Jr., chairman, Committee on Government Operations.

Staff present: Warner Session, acting staff director; Miles Q. Romney, senior counsel; LaQuietta J. Hardy, professional staff member; Cecelia Morton, clerk; and Ken Salaets, minority professional staff, Committee on Government Operations.

OPENING STATEMENT OF CHAIRWOMAN COLLINS

Mrs. Collins. Good morning.

This hearing of the Government Activities and Transportation Subcommittee will come to order at this time.

We have been joined today by the full committee chairman, Mr. John Conyers, of Michigan.

I yield at this time to the chairman.

Mr. Chairman.

Mr. Conyers. I almost thought you said Jack Brooks of Texas.

Good morning, Madam Chairwoman and members of the subcommittee. I want to welcome everyone here today for this important hearing of the subcommittee on aviation security.

The hearing today is important for two reasons. First, to determine whether the Federal Aviation Administration is adequately meeting its responsibilities to regulate aerial security in the current terror of terrorist atrocities against large passenger aircraft, and the horror of which was illuminated by the bombing of last December.

Second, to examine how do we prevent weapons and bombs from being placed aboard such aircraft which departs every day in thousands of flights from hundreds of airports, which pass hundreds of thousands of airline passengers. There is not a more vulnerable target for this cruel activity than a large aircraft in flight.

The ingenuity and sophisticated technical capability plus the traveling public's total dependency on air transport provides the measure of the enormous challenge that faces both the airlines, the airports and the government regulators as well.

Now, it seems from our point of view that the traveling public has a right to have the airports and airlines as safe as possible from terrorist attack. To do that, the public should be informed about the reasonable and realistic threats against airports and airlines, so the citizens should be permitted to make their own informed judgment about whether they think it is safe to fly.

Both the Congress and the public need to have a thorough understanding of the scope of the problem, the size of the task being immediate, the policies and capabilities and kinds of measures that are necessary to accomplish this task. All of us will have to hold on to a deep appreciation of a basic point.

Control of aviation security requires not a measure here or a device there, but a full systems approach, one that preserves its own dynamism to meet the awesome challenge what we are confronted with.

It is in that sense that I want to compliment you, Chairwoman Collins, for the thoroughness, the great detail in which you have pursued this investigation that is now being brought to another important point in its development.

You brought an excellent array of witnesses forward for today, that will provide not only a close examination of the events before and after Lockerbie, but a critical look at measures and devices that are being introduced largely as a result of that event.

On behalf of all the members of the full committee, we compliment you and look forward to your continued work in this area.

Mrs. COLLINS. Thank you, Mr. Chairman.

There is no question that the shocking and heinous destruction of Pan Am Flight 103 last December was an act of criminal sabotage of profound proportions. While we cannot redeem the lives of the 270 victims, we can vindicate them by doing everything possible to investigate this incident, bring to justice promptly those responsible, and enhance aviation security to help prevent a repetition of this tragic event.

Such a commitment to upgrade air security worldwide requires a concerted effort by the Congress, administration, and individual air carriers. It requires that we carefully examine all the facts related to security and make informed decisions about developing new security procedures and about how to most effectively expend our resources on security equipment and technologies.

Since the tragic bombing of Pan Am 103 this subcommittee has worked diligently to thoroughly investigate this incident and to leave no stone unturned.

Over the next 2 days we will examine all the facts, issues, concerns, problems, and circumstances which surround the Pan Am incident, in the context of aviation security overall, particularly as it concerns the FAA's responsibility. Our objective in the next 2 days is not to assess blame or try to litigate liability issues. That is the proper jurisdiction of the judicial process.

Rather, we want to examine closely the FAA's regulatory role as it relates to setting standards, monitoring the airlines' security performance, and enforcing violations of those performance standards. We want to focus on those deficiencies in the U.S. airline security system which may have allowed the Pan Am bombing to occur.

The FAA's role in this regard is particularly significant because it sets the standards for the industry to follow.

I have asked the Government Accounting Office to provide an analysis of changes made to the air carrier standard security program—a program that sets forth security measures to be followed by U.S. airlines at domestic and foreign airports.

Because FAA considers information contained in this program as sensitive, the GAO will provide the details of its analysis in our executive session following tomorrow's hearing.

However, the GAO has advised me of its general observations which I can share with you. Overall, GAO found that despite additional security measures imposed following Pan Am 103, FAA cannot assure itself that required security procedures are being properly carried out by the airlines at designated high-risk airports.

Security deficiencies found in recent FAA airline security inspections show breakdowns in the training of airline security screening personnel. GAO believes these deficiencies occur largely because FAA has not established minimum training standards needed to ensure that airline security personnel working at high-risk airports overseas are sufficiently trained to carry out required security measures.

The GAO also noted that, while the airlines generally provide formal training to security employees, the FAA does not evaluate the adequacy or quality of such training. The FAA will appear to respond to these findings and to describe what initiatives it has taken to upgrade aviation security.

Additionally, several expert witnesses who have been critical of the FAA's performance will also present testimony.

With respect to Pan Am itself, the subcommittee will take a close look at Pan Am's formation in 1986 of a special security operation called "Alert," which was touted as an elite airline security unit involving the most highly trained security experts and the most sophisticated machines available.

In the aftermath of Flight 103 serious doubts have been raised about this claim. Additionally, we will examine a 1986 security report prepared for Pan Am by an Israeli firm, which assessed 26 Pan Am stations, including Pan Am stations in London and Frankfurt.

The most important conclusion of that report was that "Pan Am is highly vulnerable to most forms of terrorist attack. The fact that no major disaster has occurred to date is merely providential."

We must ask, then, to what extent did the problems cited in 1986 exist at the time of the bombing? Just this week the FAA announced proposed fines against Pan Am for alleged security lapses at Heathrow and Frankfurt. Those alleged violations include:

One, failure to apply security procedures to identify passengers for further screening.

Two, improper methods used to check carry-on baggage of passengers identified for additional screening.

Three, failure to conduct the required search of cargo areas prior to loading cargo.

Pan Am's director of security is present to respond, as well as a former Pan Am security official and a member of the Israeli security firm which conducted the 1986 study.

So, during the course of these hearings some hard questions have to be asked:

Are FAA security standards adequate?

Should the American public have had reasonable confidence in December 1988 that our airline security system was adequate to meet the known terrorist threat to U.S. airlines?

Can the U.S. public have confidence in the system as modified in the weeks and months since the Pan Am 103 bombing?

What security policies and measures should be requested on a long-term basis to meet the known threat?

In seeking answers to those and other questions, I encourage the witnesses to be candid and straightforward in their responses.

Please be reminded that your oral statements will be limited to 5 minutes and that your written statements will be made a part of the official record.

It is our hope that these hearings will be constructive and result in positive changes.

Mr. Nielson.

Mr. NIELSON. Thank you, Madam Chairwoman.

Good morning.

In my opinion, aviation security is one of the most critical issues of our time. Unfortunately, as is often the case, the more critical and sensitive an issue, the more difficult it is to address, particularly in the United States, the target of choice for most international terrorist organizations.

In as open a society as ours, very little of what we do remains secret for very long. That holds true in the struggle against terrorism.

One needs merely to pick up a newspaper or magazine to learn about the vulnerabilities of the latest explosive detection technology; or even simply to dial up one of many so-called bulletin boards on a home computer, to find out the latest techniques for building a sophisticated homemade bomb.

There may even be individuals in this very room who are hoping to gather information to assist in the planning and execution of the next attack against the U.S. target. There may be others who, for pecuniary or personal reasons, are planning to say or reveal things that will inadvertently assist the very actions we seek to prevent.

I am confident the subcommittee will take adequate steps to avoid the unnecessary disclosure of sensitive information. I trust our witnesses will do the same.

Given the environment in which we must operate, and the sophistication and determination of those who commit these reprehensive acts, it is absolutely critical that every member of the aviation security team—including the FAA; the airlines; the airports; and Congress—perform our roles and fulfill our responsibilities to the utmost.

Unfortunately, the U.S. effort against terrorism in the skies remains splintered and confused, with too much time and resources wasted on finger pointing and dodging blame. Is it any wonder American taxpayers and airline passengers continue to question just what exactly they are getting for their security dollar?

It is time we commit the necessary money and personnel to effective security, not just to rhetoric and public relations campaigns.

Clearly, the airlines must do more. What can you expect from employees who get paid fast food wages for so important a job as security? It doesn't take much deliberation to choose the minimal risks of burning an occasional hamburger over the burdensome responsibility of deterring terrorists and savings lives. Incredibly, the level of pay and training for both is about the same.

Clearly, the FAA must do more, particularly in the area of oversight. During the course of our investigation, it became apparent the airline industry will only do that which is required of them and not much more.

In addition, we not only found inconsistent levels of security among airlines, but inconsistent performance within airlines as well. The situation cries out for more diligent oversight and the standardization of training and security procedures.

The FAA must become more proactive rather than reactive, to quit worrying so much about avoiding controversy or waiting for Capitol Hill to point out the way. Personally, I don't think we need an FAA independent of the Department of Transportation, we need an FAA independent of the airlines and congressional micromanagement.

For our part, Congress must back off a little and give the FAA the room it needs to enable its experts and researchers to do their jobs, without having to constantly jump through political hoops or look over their shoulders. We need to stretch our collective attention span to a sustained and consistent level, rather than turning it on or off in reaction to the most recent airline tragedy or incident, because ultimately, Congress determines the degree of effectiveness of aviation security in the United States.

The old adage of a chain being as strong as its weakest link certainly holds true in the area of aviation security. It is time we all pull together or eventually we will be pulled apart.

Mrs. COLLINS. Thank you.

Much of your investigation could not have gone on without his thorough and complete cooperation. We appreciate the work that you have done in this regard.

Your staff has certainly been one that can be commended in a laudatory manner for their operation as well.

I now yield to the gentleman from New York, Mr. Owens.

Mr. OWENS. Thank you, Madam Chairwoman.

I originally had not intended to make an opening statement, in view of the fact that you have a long history of very knowledgeable and concerned witnesses. However, in order to arrive here and guarantee I would be here on time this morning, I decided to take the Pan Am shuttle last night. The example of abuse and misuse of passengers is such that I think it is relevant to this morning's hearings and should be noted.

I called the airline to make certain I would not be on the last flight. I asked what was the last flight, and I was told it left at 9:30.

I asked them if there was an 8:30 flight, and they said, yes, there was an 8:30 flight. In order not to be on the last flight, which by experience, I noted always has some kind of problems, I tried to get the 8:30 flight. I arrived at the airport at 8 o'clock. There was a posting that the 8:30 flight would leave at 8:50. The skies were clear in New York, the weather had been beautiful all day. I didn't see any reason for the delay.

We were not told the reason of the delay. However, the 8:50 flight turned out not to have loaded until 9:30. The plane was loaded at 9:30, which was originally supposed to be the time of the last flight. We sat on the runway for a while and finally took off. We were never given an explanation for the delay.

After we approached the city of Washington, we were told it was too late to land at the National Airport and we would have to land at Dulles and be transported from Dulles to National by bus. A flight that was supposed to have started at 8:30 and arrive in Washington at 9:30, started out much later. I arrived at the National Airport at 12:20. I could have taken the train and gotten here much sooner.

No explanations were given. There was no bad weather. I cite it because it is an example of abuse and misuse of passengers, which I think is important to note in the context of these hearings. The incident reflects certain ingrained habits of dishonesty in dealing with passengers, of blind contempt for the problems generated by manipulating some pieces of information and withholding other pieces of information.

If we had been told we would have been going to Dulles before we left the airport in New York, many passengers would have made plans to have been met and a number of other things could have happened. It was a 1 hour domestic flight from New York to Washington. You can amplify that sloppiness and it continues over a long period of time and there is a pattern that on the weekend flights get truncated, and there is a pattern of less experienced personnel and less courtesy.

A number of things happen on the weekends that don't happen at other times. This kind of sloppiness when continued over a long period of time, becomes an institutional disease. This will have to be one of the components of the process to insure greater safety of our airlines.

I think a hearing of this kind is very much in order for air travel.

Thank you very much.

Mrs. COLLINS. The gentleman from California, Mr. Cox.

Mr. COX. Thank you.

It is fitting that this subcommittee charged with oversight of FAA's aviation security mission should be conducting this investigation into the adequacy of America's defenses against terrorist attack. We have got to do everything we can to apprehend terrorists before they succeed in killing international travelers. That is why we are here today.

But as we enter into this inquiry, let's all keep one thing foremost in mind. The airlines and the traveling public are not the enemy. Terrorists are the enemy. In a recent editorial in the Los Angeles Times—Tom Clancy wrote an article headlined "Nothing is Safer for Terrorists than Killing Another American." Nine months after Pan Am Flight 103 disintegrated over Scotland, nothing has been done to bring a single terrorist or a single sponsoring state to account. Nobody has yet paid a price. Until we address that side of the terrorist equation, no American will be safe. No amount of new technology will keep us ahead of terrorists intent on killing innocent Americans.

We will also hear some testimony during these hearings that suggests that perhaps the Government should take over airline security by mandating particular technologies—for example, particular explosion detection devices. This may be warranted, but we might also keep in mind that by mandating such nationwide solutions, we might stifle the very technological advances that will protect us in some measure from terrorist attacks.

Thank you.

Mrs. COLLINS. Our first panel today will consist of the following. I am sorry, Mrs. Boxer, the lady from California.

Mrs. BOXER. Maybe you didn't recognize me with my new hairdo. Madam Chair, I am delighted you are back in form. I am very happy that you are feeling well and that we are here today to discuss this urgent issue.

Very briefly, I have just a couple of comments to make. I don't think I will ever forget, nor will anyone else, the look on the parents' faces as they were waiting for those children to come off that plane. As a parent myself, and having been in a similar circumstance where I was waiting for kids to come home, I won't ever forget it. I am pleased you are having this indepth investigation.

I would like to agree with my colleague from California that the enemy is the terrorists, but I would also like to point out that there are other countries who live with terrorism day after day in much worse circumstances than we do, and they seem to do better. They seem to be better at airline safety. I think we ought to be able to do better in the future, and I commend you for these hearings.

Mrs. COLLINS. Thank you. I apologize.

Our first panel will consist of Mr. Ed Cunningham, the director of security for Pan Am; Mr. Isaac Yeffet, a security consultant on the 1986 Pan Am KPI report; Mr. Fred Ford, a former Pan Am security director; and Mr. Noel Koch, a security consultant. Won't you come forward, please, gentlemen?

As I mentioned earlier, gentlemen, the House operates under a 5-minute rule. Your full testimonies will become a part of the record. Therefore, we are going to limit your discussion at this time to whatever you want to talk about for 5 minutes only. We have a time clock up here. We are going to use it.

I would like for you to stand, please, witnesses. We are going to swear you in this morning.

[Witnesses sworn.]

Mrs. COLLINS. I will begin with you, Mr. Cunningham.

STATEMENT OF ED CUNNINGHAM, DIRECTOR OF SECURITY, PAN AMERICAN AIRWAYS

Mr. CUNNINGHAM. Good morning. I would just like to say one or two words from my prepared statement, which, of course, you will include in the record, and from the comments I have heard from the members this morning.

I think the gist of what should come out of our hearings is that airline security is very, very important. It is not a one person or one group responsibility. I think it is very, very important that it be shared by both the carriers, who, of course, have a tremendous responsibility in that area, and as the rest of the nations around the world do, by the governments, who also have a tremendous responsibility.

We certainly, in the carriers, recognize our responsibility, but unlike a maintenance issue or an operations issue, we are not equipped to do this all by ourselves. We very definitely need the help of the Government in this important undertaking.

Thank you.

[The prepared statement of Mr. Cunningham follows:]

STATEMENT OF EDWARD F. CUNNINGHAM
BEFORE THE HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON
GOVERNMENT ACTIVITIES AND TRANSPORTATION
MONDAY, SEPTEMBER 25, 1989

Madam Chairwoman:

My name is Edward F. Cunningham, and I am Managing Director of Corporate Security of Pan American World Airways, Inc. I am appearing today at the request of the Subcommittee to testify with respect to aviation security measures in the airline industry.

Aviation security today is not a matter for the individual carrier alone; it requires a joint effort by both governments and air carriers. Private air carriers alone are ill-equipped and ill-suited to the task of combatting international terrorism. Attacks against U.S. carriers are attacks upon the United States. The tragic result has been the loss of hundreds of innocent lives. This must end now and forever.

The United States and other free nations must commit resources to the interdiction and eradication of international terrorism at its sources <u>and</u> to the protection of their citizens engaged in international travel. Forty years ago, when commercial aviation was in its infancy, the world governments, in the Chicago Convention, first formally accepted government responsibility for aviation security. During the intervening 40 years, international aviation has changed dramatically. Even more dramatic have been the risks to international aviation posed by ever more sophisticated terrorists and terrorist instruments of fear and destruction. As a security manager, I know that air carriers' security programs cannot remain static. So, too, national government security programs must remain dynamic. The U.S. Government and other governments must quickly develop new measures to combat the terrorist threat to international aviation.

The U.S. Government must, through diplomatic and other channels, work closely with foreign governments to deter terrorism effectively. U.S. flag carriers operating overseas are often subject to constraints imposed upon them by their host governments. Yet, the U.S. Government has traditionally imposed on U.S. flag carriers the burden of complying with FAA mandated security measures overseas regardless of the constraints placed upon them by the host governments. Greater inter-governmental dialogue must begin so that security in international aviation will become an effective, internationally coordinated process.

No country and no airline is totally secure from terrorist attempts of sabotage. Any perception that foreign carriers are more secure than U.S. carriers is illusory. In reality, all airlines are vulnerable. In this regard, more than fifty percent of Americans traveling abroad utilize foreign carriers for international travel. Yet, the FAA requires only

U.S. carriers to implement rigorous security measures; most foreign carriers have far fewer screening procedures than U.S. carriers. American citizens are, as a result, placed in jeopardy and, at the same time, American carriers are needlessly penalized and put at a disadvantage. The Government's resources must be utilized to remove this disparity and to provide protection for all American travelers.

Finally, on behalf of Pan Am, I wish to extend my deepest sympathies to the families and friends of victims of terorist acts. Pan Am shares your pain and sorrow. We hope that these hearings demonstrate that a cooperative and concerted effort is needed on the part of our Government and the governments of other nations, sparing no effort or expense, to ensure that international terrorism will never again strike at our citizens.

Mrs. COLLINS. Mr. Yeffet.

STATEMENT OF ISAAC YEFFET, FORMER DIRECTOR GENERAL OF SECURITY, EL AL AIRLINES

Mr. YEFFET. Allow me to express my appreciation for inviting me to appear before you to talk about the U.S. security in aviation. I spent many years—most of my life—in the field of security in various areas, including having been the head of security of El Al, the Israeli National Airlines for 6 years. In 1986 I was part of a team that was hired by Pan Am to do a security survey in Europe and in the United States. At the end of 1986, we gave Pan Am our report that included findings and recommendations.

In 1989, I was hired by three different companies to do a security survey inside the United States. I was hired by Life Magazine, News 4 TV in Washington, and another company in Chicago.

What I found out in our security survey in 1986 and 1989 I must say that I didn't see any changes that were made. I have the impression that the security airlines of America are running their security in a way as if nothing happened in the past, and nothing will happen in the future.

The American Government cannot be allowed to face every year a new tragedy. February 1986 TWA 840, Athens. Explosives exploded, people were killed and injured.

Summer of 1986 Pan Am Karachi, when the airplane was attacked on the ground by terrorists, people were killed and injured.

December 7, 1987, flight PSA-1771, 43 people were killed.

1988, Pan Am 103. We know the results of 270 people that were killed.

The American carriers are running their security and they are following the FAA procedures. While the FAA told the airlines that they are responsible—each airline—for its own security, the result was that the airline decided to give a low priority to security, and they are signing contracts for the cheapest private security company.

The results of this contract, the cheapest private security companies are hiring the low level personnel by paying them $3.35, $3.60, and $4 per hour. They train people 8 to 10 hours—and I was told that also for less than 8 and 10 hours.

Allow me to give you examples:

In Denver we were interviewing a security man who was in charge, running an x-ray machine on an international flight. He told us that he was trained 8 hours before he was put in charge of running the x-ray machine on this international flight. He also said also that he is looking for the green color, which means metal and the dark color which normally might be books.

When we asked him if you see something more suspicious, then what do you have to do? His answer was, "I was instructed to ask the owner of the luggage what he has inside the luggage. Whatever he tells me, I have to believe him and to release the luggage and to send it to the aircraft."

Security background checks: Why do we only check the last 5 years of everybody who is going to be a security man?

FAA is sending the procedures to the airlines and must follow how the airlines implement the procedures or are they ignoring the procedures. If the FAA would check how the security of PSA at Los Angeles were running their security, they would find that they ignored the FAA procedures—and the PSA incident happened because of the bad security system.

I believe that America must force the airlines to have a good security system by law. It is not enough to fine the airlines $10,000 when they fail on tests. Airlines that have budgets of billions of dollars, $10,000 wouldn't sake them. But if they will know that they have violated the law and they will be brought to court and they might lose the rights to land on the station where they have made the violation, they will understand that they have to run the security by thinking about the lives of innocent people that are traveling with them.

Thank you very much.

Mrs. COLLINS. Thank you.

[The prepared statement of Mr. Yeffet follows:]

Monday, September 25, 1989

STATEMENT OF ISAAC YEFFET
FORMER DIRECTOR GENERAL OF SECURITY FOR EL AL AIRLINES

Madame Chairwoman and Members of the Subcommittee: I would like to thank you for the opportunity to appear before the subcommitte to speak about the current state of security for American flag carriers. In your invitation you requested that I address certain specific matters which concern your subcommittee. What follows is a brief summary of my experiences and thoughts about those areas of concern.

TRAINING OF UNITED STATES AIRLINE SECURITY PERSONNEL.

In January of this year I was hired by LIFE magazine to survey the levels of security at several major American Airports. Accompanied by LIFE reporter Edward Barnes, we visited seven major airports and interviewed security agents, airport officials, and police. We found that, while vast sums are spent on guards, machines and equipment, there is virtually no security provided any of these airports. They are open targets waiting, unprotected, for any lunatic or terrorist who wants to capture the next day's headlines. American airline security does very little well.

The level of training given by American air carriers to their security agents is extremely low, insufficient and not effective. The training period is too short--just eight to ten hours for each security agent. That training usually consists of teaching an agent what a revolver, hand grenade, dynamite and pipe bomb look like on an x-ray machine and how to operate the machine.

Most American carriers rely on private security companies to perform their security functions. The security requirements these companies must fulfill are enumerated in Federal Aviation Administration (FAA) regulations and directives. In effect, the FAA has told the airlines that they are responsible for their own security. This not only allows the FAA to avoid responsibility for security failures, it allows airlines to ignore their responsibility. The

Warsaw convention limits their liability for security failures, as long as FAA procedures are followed. The result is that American airlines have made security a low priority. This can be seen in their choice of security companies. Virtually all American airlines hire security firms based solely on the lowest price. The result: private security companies hire personnel who would be virtuall unemployable in any other industry. They pay them the minimum wage and fail to adequately screen for criminals and drug users. This alone, we found, is a major factor in the poor quality of American airline security.

To show how poor is the quality of the American personnel, I would like to recount an incident that occurred at Denver's Stapleton Airport. Ed Barnes and I interviewed the agent responsible for the operation the x-ray machine used on most international flights. He told us that he had been given only one eight-hour training session on how to operate the x-ray and what to look for. Immediately after the training he was assigned to the machine. All he remembered from that session was that the color green on the moitor meant the presence of metal. Dark spots, he said, were usually books. Asked what he is supposed to do when he sees something suspicious, he replied he was under instructions to ask the owner of the luggage about the contents of the luggage. Whatever the owner answered, he has to believe him. He must then release the luggage to the aircraft uninspected. He confided that if he made a mistake and a bomb gets through to a plane, he would have to go back for retraining the first time. If it happened again, he would be fired.

On another occasion, I asked a security supervisor at National Airport what it would take to get hired as a security agent. I was told that all I needed to do was fill out a form and give a brief history of my last five years. If they determine I hadn't been a criminal in the last five years, I would then be given two hours of videotaped instruction in how to recognize weapons. I would then be instructed on how to operate the x-ray machine. This, I was told, would take another two hours. In only four hours I could have been protecting the flights that carry some of the nation's most influential citizens.

When I asked about the minimal requirements--only a five year history and four hours of instruction--the supervisor responded that was all the FAA wanted.

The supervisor added that she was sure I would be hired. Most of the people hired for security work were unemployed and stayed only as long as it took to find another job. The average agent stayed for only two months, she stated.

ASSESSMENT OF SECURITY AT AMERICAN AIRPORTS

The security survey that I undertook at John F. Kennedy, LaGuardia, O'Hare, San Francisco, Los Angeles, Denver, Miami, Dulles, National, and Baltimore-Washington International this year found that in every airport the level of security and the quality of personnel was extremely low. No one saw the job of sewcurity agent as permanent. Agents were apathetic because they did not view this as a career: it is a job that goes nowhere. Not one person I interviewed saw security as an important mission. No one ever even hinted that they were aware they held the lives of thousands of passengers in their hands. It was shocking.

Proceedurally, the biggest breech in American domestic security is the failure to screen luggage bound for an internal destination. Anyone can place an uninspected bag--or bomb--on a domestic flight through curbside check-in without accompaning that luggage. This is a recipe for disaster. a failure that leaves passengers open not only to terrorists but to angry lovers, criminals and the insane.

With curbside check-in there is no possibility of preventing a disaster and little hope of finding the terrorist once the destruction of the airliner has occurred.

Inside terminal unattended luggage presents another grave threat to the traveling public. No one at any airport I visited was charged with monitoring this problem. Americans must think they are immune from this type of disaster. In 1975 a suitcase exploded at the TWA terminal at La Guardia killing ~~or~~ AND injuring a large number of innocent people. In 1981, an explosion in the men's room at the Pan Am terminal in JFK killed one man. A second explosive device was discovered before it could go off.

In the terminals of Los Angeles' International Airport, the public address system warns passengers twenty-four-hours-a-day not to park in front of the terminal. Not once does it announce that travelers should not leave luggage unattended. Inside O'Hare one can also hear the public address system message warning against smoking. Again, there is no mention made about unattended luggage. At O'Hare, LIFE reporter Ed Barnes and I sought to determine whether there were any hidden systems that might protect against unattended luggage. We left a bag in the main corridor of the new United terminal which leads to the boarding gates. Hundreds of passengers, dozens of crew members, cleaning men, police and security men all walked near, around or over the unattended bag. To our surprise, no one paid any attention. No one asked who owned the luggage. In fact, the cleaning man swept around the bag several times during the three hours, but never touched it. Neither he, nor anyone else informed security that it was there. After more than three hours we decided to give up. It was clear there was no effective system for monitoring luggage.

Another serious breech at American airports is the common practice of allowing non-passengers to go to the gates. This puts needless and onerous pressure on the primary security check-point for no good reason. The security personnel should not be forced to screen people who are not flying. By doubling and tripling the number of people who have to be screened, this policy severely decreases the level of security that can be attained at any given time.

At some airports you can see signs that say "Ticketed passengers only." In spite of this sign, non-passengers are regularly allowed to circumvent security. The easiest way is simply telling guards that you have to go to the locker areas, which are usually behind the security gates.

The lockers themselves are another troubling aspect of security. They should be eliminated from airports. But if that is not possible, they should certainly be moved from the "sterile "areas, behind the security post, to the public areas of the airport.

Another senseless procedure, one that still baffles me, I discovered in Miami. There, I watched as a flight from London to Miami arrived. Some of the passengers were transferring from that flight to one bound for Mexico. Their luggage was x-rayed on the tarmac. But passengers beginning the flight to Mexico in Miami, taking the same aircraft, underwent no checks at all. This just doesn't make sense. Clearly the luggage that had already been pressure-tested by a transatlantic flight was safer than unscreened bags from Miami.

"These are the procedures," the security officers shrugged.

~~area that surprises me I am surprised that~~

VIEW OF THE FAA's REGULATORY PERFORMANCE

The FAA has done an inadequate job of insuring that the security network, which they require to be in place, is performing adequately. Moreover, the FAA seems incapable of keeping abreast of the changing security needs of American airlines. Their history has been to guard against the last attack, not stop the next one.

It should be the FAA's job not just to mandate security functions. They must be required to insure that those mandated procedures address the current level of threat and that the airlines, who implement them, do so professionally and adequately. It has been my experience that this is not the case.

The FAA regularly tests airline security to see if agents can spot revolvers or dynamite. This is not enough. During these inspections the FAA simply shows up and then disappears. It's inspectors do not attempt to speak to the security people at the various airports to determine if they are doing the other critical jobs adequately, they make no effort to assess the level of protection being attained, nor do they attempt to understand whether security people understand or properly implement their rules. The only testing the FAA does is to run test revolvers and hand grenades through the x-ray machines. Every failure costs an Airline $10,000. In 1987 the airlines failed 557 times and were fined $3.9 million. Such a large scale failure should have the FAA enraged. It is unacceptable to have that many flights vulnerable. (Incidentally, during the survey, we were told by security personnel that the FAA bag containing the weapons hardly ever changes and security personnel are given specific instructions to look out for *that* bag.)

I believe, that had the FAA instituted a policy of measuring the adequecy of overall security and regularly checked to determine whether security people at all airlines were properly implementating their procedures, they might have prevented the loss of PSA flight 1771.

In that case, the FAA issued a comlex set of rules which allowed some airline employees to avoid security checks. Those rules, however, were so complicated, that PSA security agents simply ignored them. Instead they allowed anyone with an official identification to walk around security. On December 7, 1987 a US Air employee, who had been fired for stealing money from the airline, did just that. Seeking revenge against his former boss, and aware that he would not be checked, he took a gun aboard PSA Flight 1771. His boss, a passenger on the flight, and 42 other perished as a result of that lapse in security.

Had the FAA checked to see if PSA security officers were following their guidelines, they would have found this breech and the 43 people aboard that flight might be alive today.

The FAA's failure to insure that its' procedures are carried out in a meaningful way is also evident in the implementation of the questioning procedures required of passengers on international flights are implemented. The FAA requires airlines to ask six questions: Did you pack your own luggage? Does this luggage belong to you? are two examples. The questions are designed to elicit responses from passengers that trained security people can read. Often, it isn't the response that is important, but how that response is given. If a passenger is lying, it is likely that there will be a physiological change that a trained agent can see. The questions are meant to identify those passengers who might be suspicious. But, to be effective, a trained security agent must watch the respondent as he answers, and focus on his reactions to the questions. Done correctly, the questions are the most effective way to stop a terrorist.

During my surveys I have found the questions were often taped to ticket counters and responsibility for asking them given to ticketing agents, rather than security personnel. This defeats the purpose of the questioning but complys with FAA regulation. The FAA has shown little concern that the questions be asked by someone who might use the information effectively. It is my experience that no ticket agent, required to ask these questions, did it in a meaningful way. Indeed, it is wrong to expect a ticket agent, whose job it is to get a passenger on a plane, to also be expected to keep passengers off. One ticketing agent complained that they didn't know what was expected of them. Their training was in seating, reading passports, and other aspects of boarding, they knew that the added responsibility of questioning passengers did nothing to enhance security. In fact, few even watch the passenger when they asked the questions.

One of the fundamental flaws in the FAA's philosophy of security is an unwarranted trust in machines, rather than people, to provide adequate security. Machines can never hope to keep a step ahead of terrorists. The minute a machine-based security system is in place, it starts to quickly become obsolete. The weaknesses and flaws of the machines become apparent, the calibration and sensitivity of the machines become public knowledge. and they grow easier to circumvent each passing day. The only true deterrent is capable, dedicated and knowledgable people, who are proud of their jobs, and aware of the tremendous responsibility that rests in their hands. They see their jobs as a mission that they cannot fail. That has been their philosophy that has protected the passengers on El-Al Airlines so successfully. It is a system that doesn't need costly machines. At El-Al, the machine is assists the human. At American airports the human is there to make the machine work, but the responsibility is the machine's.

In 1986, we made a security survey for Pan Am at six American airports. We discovered that it is almost impossible to prevent a determined terrorist from blowing up an American airliner. By 1989 it hadn't improved.

Among the weakest areas of FAA security regulation concerns the procedures surrounding the loading and shipping of cargo. Most of which is carried in the baggage hold of passenger airliners. The FAA rules give cargo handlers at the airlines three options: to deny loading, to open and check, or to hold it for 24 hours. We never saw anyone check or deny a load of cargo. If their was a question the usual process involved a hold for 24 hours. But this is totally inadequate in that it fails to protect against a barometer bomb--the type of bomb that destroyed Pan Am 103--or even a simple timing device that can be set for more than 24 hours. Most terrorist organizations in the world have the capability of building a timer that can go off after 24 hours any time they decide.

When we asked why these inadequate methods were not changed in response to the growing sophistication of terrorist organizations we were told, "These are FAA procedures and we don't argue with them."

On that 1986 survey we found the search of passenger luggage also woefully inadequate. At Frankfurt airport in Germany we found that the company hired by Pan Am to search the passenger bags didn't know how to conduct these searches. They did not know, for example, how to look for double-bottom suitcases. Moreover, at least one of the security officers had a criminal record and that Pan Am was aware of this breech but failed to take any action to remove him from his position.

We also found that there was an agreement in Germany on Pan Am flights to allow German and American passengers to board without any security check of their luggage. Only nationals of other states had to go through this security. In West Berlin, all passengers on Pan Am flights that are American., British, French or German citizens were released from security checks. This despite of a wall poster next to the security station of wanted terrorists. All of whom were GERMAN nationals ~~of the four exempted countries~~ Germany. Again surprised at the implication there were no German terrorist we received the reply that, "These are procedures."

In Heathrow, London , next to the Pan Am counter a large x-ray machine carried a sign releasing British and American citizens from the screening. Again the response to our surprise was that this came from "upstairs" and we don't argue with them.

At most of the airports serviced by Pan Am we also found that the station managers also served as the director of security. It was obvious that these two functions are in direct conflict. A station manager's job is to get all flights out on time. As a result security became a secondary priority. These managers got just two days of training in West Berlin before getting the director of security post. I observed this session. Some of the managers of Pan Am admitted that the training was done in less than three days to meet possible FAA objections. Two days was not enough to teach anyone how to handle the complexities of security.

Again, I have no doubt that had the FAA inspectors responsible for Europe attempted to discover if their own procedures had been implemented properly, they would have found that the level of security was inadequate and that Pan Am's flights were vulnerable.

I cannot accept a situation where they know about the hiring of private security companies that thy have poor quality personnel and not do anything to rectify that situation. At Dulles Airport the security company that failed seven of 21 security tests was finally fired. Ironically, the new company came in and simply changed the uniforms on the existing personnel. How can the FAA allow that to happen?

It is my firm belief that the FAA is incapable of preventing the next airline disaster--only the last. Change, tragically seems to come only in reaction to a disaster. The PSA disaster forced the FAA to change regulations and the downing of Pan Am 103 has made the FAA buy new TNA bomb detectors. There seems to be little, short of disaster, that can bring about change. It is important that the FAA review its security procedures every six-months. It is the only way to keep ahead of the changing threats. That reevaluation should determine if procedures have been effectively implemented. Professional security people should test and question airlines security people searching for both weaknesses and things that can be done better.

VIEWS ON DISSEMINATION OF AMERICAN INTELLIGENCE

It would be a serious mistake to publish or otherwise announce the existence of threats to airlines. Announcing these threats will not save lives and will not increase safety. It will only bring panic. It will hurt airline security. It will hurt intelligence agencies. It will help only the terrorists.

Revealing threats will alert terrorists that they have an informer in their organization and it will give them warning so that they can alter their target. You cannot tell the public without telling the terrorists. Sooner or later they will succeed. Moreover, the panic caused by an anrouncement will only lead to false reports by the lunatic fringe. Once false threat announcements cause the needless disruption of airlines, they will soon be ignored.

One recent threat announcement showed what would happen. The media focused all its energy on the threat and panic ensued. The majority of the passengers flew anyway. The airlines announced security had been raised to insure the safety of the flight. The government cannot be allowed to be absolved of responsibility for the flight because of a warning. The government is always responsible.

Information that comes through American intelligence agencies from one of the terrorist groups should first be evaluated. If that information can be believed with any degree of certainty, it should be sent, along with their assessment, to the FAA. The FAA then must decide what must be done to add to the security of the targeted airlines. This information must be disseminated secretly, preferrably through the American embassy. The embassy should inform the directors of airline security to institute higher security levels. Those level will be determined by the FAA. Within days, an inspector from the FAA should be sent to determine if the security level is adequate, and if there are any additional steps that must be taken.

Not publishing ensures that the intelligence agent who provided information will survive and offers the best chance of surprising the terrorists before they surprise us.

RECOMMENDATIONS ON FAA EFFORT AT FOREIGN AIRPORTS

There is only one way to prevent the next disaster to American airlines. That is the construction of an adequate security system capable of meeting the array of threats currently facing America.

This new system must begin with a review of current procedures to determine what has proven effective and what needs revision. This includes a reevaluation of the political state of the world. For example, we must now begin to react to a possible attack by Columbian drug lords because of President Bush's recent declaration of war. Already they have shown that their weapon of choice is the bomb and that their enemy is the United States.

The FAA has to prohibit the station managers for airlines from also acting as security directors. Those offices will always be in conflict and must always remain separate. The security director must have ultimate authority on all matters related to security. That means he can halt flights and unload planes.

The FAA must make sure that airlines security people are qualified and well trained. And only security people will run the security of the flight. Other airline employees should be instructed in the importance of security and how to work with agents. Reporting unattended luggage or suspicious people should become part of each employees job and they should rewarded to show that the airline is concerned.

The FAA should make arrangements with the State Department to nominate one diplomat in each embassy serviced by an American carrier to act a liason with American security managers. He would insure intelligence information is promptly relayed and, in case where threats are severe, request local help in protecting planes, passengers or other security.

The FAA should inspect all airports regularly to determine that American carriers are providing adequate overall security. They should make sure that the questions asked on international flights are being asked properly by professional security people who can adequately judge potential threats.

Inspectors must test every facet of station security. They must question the ..nowledge and ability of airline security personnel. They must upgrade security penetration tests by using the new weapons of terrorists--simulated plastique explosives and false bottom suitcases. Today the FAA uses dynamite sticks and hand grenades hidden in a handbag.

-Through these kinds of tests the FAA will bring the security people to t high level of readiness so that they will be ready to deal with the threat whenever it occurs.

The FAA should change the manner of questioning passengers so that they can never be answered with a yes or a no. The questions should be constructed so that passengers have to respond in full sentences. It should be an interview. This allows the security agent to elicit more information and prepare another question. It also allows him to search for tell-tale signs of lying or other suspicious actions.

After every inspection a full report should be written that includes comments and impressions of the adequacy of the security directors and managers as well ass weakness. The report should go to the FAA's director of security, director of the airline's security and the station's director of security.

. Airlines should designate special seats for passengers who pass security but about whom there is still some suspicion. These seats allow air marshals and air crews to easily monitor them during flights.

Passengers on connecting flights from places where security is known to be weak. They should be put through security again.

RECOMMENDATIONS REGARDING UPGRADING AMERICAN AVIATION SECURITY

The FAA should demand that the director of security for any airline meet certain educational and professional standards. He must also successfully pass a course that covers in depth the numerous aspects of the job. For example, how to search luggage and people, how to secure cargo, how to search an aircraft, how to handle pre-boarding passengers and catering all require different skills. He must know them all.

Airlines should stop hiring outside firms. Instead airlines should make a commitment, through training and better pay, to provide professional security. Backgrounds of security agents should be thoroughly checked. Airlines should not be allowed to include luggage inspectors, translators and others not directly involved with the safety of the airplane and passengers under a security budget. It needlessly distorts the cost of security and lowers the importance of the job in the eyes of other personnel.

Every passenger should be matched to his luggage and interviewed in the presence of the luggage. No bag should ever get onto a plane without its owner. This, of course, means the end of curb-side check-in.

Forbid leaving baggage unattended inside a terminal. This denies one of the most common avenues of attack by terrorists.

Decrease the reliance on machines. Eliminate the x-ray machine and let the security people do their work. Put the money saved into people who know how to do their jobs.

Keep a law enforcement presence inside terminal areas where there is a concentration of passengers. This will minimize losses from a direct, suicide attack.

Inspect every security system at least four times a year to insure it continues to operate at peak efficiency. Security systems have a tendency to grow lax. Unannounced inspections are the only way to keep them alert.

Security defenses must be widened. Currently all domestic airline security is directed against a hijacking. America's enemies are sophisticated and the nation remains a target for drug lords, criminals and terrorists, it cannot allow any sector of its security to be weak because that is where an attack will occur. We can build that system, internally and externally, now, before it is too late. Instead of later, after hundreds more have died..

Mrs. COLLINS. Mr. Ford.

STATEMENT OF FRED FORD, EXECUTIVE DIRECTOR, GREATER ROCKFORD AIRPORT AUTHORITY, ROCKFORD, IL

Mr. FORD. Chairwoman Collins, members of the subcommittee, it is an honor and a privilege to appear before you today to submit testimony on a matter of great importance. It is important not only to those families who lost loved ones in the tragic bombing of Pan Am Flight 103, but to those who may travel today or in the future on airlines carrying the flag of the United States of America.

I did not come here today to debate the responsibility of the fate of Pan Am Flight 103, a flight I have traveled on several times in my aviation career, but to comment on assignment of the transportation industry that is in transition. I hope that we do not need another Pan Am Flight 103 to learn a lesson that should already be in the textbooks of airlines and those who regulate them.

Pan Am Flight 103 was not skijacked. Previous bombings of foreign airliners made headlines for a few days, the Americans sympathized, but the tragedy did not find its way into our hearts until one of our own was destroyed. The Pan Am Flight 103 tragedy has forced us to reevaluate our position, and to my thinking, not a minute too soon.

There are many questions to be answered. Is a private sector owned airliner aircraft entitled to less protection than a U.S. military aircraft when they both carry the flag of our country?

Parts 107 and 108 of the Federal Aviation Regulations adequately deals with the threat of hijacking. Passengers routinely reach for their keys and coins when approaching a security checkpoint just as Israeli children reach under their seats on a schoolbus to check for explosives. Awareness has become second nature, it has become as routine as stopping at a railroad crossing and frequent travelers will adjust to most new procedures promulgated to increase the survivability of a journey by air.

The airline function was initially created to counteract internal acts of fraud, ticket theft, cargo security, et cetera. Hijacking was a new wrinkle and it took the Federal Government to act to create industry standards for both airlines and airports. This is no different an evolution than what the industry is going through with the matter of aging aircraft, a new problem created by the fact that we have a fleet of older aircraft, but that was not in the public eye until the Aloha 737 and United 747 incidents.

Does parts 107 and 108 need to be reevaluated?

Should U.S. flag airlines be left to their own to design a system of protection?

Was Pan Am Flight 103 a fluke that may never reoccur? Can we afford to make that assumption?

Will the actions of our Government in the Middle East provoke further terroristic acts against U.S. flag carriers?

Are airlines natural targets because they are defenseless and create a public arena for revolutionaries of various factions?

I cannot answer these questions and doubt that this committee today could rationalize these discussions to the satisfaction of all concerned. We could, however, make an assumption as to the possibility of Pan Am Flight 103 being repeated, and let us assume that it will. Does compliance with parts 107 and 108 relieve all from responsibility? Is saying "we are in compliance, what more could we do have done" absolve any of us from the responsibility of providing safe air travel?

While these aircraft are owned by private industry they do carry our flag. Their routes are awarded by international treaty and regulated by intergovernmental agreements. Many international airlines are owned by their governments and considered representatives of their country. Pan Am certainly bears the burden of being a carrier of that flag.

Assuming that is true, do our aircraft require any less protection than Kuwaiti oil tankers traversing the Straits of Hormuz? Is oil more precious than human life? We have asked these same questions and responded using different commodities. I suggest our families and loved ones are entitled to at least the same concern and level of safety as oil from Kuwait.

In closing, I must submit to this distinguished panel and its observers that I am hesitant to comment publicly on this subject, but from a personal viewpoint, I am most concerned. I have personally observed those who play the odds in terrorism and I respect their respect for the enemy. I am seated by one today. These are not people seen only in James Bond movies, the perpetrators are real. The families of the passengers of Pan Am Flight 103 know they exist.

We were warned and chose not to act because parts 107 and 108 was the insurance policy. This insurance policy is reasonably valid if the violator comes to the front door of the aircraft. If the violator choose to enter through the cargo door, the catering truck, or maintenance vehicle, then the policy is not in effect and we have no further obligations.

I think it is time to review the contents of our insurance policy.

Mrs. Collins. Thank you.

[The prepared statement of Mr. Ford follows:]

Testimony of

Frederick C. Ford

Executive Director

Greater Rockford Airport Authority

Rockford, Illinois

before the

GOVERNMENT ACTIVITIES AND TRANSPORTATION

SUBCOMMITTEE

of the

COMMITTEE ON GOVERNMENT OPERATIONS

Rayburn House Office Building

Room B-350-A-B

Washington, D.C. 20515

September 25, 1989

Chairwoman ~~Collins,~~ Members of the Subcommittee, ~~Observers and Guests~~;

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In the late 1960's skyjacking became a relatively common phenomena. It became an event that was soon to become cocktail chatter, a free ride to Havana, usually without significant risk, and usually ending on a happy note with the passengers proudly displaying Cuban cigars. When lives were lost the game changed. Sky marshalls took to the air, pre-board screening, metal detectors and x-ray equipment became fixtures. THE INDUSTRY AND ITS PASSENGERS adjusted to the new environment. Skyjacking was dramatically reduced. The luggage search became an accepted facet of air travel. It became an accepted cost of doing business and, in general, the passenger did not object to a modest surcharge for increased security and safety.

Pan Am 103 was not skyjacked! Previous bombings of foreign airliners made headlines for a few days, the Americans sympathized but the tragedy did not find its way into our hearts until one of our own was destroyed. The Pan Am 103 tragedy has forced us to reevaluate our position and, to my thinking, not a minute too soon. There are many questions to be answered. Is a life worth more if it is terminated in a crash in a thunderstorm in Dallas, Texas than it is if it is heinously snuffed out in a political/terroristic act over the skies of Scotland? I ~~think not~~. Is a private sector owned airliner aircraft entitled to less protection than a U.S. Military aircraft when they both carry the flag of our country? In many lands the Blue Ball of Pan Am and the letters TWA signify the United States of America in the minds of many.

Part 107 of the Federal Aviation Regulations adequately deal with the threat of hijacking. Passengers routinely reach for their keys and coins when approaching a security check-point just as Israeli children reach under their seats on a school bus to check for explosives. Awareness has become second nature, it has become as routine as stopping at a railroad crossing and frequent travelers will adjust to most new procedures promulgated to increase the survivability of a journey by air.

Does one need to be an expert in security or police work to be a credible spokesperson on this subject? Definitely not! The airline

The airline security function was initially created to counteract internal acts of fraud, ticket theft, cargo security, etc. Hijacking was a new wrinkle and it took the Federal government to act to create industry standards for both airlines and airports. This is no different an evolution than what the industry is going through with the matter of ageing aircraft, a new problem created by the fact that we have a fleet of older aircraft but that was not in the public eye until the Aloha 737 and United 747 incidents. This is a situation created by a dynamic industry undergoing change. While the industry struggles with ageing aircraft, frequent flier programs, fortress hubs and merger mania without uniformity it would be ludicrous to expect that this same industry will act in unison on measures designed to answer this newest threat to safety in the skies.

Does Part 107 need to be reevaluated? Should U.S. Flag airlines be left on their own to design a system of protection? Was Pan Am 103 a fluke that may never reoccur? Can we afford to make that assumption? Will the actions of our government in the Middle East provoke further terroristic acts against U.S. Flag carriers? Are airlines natural targets because they are defenseless and create a public arena for revolutionaries of various factions? I cannot answer these questions and doubt that this committee today could rationalize these discussions to the satisfaction of all concerned. We could, however, make an assumption as to the probability of Pan Am 103 being repeated and let us assume that it will. Does compliance with Part 107 relieve all from responsibility? Is saying "We were in compliance, what more could we have done" absolve any of us from the responsibility of providing safe air travel?

While these aircraft are owned by private industry they do carry our flag. Their routes are awarded by international treaty and regulated by inter-governmental agreements. Many international airlines are owned by their governments and considered representatives of their country. Pan Am certainly bears the burden of being a carrier of the flag.

Assuming this to be true, do our aircraft require any less protection than Kuwaiti oil tankers trave sing the Straits of Hormuz? Is oil more precious than human life? We have asked these same questions and responded using different commodities. I suggest our families and loved ones are entitled to at least the same concern and level of safety as oil from Kuwait and the cost of protection of our airliners to a reasonable degree better than they are today is probably no greater than the cost of one month of patrols in the waters between Iran and Iraq.

In closing, I must submit to this distinguished panel and its observers that I am hesitant to comment publicly on this subject but, from a personal viewpoint, I am most concerned. I have personally observed those who play the odds in terrorism and I respect their respect for
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the enemy. These are not people seen only in James Bond movies. The perpetrators are real. The families of the passengers of Pan Am 103 know they exist. We were warned and chose not to act because

Part 107 was the insurance policy. This insurance policy is reasonably valid if the violator comes to the front door of the aircraft. If the violator chooses to enter through the cargo door, the catering truck or maintenance vehicle then the policy is not in effect and we have no further obligations. I think it is ~~Is it~~ time to review the contents of our insurance policy?] end

Mrs. COLLINS. Mr. Koch.

STATEMENT OF NOEL KOCH, PRESIDENT, INTERNATIONAL SECURITY MANAGEMENT

Mr. KOCH. Thank you, Madam Chairwoman.

One welcomes the opportunity to be present on such an occasion, but we rather it were not necessary. The hijacking and the bombing of civil aircraft are not new. It is new these acts are carried out for political purposes supported by nations that can bring resources and a great deal of sophistication to the work.

These are acts of war for the 21st century, and our response to the problem is rated in the civil doctrines of the 20th century. People are making war on our country by attacking our civil air assets. We are responding by asking the victims of the fight to defend themselves.

One result is that aviation security is not taken very seriously any more than most other types of industrial security are taken seriously by the upper management level. Security is overhead and money managers want as little of it as they can get. There seems to be a working consensus that if you are a policeman or a military man, the FBI or the Secret Service, you must know how to deal with things like terrorism. No director of security will ever admit that he doesn't know or have means at his disposal to deal with an issue like terrorism.

This becomes a manhood issue. We end up with security departments filled with unqualified retirees at the top and entry level minimum wage workers who are not properly trained at the bottom.

Another result is to the extent security is taken into account, it is as a marketing device. It is, to bring it to the point, much easier to understand Pan Am's Alert systems as a marketing program than as a security program. When the inevitable consequences of these attitudes befalls us, we dash about looking for some magic to deal with the problem—special techniques, special experience, special technology, special this, special that.

Madam Chairwoman, we have to see our national aviation system as a national asset and defend it accordingly. By insisting that our allies observe the existing protocols providing sanctions against countries associated with hostile acts against civil aviation, that we must exert our own unilateral sanctions where necessary, and where that is possible, and we have to certify and regulate those who are involved with aviation security, from the screeners at the bottom, to those at the top.

We have to take the same farsighted and systematic approach to this problem as any other matter affecting our national security, our national interests and our economic future. Each of the components in this system, the carriers, the air terminal operators—who have not been mentioned yet—and the Federal Government, has a part to play. I think we need a better distribution and a redistribution in the burden of labor that associates itself with this problem.

I want to touch on one matter, because it comes up again and again. This is the role of FAA. If I have time left in my 5 minutes, I want to recall that the division of labor within the Federal executive, the executive branch of the Federal Government, assigns to all acts of terrorism the responsibility to the State Department, with the exception of aviation security, and that falls in the lap of the FAA. We have a major Cabinet responsibility for most forms of terrorism and we have a very small, essentially regulatory, agency taking responsibilities for perhaps the single largest problem we have in the acts of terrorism.

You can assume the assignment of resources to deal with that responsibility are roughly equal and it is not sufficient to the problem we face.

Thank you very much. Are my 5 minutes up already?

Mrs. COLLINS. Not quite.

[The prepared statement of Mr. Koch follows:]

Testimony of Mr. Noel Koch, President
International Security Management, Inc.
Before the House Subcommittee on
Government Activities and Transportation
Room 2154 Rayburn House Office Building
September 25, 1989

My name is Noel Koch. I am the President of International Security Management.

I served in the Department of Defense for six years, and I was responsible for dealing with terrorism. My title then was Director of Special Planning.

I appreciate the opportunity to come before the Committee on Government Operations to testify on the matter of aviation security.

I have recorded my thoughts on this subject in a number of articles over the past several years. With the Chair's permission, I will submit certain of these for the record.

Civil aviation has been a target of terrorist activity for more than two decades, yet the evidence that we are unable to take innocent air travelers off the target list is as fresh as last week's headlines.

As a nation we have not always dealt in a consistent and systematic fashion with the problem. The span of public attention given to assaults on our aviation assets is normally quite narrow. If PAA 103 had been carrying a load of US servicemen and dependents, foreign tourists, and retired Baptist conventioneers, it is arguable that the issue would not now be the subject of a Congressional hearing.

Instead, the passenger list included a heavy representation of the sons and daughters and brothers and sisters of people who understand the levers of power in this country, where they are, and how to work them. And they are moving to assure that something redemptive will come of their grievous losses.

Perhaps they will succeed.

Nothing will come of the effort if it is diverted into scapegoating and fingerpointing. There were certainly failures -- some of them difficult to understand -- in Pan Am's security provisions. Clearly these need to be examined.

But Pan Am's failures are symptomatic of a larger difficulty, and that difficulty shouldn't be obscured, nor attention to it diverted, by the temptation to eviscerate a great American airline.

The overriding difficulty we have in protecting our airlines is systemic: our carriers are private; they operate in the free market. In normal circumstances, the federal government has a virtually unlimited ability to regulate them, and almost none at all to help them.

These attacks on our airlines are nothing less than an attack on the United States. We can turn our backs on the implications of that reality if we wish to do it. This is not going to alter the fact that the greatest damage done here is not that which is done to one of our carriers, but that which is done to our national interests.

To be denied freedom of the air at this end of the 20th Century would be as inimical to American interests as to have been denied freedom of the seas at the other end of this century. We were willing to go to war to protect the right of American vessals to ply the seas safely and uninterrupted. Today the skies are our oceans; we have to keep them open.

Last week Secretary of Defense Cheney summed up the case for a US military role in the effort to contain the threat of narcotics. He said the narcotics trade is an assault on the national security, and it is the responsibility of the military to defend our national security. That simple insight, put to work, will do as much to protect our country as all the trillions of dollars committed to the purpose in the past ten years.

The Secretary was acknowledging the impact on the United States of a type of aggression which we have not previously been willing to define as an act of aggression. These activities fall within the framework of what we now call Low-Intensity Conflict. Terrorism falls within the framework of what we call Low-Intensity Conflict. Hijacking and bombing our air carriers is terrorism -- it *is* Low-Intensity Conflict.

Does this mean we should deploy military force to try to deal with threats to our civil aviation? In some instances, it probably does. But that is not the principal point. The point is that the government cannot decline a role in preventing the hijacking and bombing of our carriers on the grounds that they are private -- that somehow, presumably, they have to produce their own solution, perhaps a market solution, to the problem of terrorism.

On the other hand, the matter of assigning responsibility for these issues within the government does not seem as simple to me, as it appears to be to others. There are those who maintain that when an airplane gets blown up by a foreign government, the FAA isn't doing its job. The same logic suggests that if one of our merchant vessals was attacked and sunk on the high seas, the Federal Maritime Administration wasn't doing its job.

The problem does not rest at the feet of the Secretary of Transportation, or of the Federal Aviation Administrator. It is broader than their present charters. And it is certainly broader than anything our airlines were ever expected to have to handle.

It is not necessary to elaborate an argument that I think is self-evident. We have been seized with this matter long enough to have some idea of what is required to tackle it.

First, we must see the national air system as part of the transportation infrastructure of the United States. Our air travel system is as important as our federal highway system, or our rail system. We must be prepared to take whatever steps are necessary to preserve and defend it.

Second, going specifically to the matter of security now, we must adjust the burden of responsibility for aviation security. We need to emphasize the obvious distinction between safety and security. The carriers *should* be responsible for safety, and they are. It is something they can do, and they do it superbly. Security is a separate problem, far beyond their competence, and it shows. Yet, under assumptions that go back to the open cockpit, they bear the primary responsibility for security.

Security is a whole system; it is not an x-ray machine, a magnetometer and a handful of half-managed rent-a-cops.

Security begins with an understanding of the threat it faces; our intelligence services must provide this understanding. They don't do it especially well, and it isn't especially easy to do. The FAA should have an independent intelligence capability. They have now a small analytical capability, and they must rely substantially on what our other services provide them. This is not adequate.

Our intelligence services do not have uniquely configured elements to deal with aviation intelligence. More to the point, competition between the services leads to failures to share information between themselves and, an extension of the attitudes that govern these relationships, they give consumers like FAA what they want them to have. What they want them to have may not always be what they need.

An assessment of the threat is part of the system of security. Having as accurate a grasp of the threat as we can get, we have a better sense of where to direct finite resources. Within the framework of this understanding, we look next for the threat to aviation at the place and point of ticket acquisition.

In the case of countries that have a national airline, a relative handful of planes, few routes, passengers drawn from a small and definable universe, national intelligence support, and a national treasury to subsidize security, it is relatively simple to narrow the focus of attention to prospective threats.

In the case of the United States, moving something between one and a half to two billion air passengers a year now, we have to seive the threat universe to get it down to managable proportions. We still have to develop the means to do this. But this, too, must be a part of the system. The time and place to deal with a threat is when and where it begins, not when and where it arrives. This is an ideal not likely to be achieved often but, like any ideal, it sets our course.

Third, aside from improvements in intelligence, and methods of seiving the threat universe to manageable proportions, the air terminal itself gives us our last best chance at stopping a threat. The process begins at the airport perimeter and moves from there inward, in a series of layered defenses, some of them apparent, some not. Look at the air terminal as a giant car wash: what comes out the other side should be clean.

This suggests that the terminal operators ought to have at least as large, if not a larger, responsibility for security than the carriers. Here again, the current division of labor is antiquated, going back to a time when the "terminal" was the hangar where the aircraft was parked and serviced.

As a static facility, the terminal offers a terrific opportunity as a laboratory/test-bed, and showcase for trying new technologies, procedures and concepts in security to see what works and what doesn't before fielding them.

Baltimore Washington International is doing excellent work in this regard; our aviation security would benefit from replicating and expanding such efforts at selected airports around the country. I have spoken at length to people in the industry on this point, and there seems to be broad agreement on the utility of such real-time R&D projects.

We should use the terminal in the integration of our security systems to teach us what things will help.

In the matter of new technologies, before leaving this point, I would mention the Thermal Neutron Activator (TNA), and the controversy that surrounds it. It is always easy to criticize new technology; it always involves change, and it usually involves expense. And there will be conflicting points of view on it. One of your witnesses, for instance, has argued against the utility of the X-ray machine for finding bombs. Yet, our X-ray machines *do* find bombs.

The point here is at the heart of the systems integration process. No single element in the system is a panacea -- if it were, you wouldn't need the rest of the system in the first place. Each part contributes something; nothing is 100% the right answer for any given threat. What you are trying to achieve is a combination that gets you as close to 100% as you can get. Certainly the TNA machines have a contribution to make in this regard, and I think Secretary Skinner would be remiss in not pressing forward with their deployment as he has.

Cost-effectiveness is always an issue in these matters but, stipulating that, the next test is not whether a device is perfect but whether it helps.

Fourth, we have to pay much closer attention to the personnel side of the security equation. At the present time, the economics of security appear to militate in favor of hiring entry-level minimum wage people. They often get little or no training, they have frequently the most limited "people skills," and the turnover rates among them are wholly inconsistent with the requirements of an effective security system.

Put minimum wage people on a million dollar machine, give them little or no training, manage them like entry-level people, and you will get minimum wage performance out of your million dollar machine.

Obviously, this approach constitutes a false economy. We can broaden the security labor pool by reaching out to retired people, to college students, to housewives and others who want to work and can't put in a 40 hour week. The empirical evidence suggests that these people can often be hired at not much above minimum wage, and the "people skills" they bring to the job can help improve -- just by observation and imitation -- the skills of the entry level workers.

Coupled to a more imaginative hiring philosophy, we will benefit from a systematic approach to training security personnel.

This is an area in which the FAA may need additional authority, to standardize training requirements for security personnel, and to assist in bringing training regimes up to those standards. We need, and we can get, training procedures that are consistent, state-of-the-art, congruent with the threat, inexpensive and, of course, secure.

Increased productivity will offset the increased labor costs, and by treating entry-level workers as valued employees -- especially by training them -- you will increase retention rates. From this you get better security because you get the value of experience.

Fifth, and finally, without regard to the larger questions of airline regulation, someone in DOT or FAA should have broader authority to regulate the aviation security industry itself. This would include, as mentioned, standardization of training, but it would also include procedures for reviewing the backgrounds and qualifications of those working within our aviation security systems.

This may sound complicated, especially in the case of foreign hires. But it is hardly impossible. Our embassies vet their local national hirees, and so do other businesses. I see the importance of this continually in my own business.

The unfortunate case of the head of Pan American's Alert system in Europe at the time of the 103 bombing is not merely a reflection of inadequate security management, but specifically of an apparent failure to pay attention to who they were hiring. American lives should not be entrusted to people who place no value on them.

In another instance, the head of a foreign intelligence service, cashiered at home for his role in covering up two murders, turned up in this country about to be hired by the Port Authority at one of our major ports of entry, ostensibly to conduct a "security survey." He had no background in the work; his work was intelligence. The Authority discovered the man's background at the last moment and terminated his contract.

Our air terminals and our airlines are, as I noted at the outset, of a piece with the fabric of our national security. The intelligence from information that can be gathered through a properly run aviation security system is considerable.

Access to such a system would permit one to know who is flying and with whom, to where, when, and for how long; it would permit one to learn what is being shipped, when and where and in what quantities. This information, combined with collateral information, would constitute useful intelligence for commercial and financial exploitation.

Insofar as shipments between governments, and between corporations and governments may be involved, the information could be of strategic interest. Additionally, our airlines are part of our civil reserve aviation fleet, eligible for mobilization in the event of contingencies affecting our national security. The modalities of this process would be of value to other governments.

I suggest we need some better sense than we now have of who is working around our air system.

In closing, I want to reaffirm to the Chair my conviction that many of the difficulties we have faced in this matter are organic. They are not often somebody's "fault." They result from the fact that the threat to our interests usually moves ahead of our efforts to meet those threats.

Any assault on US private sector assets, outside the continental United States, raises difficult jurisdictional questions. When the problem occurs in the air or on the high seas, those questions can be further complicated, and when they involve the lives of some people entrusted to the care of others, the problems get even more complex, as well as deeply felt. There is no road map for federal agencies having to deal with such complexities, to do it with limited authority, and with limited resources.

With all the skill and considerable dedication at the disposal of the Secretary of Transportation within his Department and within the Federal Aviation Administration, it is still true that in addressing the bombings and hijackings of our civilian airliners they are grappling with problems never anticipated either in their charters, nor in the governing principles of a peacetime United States.

Thank you.

Mrs. COLLINS. Mr. Chairman.

Mr. CONYERS. First of all, I thank all of the witnesses for their statements.

I am going to ask two questions:

I am going to ask security consultant Isaac Yeffet about his reporting in 1986, to summarize its key points.

Then, of course, I am going to ask Mr. Cunningham what happened in terms of the failure to implement or the implementation as it may have occurred.

So you may divide this time accordingly.

Mr. Yeffet, what was in your report? What did it tell us?

Mr. YEFFET. Allow me, sir, to ask Madam Chairwoman and members of the subcommittee to discuss this subject, while we have to go into detail, in a closed session, because the report was over 260 pages with the findings and our recommendations, and I believe that this kind of subject should be discussed in closed session.

Mr. CONYERS. Well, I want to talk about it in a closed session tomorrow, but you are the one that brought up the fact that there were some proposed changes that ought to be made. For example, adequate training.

Let me just trace—there are many ways to skin a cat, OK? Let me just trace what you said here. I believe you said there was inadequate training procedures and that the people themselves were probably relatively unskilled, and they were uncompensated. Is that correct? What can you amplify on that?

Mr. YEFFET. When we are talking about training security people, first, we cannot hire qualified people for $3.35 or $3.60 per hour. Nobody can hire a qualified security person to run the security of the airline at this salary. While we know that in the hands of the security people we leave the lives of thousands of passengers, the problem that the security people are coming to work not because they are looking at this just as a career, or a permanent job. While they were unemployed and they were looking for a job, they come to the security, they remain a couple of months, and they leave.

While I was doing the security survey for News 4 in Washington, I spoke with a supervisor at the National Airport, and I asked her how can I be hired as a security man? She told me that I have to fill out a form and to write what I did only in my last 5 years. And if they would find in the last 5 years I wasn't a criminal, they will call me.

I will be sent to a class to see what hand grenades, revolver, time bomb, and dynamite looks like.

From there they will take me for another 2 hours to see how to run x-ray machine.

Immediately after that, I will be in charge of running the x-ray machine and other job that they will tell me to do.

Thousands of lives of innocent people will be put in my hands.

When I asked her "can you see what is my age? I am not 25 years old."

She said, "This is not important. We are following FAA procedures. Only the last 5 years."

When we asked her how can I be sure that I will be hired, she told us—to the reporter and myself—that I have nothing to worry about. She can assure me that I will be hired because they have problems with the security people that they are hiring. They remain in their position until the day they find another job with a better salary and they leave.

Nobody told me even once that he is looking at the security of the airline as a permanent job.

Mr. CONYERS. Of course that is not the employee's fault. We have got some massive unemployment in this country, and people get jobs wherever they can. What about the requirements in the Federal Aviation Administration on the airline? What about the airline itself, in terms of the regulations and the kind of and quality of personnel that they are supposed to recruit at the FAA?

Mr. YEFFET. They know much better than I do what are the low level of security that the airlines are hiring, and they told the airlines that they know that they are looking to sign a contract with the cheapest private security company.

Why the FAA didn't force the airlines to change this concept, this attitude, I cannot answer, sir, but also the FAA knows, as I know, that owners of a restaurant started to bid to get contracts with the airlines, and they went to security people at airports by trying to convince them if they will work for them, they will add to their salary food from the restaurant.

When Dulles Airport private security company failed almost a third of the tests that were made by the FAA, almost 7 times from 21 times they failed in the test. They decided to fire the company.

Mr. CONYERS. What happened?

Mr. YEFFET. I have learned—and I hope that I am not wrong from the information that I received—a new security, private security company has been hired. They just change the uniform of the security people, and the same people that failed in the tests are continued to running the security, sir.

Mr. CONYERS. And maybe working there right now?

Mr. YEFFET. It is possible.

Mr. CONYERS. To what extent did Pan Am comply with the report that you filed in 1986?

Mr. YEFFET. I would appreciate it, sir, if we can leave the discussion about our report about Pan Am for the closed session.

Mr. CONYERS. All right.

Well, let me ask Mr. Cunningham, the director of security presently, for a response to the comments that he has heard.

Mr. CUNNINGHAM. Yes, thank you, Mr. Conyers.

I think Mr. Yeffet is saying two things there. I am not sure he realizes exactly what he is saying.

First of all, I think he is supporting what you hear from everybody else, that airlines security needs some help from the Government and it needs some very much direct involvement in it. It needs more than regulation, oversight. It needs active assistance.

What I also think he is missing is he is missing the basic fundaments of our American system when he is trying to impose the El Al system one for one, or the Israeli system one for one on U.S. carriers. I don't think that works.

For instance, he talks about 5 year background checks, why is that all we do? One of the problems we have doing a background check is, of course, we run into the Privacy Act issues. We are not going to get a tremendous amount of information from the State or

Federal Government. All we are going to get is an arrest check. We are not going to—conviction check, rather. We are not going to get arrests, we are not going to get information from terrorist files. That is a difference between the system he is speaking of in Israel.

Second, he is speaking of the awareness. That very definitely is true here. As somebody said, when an Israeli child gets on a bus, they reach under the seat to see if there is a bomb there. We don't do that anywhere in the United States. I think if anybody rode the bus or metro this morning and you reached under the seat, you were looking to see if your brief case was still there. You weren't looking for a bomb. That level of awareness is not present in our society throughout the United States today.

I think that is the biggest difference in what Mr. Yeffet is dealing with.

Mr. CONYERS. Let me just suggest to you that the Privacy Act is a law that deal with the release of information on individuals voluntarily. It has nothing to do with the background check in this kind of case.

A Government check doesn't go back 5 years unless you specify more, and a FBI background on any citizen covers his entire lifetime. There is no statute of limitations on how far back you go.

Mr. CUNNINGHAM. We don't have access to that, Mr. Conyers. That was my point.

Mr. CONYERS. The FAA does. You could, too, if you wanted to. All you have to do is ask the person that is applying in the application to OK a background check for all kinds of work. That is a standard requirement.

Now, let me allow Mr. Yeffet to make a comment.

Mr. YEFFET. Mr. Cunningham said that in my words maybe it is unrealistic to build a security system like El Al. Allow me to emphasize, America is a big target for terrorism and Israel is a big target for terrorism.

It is true that El Al is a small airline. The question that should be asked, Madam Chairwoman, the very few millions of passengers that are flying with the small El Al airlines, do they have the right to fly safe and to be secure and the many millions of Americans that are flying with a big American airlines, don't they have the same right to survive, to be safe, and to be secured.

What happened 2 years ago when a big American airline decided to start running their security similar to El Al. Did they change unrealistic to realistic?

The fact that we are calling America to see Pan Am 103, as the last tragedy of this country, and it is in our hands to build a good security system. The fact that many millions of Americans are flying with big American airlines, when we ask that they have the same rights to fly safe and to be secured like El Al, this is not realistic?

This is—there should be no differences between El Al and the American carrier. Are we looking only to react and to be always behind the tragedies and then to ask ourselves what happened? Why this happened? What we should do now that this won't happen again?

So what about the FAA, I just read in the newspaper, that they made inspections at Pan Am in Frankfurt three times this year and are looking to fine them more than half-a-million dollars because of the lack of security that they found.

I believe that the same results that they found in the inspection this year, they could see it in 1986, 1987, 1988, and we—might have saved lives of the passengers of flight 103.

The same I can say about PSA 1771 on December 7, 1987. If one of the FAA inspectors that went to test the security people of PSA at Los Angeles, and talk to the people to understand what kind of level of security people are running the security there, what they would have learned, how they implement the procedures, and would find that nothing was implemented.

We cannot allow ourselves only to react. After flight 103, I am listening to what kind of effort and pressure is being put into buying the TNA? Is the TNA—will it really solve our problems of the security of the airlines?

What I have learned is that 2½ pounds of plastic explosives cannot be identified through the TNA, are we ready to invest millions of dollars when everyone knows that less than 2 pounds of SEMTEX, which is the plastic explosive, will be more than enough to blow up a 747?

I don't believe that we are not making mistakes in this country by putting all our trust and faith on equipment, on machines only.

Mrs. COLLINS. Mr. Yeffet, if I may, one of the things we will be discussing tomorrow in the executive session is some of the technologies that are available and potential technologies that are available. Perhaps the TNA will be one of those we will discuss.

We aren't going to discuss it in detail at this particular time.

I would like also to move on to my questions. I would like to start with you, Mr. Cunningham.

Were you at Pan Am in 1986?

Mr. CUNNINGHAM. No, Madam Chairwoman, I was not not.

Mrs. COLLINS. Do you happen to know about operation Alert?

Mr. CUNNINGHAM. I have some limited information about it, yes.

Mrs. COLLINS. I have been told it was described as something that Pan Am advertized as being the most secure airline in the United States, the world—or something like that—of all the air carriers for the United States, and all those kinds of things. When did you come to Pan Am?

Mr. CUNNINGHAM. I came to Pan Am in August of last year, 1988.

Mrs. COLLINS. What kind of security measures can you talk about now that were in place at that time?

Mr. CUNNINGHAM. Pan Am had Alert functioning in several of its cities both in the United States and Europe.

Pan Am complied with the FAA requirements throughout our system. I think the Alert was an effort to remedy some of the problems that Mr. Yeffet may have talked about and may have found in 1986, and on a level to raise the awareness and level of security.

Yes, I believe that——

Mrs. COLLINS. Was that to raise the level of security within Pan Am or for the passenger to have the impression Pan Am was safer than perhaps some other U.S. carrier?

Mr. CUNNINGHAM. I think it was a genuine attempt to raise the effectiveness of the level of security.

Mrs. COLLINS. Can you tell us at this time—I know you will be back tomorrow for our executive session—can you describe to us at all Pan Am's security operations at the time of the December 21, 1988, bombing when you were a member of the Pan Am staff?

Mr. CUNNINGHAM. I think maybe that is something we should do in a closed session.

Mrs. COLLINS. Can you tell us about any changes you have made since then?

Mr. CUNNINGHAM. Yes. But again I think we should do that in a closed session. There have been some changes. Of course, we believe security can't be a static system. It has to be one continually upgrading, a program to stay ahead rather than look back, as Mr. Yeffet said.

Mrs. COLLINS. How do you do that?

Are you making monthly analyses of situations as they develop? Or is it just a one-time shot in the arm and you aren't going to do anything else until perhaps another tragedy occurs?

Mr. CUNNINGHAM. We are continually redoing our security across our system. We have people look at it on a monthly or quarterly basis depending upon the situation. We have people reviewing it regularly. We are attempting to put in systems that will prevent another incident as opposed to looking back on one, seeing what we can do.

Mrs. COLLINS. The 1986 study that was done by KPI seemed to have indicated that Pan Am's security was somewhat lax. In fact, the findings were, I think, pretty damaging. Could you comment generally on Pan Am's response to those findings, Mr. Ford?

Mr. FORD. I would like to preface my remarks by saying from a personal standpoint and from a professional standpoint this is much more than a Pan Am issue. I understand why Pan Am is the focus here today, but I would respectfully request that my remarks be interpreted from an industry standpoint as opposed to one of looking to find fault on Pan Am 103.

Mrs. COLLINS. In my opening remarks I said we weren't trying to find fault or assess blame. We were trying to discuss a situation of security for all our flying public, not just for Pan Am.

Mr. FORD. I understand that. I am looking to confirm it.

Mrs. COLLINS. Your comments are well taken.

Mr. FORD. I think in 1986, if I go back to May, I believe May 5, 1986, I met with the chairman and vice chairman of Pan Am regarding the formation of Alert, and I walked away from that meeting believing as I think both those gentlemen did, too, that this was an undertaking of the utmost priority, certainly a strong seriousness of purpose and it was our intent at that particular time to establish a security system both domestically and internationally that would be the model of the industry and, in fact, hopefully it would be so strong that other airlines and people engaged in public transportation would contract with us to help them implement the same level of security.

Mrs. COLLINS. What were the differing views of Pan Am regarding those approaches to security?

Mr. FORD. Excuse me?

Mrs. COLLINS. What were the views of Pan Am about the various approaches to some of the suggestions made by the Alert program and others?

Mr. FORD. Well, I think there were two distinctly different schools of thought, like you would have in any other industry on marketing issues and so forth. One was the traditional security viewpoint which was if you are in compliance with parts 107 and 108, then what you have is adequate, and the other school of thought was that parts 107 and 108 was no longer adequate in terms of the terroristic threat and that the level of security had to be greatly enhanced and it had to be greatly enhanced in a very short period of time.

I was in the latter school and the director of security at that time was in the former school.

Mrs. COLLINS. Which view prevailed at that time?

Mr. FORD. I think in the early stages of Alert, the more aggressive approach, of developing a first class, very effective security system was the overriding objective.

Mrs. COLLINS. KPI—in the KPI arrangement that they had with Pan Am, it called for a phase 2, during which certain recommendations were to be implemented.

Do you know whether or not those recommendations were ever implemented?

Mr. FORD. No, I do not. I left that particular program, I believe, in August 1986.

Mrs. COLLINS. My time has expired.

Mr. Nielson.

Mr. NIELSON. Thank you, Madam Chairwoman.

I have about 50 questions I would like to ask. I don't have time for that many. I would like to submit some in writing.

Mr. Cunningham, first of all, how does Alert fit into Pan Am's corporate structure and to whom does Mr. LeBlanc report?

Mr. CUNNINGHAM. Alert is a subsidiary of Pan Am Corp. today. Mr. LeBlanc, the president of Alert, reports to Mr. John Lindsay, senior vice president and general counsel of Pan Am.

Mr. NIELSON. What kind of background checks are done for the people you hire to work for Alert? Do you make background checks of personnel in general and foreign nationals in particular?

Mr. CUNNINGHAM. Yes. We do what we can with the minimum 5-year background and go beyond that if it is possible. In foreign countries, it really depends upon what the law of that country permits us to do.

Some of them are very restrictive. Some of them the Government has to do the complete background for us. Some we can do virtually nothing.

Mr. NIELSON. What is the average turnover rate of personnel in Alert?

Mr. CUNNINGHAM. I don't know, Mr. Nielson. I would be happy to get that.

Mr. NIELSON. What is the average hourly wage and starting wage for Alert personnel in London and Frankfurt? There was an allegation earlier both by myself and another person that the wages are very nearly minimum wage.

Do you have any notes on that?

Mr. CUNNINGHAM. I can speak to Frankfurt. That is the only one I can tell you off the top of my head. I know Frankfurt, our wage is the same as other American carriers there which I am sure is above the minimum wage.

Mr. NIELSON. I have a question for Mr. Yeffet. I appreciate your testimony.

One part of your statement which you did not read says that we have an open invitation for terrorism because we use curbside check in.

We check bags at the curb and don't necessarily accompany those bags to the aircraft. How does that differ from checking bags in at the counter?

We don't necessarily go to the airplane after we check in at the counter either, do we?

Mr. YEFFET. Today, at every airport in the country, everyone can go to the curbside of the terminal, giving the sky cap luggage, packages, whatever he wants, telling him please send this luggage to this flight number, this destination, and the luggage will be going straight to the belly of the aircraft.

Mr. NIELSON. Don't they do that for ticket check-in at the counter also?

Mr. YEFFET. They do the same. There is no kind of security check of any luggage that is going to the belly of passenger aircraft on domestic flights. The worst is that while I was doing the security survey for News 4 in Washington, we went to National Airport and we were surprised to see that people took their luggage and they themselves placed luggage on the conveyor belt that leads to the baggage room and from there to the aircraft.

Even the sky cap didn't have to do it, and News 4 filmed pictures while we were doing our security survey.

Mr. NIELSON. In Amsterdam, when I was flying through there a year or so ago, they had us check the luggage normally and then that luggage was sitting out in front of the aircraft. We had to identify our luggage that went on as we went on.

Do you think that would solve the problem?

Mr. YEFFET. I think the system in Amsterdam, while I am familiar with the system on certain flights, no passenger can send his luggage without searching him and by opening his luggage.

Mr. NIELSON. We didn't open the luggage. What they did is, they checked it, and then they had the bags there and then only those bags which we would identify as our bags went on the plane. There were several bags left there because passengers who checked those bags did not go on the plane.

Do you think that would help at all?

Mr. YEFFET. No. I saw how they searched luggage. If they didn't search the luggage, the fact that they brought the luggage in front of the aircraft and every passenger has to identify his luggage, this didn't solve the problem of the security.

Mr. NIELSON. It does mean no one is going to take luggage on unless he is going on himself. In other words, you don't have unidentified or unaccompanied luggage.

Mr. YEFFET. Not only to identify.

Mr. NIELSON. That is all I wanted to know. Do you think——

Mr. YEFFET. No, because not only terrorists are sending explosives and flying with the aircraft. They are ready to commit suicide. We know how innocent people or criminals that they are believe that they are smuggling drugs and they don't know that they have explosives.

Mr. NIELSON. You are saying it doesn't go far enough. Don't you think it would be helpful to at least make sure no bag goes on unless the person is going to fly with the bag?

Mr. YEFFET. This is the minimum.

Mr. NIELSON. It is a lot more than we do in this country.

Let me relate also, I flew to London on a Pan Am flight just recently, and then from London on to the United States. They took the luggage off in London. We had to go through security luggage screening three more times. Pan Am leaned over backward to check it many, many times in London, even though it had been checked at the beginning point going to London, and it was going to go on by another Pan Am plane on to New York.

And I felt that they overdid it almost. A lot of the passengers were grousing and complaining, "We have done it three times," et cetera. I was among that group. How do we change our attitude, including mine, that maybe we should be willing to go through that?

Mr. YEFFET. By simply having a system that the security people—will know and will be trained well, and to understand how to run the security. By doing nothing it won't be helpful for the passenger, for the airline or for the security.

Mr. NIELSON. Has my time expired? I assume we will have another round, at least? Thank you.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Thank you, Madam Chairwoman.

Mr. Cunningham, you are in charge of Pan Am security and were the date of the crash. Yet, when you had a chance to summarize your statement, I was very disappointed and rather shocked that you said about two dozen words to us, which essentially were boiled down to, "We can't do any more, the government has to do it."

In your written statement, and I am quoting, you say, "Private air carriers alone are ill-equipped and ill-suited to the task of combatting international terrorism."

So, I am assuming you think it is the Government's responsibility. My question to you is, what should we do right now? What is the first thing this panel should recommend to our colleagues that the Government do?

Mr. CUNNINGHAM. I didn't mean to leave you with the impression I am saying it is only Government's responsibility. Certainly that is not true.

Mrs. BOXER. What is the first thing Government can do to help?

Mr. CUNNINGHAM. I think the Government can provide us with a system, for example, the FAA can provide us with a system which will work with us as partners. I don't think the FAA has all the answers. I don't think the Government has all the answers.

Mrs. BOXER. I hate to interrupt, but I have to because of my time limitations. What do you mean by a system?

Mr. CUNNINGHAM. I think the Government has more of a responsibility to us than merely being a regulator, looking at us and saying, we put the rules in, you must follow them.

Mrs. BOXER. What do you want us to do?

Mr. CUNNINGHAM. I think what they have to do is help us follow the rules. They have to provide us with some intelligence, some assistance in training; they have to provide us with some assistance—one of the big keys in the El Al system, why it works so well, is it is a Government-manned and Government-funded system.

Mrs. BOXER. You would like to see a Government-funded system to help you carry out a plan that has developed jointly with the airlines, the airports, and the Governments. OK.

Right now, you have a security system in place. What percentage of your gross receipts do you spend on that security system?

Mr. CUNNINGHAM. I don't know. If you would like, I will get figures.

Mrs. BOXER. I would like to know that. Also——

Mrs. COLLINS. Will the gentlewoman yield?

Could that information be provided in a very timely fashion, so we can close the record on this hearing? We would like that information within the next week, so we can get our report on the hearing out.

Mrs. BOXER. As a security officer—maybe I can follow up on my question—you certainly must have some notion of what percentage you ought to spend on security, do you not; that you recommend to your carrier?

Mr. CUNNINGHAM. A percentage of our gross receipts to be spent? No.

Mrs. BOXER. You just design a system and specify the money you need?

Mr. CUNNINGHAM. We design the system and submit for budget, yes.

Mrs. BOXER. OK.

Mr. Yeffet, I was very taken by your testimony, it was very strong, and I think that you have the credentials. You stated that you do not believe Pan Am made any changes after your report; is that correct? Any changes of note in their security system?

Mr. YEFFET. No. What I said, that first I would like to discuss some details, this subject, in a closed session. No. 2, I said what the FAA found during their inspection this year in Frankfurt, I said that I believed that they could have found the same results in 1986, 1987, 1988. I didn't go into details.

Allow me to add to your question to Mr. Cunningham, to throw the ball from one group to the Government, this is the easiest way. If the airlines would run their security as the FAA even told them—and I am not going to talk about what is good now or what is bad, but if the airlines did the minimum to implement the FAA regulations or procedures, I have no doubt that we would have a better security.

If the airlines would put the right priority of the security on the right level, we wouldn't have what we have today.

Mrs. BOXER. I understand your point. You don't think the American airlines are doing enough. I want to ask you to comment on Mr. Cunningham's written statement, in which he says—and I really am interested in your reaction—that any perception that foreign carriers are more secure than U.S. carriers is illusory, and he goes on to say U.S. carriers are required to implement rigorous security measures.

Most foreign carriers have far fewer screening procedures than U.S. carriers. He said American citizens are as a result placed in jeopardy when they travel on these foreign airlines.

Is that your opinion, that the foreign airlines are less safe than the American airlines? Do you agree with Mr. Cunningham?

Mr. YEFFET. No. I disagree. I don't think that he is right when he is making this kind of statement, because where is our security in this country, that when we compare it to a—another foreign air carrier, where is the good security system that we can put our finger on and say, here we are better than the other carriers?

Let's check ourselves to make sure that we built our system even 30 percent, 40 percent, or 20 percent to prevent disasters; and then to go and to look at the other foreign air carriers and to compare it. It is good to compare to see if I am better or I am worse, and what I can learn from other carriers that I can implement in my airline.

But just to testify by saying that we are better than others, I think it is a mistake and we have to be careful by using these kinds of words when we know what kind of security we have in our country.

Mrs. BOXER. Madam Chairwoman, I will hold off until the next round, but I think Mr. Cunningham would like to defend his statement, if that is all right with you? Thank you. I really appreciate that. I know the strict rules here.

Mr. CUNNINGHAM. I think some of the point is being missed here on what I said. I said certainly, that I think that no foreign, non-U.S. flag carrier does some of the things that U.S. flag carriers do.

For example, Mr. Nielson, some of the things you spoke of in London, I certainly don't think you are going to see that on a foreign carrier. I am certainly not saying that we are living with the system we have today, and that we are not going to learn from what some other people do.

Unquestionably, we do. As I said several times, airline security can't be a static system. It has got to be a dynamic one. What we have today that may work for today, September 25, may not work on October 1. We certainly have to be looking at those things and have to be moving forward.

But I think that no non-U.S. flag carrier complies, certainly, with the FAA requirements. They are not required to do that. And I don't think any of them go beyond the security you see on American carriers any place today.

Mrs. BOXER. Thank you, Madam Chairwoman.

Mrs. COLLINS. Mr. Ford; and I am going to get off this—I am so sorry. Mr. Cox.

Mr. COX. Thank you, Madam Chairwoman.

Mr. Koch, I think your years of experience as Director of Special Planning at the Pentagon can be of great value to us. I want to compliment you on your testimony, which I think was right on the mark.

In your testimony, you said that our intelligence services are not properly sharing information even among themselves, let alone with private airline carriers. You recommend that FAA develop its own intelligence capability.

I wonder if you could expand on that?

Mr. KOCH. Sir, I think it is a simple fact of bureaucratic competition and turf protection and turf building that your intelligence services don't share information as well as we would like them to do.

In addition to that point is the fact that there are certain kinds of aviation, intelligence that relates to aviation, that is unique and specific, and that our existing services don't pursue these kinds of intelligence.

We think that we need a separate capability that develops what are called essential elements of information that can be pursued within the framework of an institution that has specific understanding, specific responsibility for aviation itself.

I think that the difficulty in doing that—and may I say also, a great deal of information that is useful to you is in the public domain. It is open source information. It is a question of how to analyze it, how to deal with it. We are not presently doing that. I think we need to do it.

Mr. COX. You have also noted that the air terminal itself ought to be a better security perimeter than presently it is. In fact, you compare it to a sort of giant car wash, where we ought to think of everything coming out of the terminal as clean, if we can possibly attain that goal.

What might we do at the terminals that we are not doing presently?

Mr. KOCH. If I could step back from the terminal, Mr. Cox? This problem begins back with the assessment of the threat that you are dealing with. Then it runs through ticket acquisition, so by the time you get to the air terminal perimeter itself, you ought to begin to cull out some of the threat universe you are dealing with.

If we are going to wait until we get to plane side before we worry about getting rid of the security threat, we are not going to do it.

Mr. COX. Am I right that that would require the carriers to have much more intelligence information than presently they do have?

Mr. KOCH. That is correct. That is correct. They need it.

As far as the terminal itself is concerned, terminals right now are great shopping malls. They are extremely vulnerable to penetration. It is possible to put the equipment on an aircraft through the vendor system, through the catering systems, all of these are extremely vulnerable today.

I think we need to pay much more attention to that, and a little bit less, at least as much attention to that as we are paying to the carrier and what it does.

Mr. COX. In your view, does the FAA presently have regulatory authority to address these concerns?

Mr. KOCH. FAA is clearly a regulatory agency. We always have difficulty when we try to push a regulatory agency into roles such as intelligence collection. They have an analytical capability. It is good as far as it goes, but they have no collection capability.

Any time you push them into an operational role, you are changing very substantially the charter of that organization. It is going to require some substantial adjustments to make an accommodation.

I would like to say, too, this question of whether we do what we do as well as other people do what they do, there is a question of what is practical in this business. We fly—this year, we will probably fly between 1.5 and 2 billion people.

Then you take all the luggage and multiply that out to see what we have to deal with. It is a much larger problem than these smaller foreign airlines have to deal with. Added to that is the fact we have a threat because of our political position in the world that Scandinavian airlines and other small airlines don't have.

I think it has to be taken into consideration when we are making these calculations. We are really comparing apples and oranges and leading ourselves to a conclusion that the solutions to this thing maybe are not as immediately reachable as we are being led to believe.

Even El Al has had great difficulties. In this business, luck—it is awfully good to have luck on your side. We are a lucky airlines. El Al itself had a short time ago, just a few years back, a bomb on an airplane that traveled all over Europe and came back home, that did not detonate because of a malfunction. It was pure luck that brought that about.

But that is not something that has generally been public knowledge. I think that is the sort of thing that is an argument for making clear to the public what the—what the terms of reference are we are dealing with when we address these issues and not to assume there is perfection attainable when it is not.

Mr. Cox. Thank you, Mr. Koch.

Mr. Cunningham, when I toured the Pan Am facilities in New York, I was made aware there is at least some intelligence sharing that presently occurs. For example, the airlines are made aware of the names of known terrorists. The problem, of course, is that terrorists generally don't check in and buy tickets under their known terrorist names.

What would you do with additional intelligence information if you had it? How could you use it? What do you have in mind that you want?

Mr. CUNNINGHAM. Well, I am talking about, of course, there are situations where there are names that are used or have been used in the past, and derivatives that are used. I am talking about information such as types of passports that are floating around that these groups predominantly use.

When a piece of information comes through, for example, that a group is planning something, maybe we should know some more about the group, about the current people that are operating within it, about their current methodologies, about what kind of technology this particular group might have, in order for us to take whatever resources we have and put it at the point where the—where it will be the strongest against the potential threat.

Mr. Cox. In your testimony, you made reference to restraints that are placed upon Pan Am by host Governments overseas. What are those constraints? How do they operate?

Mr. CUNNINGHAM. It varies from country to country. Some of them are that they object to the redundant screening processes we use, because some countries feel that it makes their—it indicates that their screening is weak.

In some places, we are not allowed to conduct background checks on various employees. It really runs a whole host of things.

Mr. Cox. My time has expired. I think this is an area we perhaps will follow up with in a subsequent round.

Mrs. COLLINS. Thank you.

Mr. Ford, can you tell us whether or not—and I understand you are very familiar with some of the considerations that were made and recommendations by KPI. Are you familiar with whether or not the—the question is, whether or not financial concerns were of major consideration in making these decisions about security at Pan Am based on KPI recommendations, as they relate to KPI recommendations?

Mr. FORD. I would have to assume there were some. As the lead factor increased in the summer of 1986—I think your chronology will show the lead factor was extremely low following the TWA 847 experience—that was part of the incentive that caused the initiative to form Alert.

As the load factor increased through the summer of 1986, although it was not anywheres near that it was the summer before, I think the sense of urgency was diminished in contrast with the expense that was being incurred through the implementation of the various recommendations of Alert or the KPI report.

Mrs. COLLINS. Mr. Cunningham, I believe in response to a question from the gentlewoman from California, you mentioned that your security package is put together and sent to budget. Has budget been very forthcoming, or do you receive the kind of financial support you need for a good security system at Pan Am today?

Mr. CUNNINGHAM. Yes, I think we do, Madam Chairwoman. I am asked to justify what we need, but I think, yes, it is a commitment there to provide the resources necessary to have an effective security program. Yes.

Mrs. COLLINS. Mr. Ford, can you address the question of whether or not there were extraordinary efforts made by Alert at JFK and Miami during your tenure?

Mr. FORD. The initial stages that received considerable attention were JFK, Washington Dulles, Miami, Los Angeles and San Francisco, the key international gateways of the Pan Am system, as they existed in 1986.

Mrs. COLLINS. And they were implemented, the suggestions and recommendations were implemented at those airports?

Mr. FORD. Well, there was—the KPI report, the survey being done by that group, was still in process. The changes that were made on—starting at JFK on June 12, 1986, were an enhanced level of security over what existed on June 11, and the enhancement included very basically more people, increased training, and increased utilization of detection devices; but again, all of these were on the format of parts 107 and 108, and had—were not implemented on the basis of anything that KPI was to recommend later on that summer.

Mrs. COLLINS. Mr. Cunningham, you also mentioned in response to a question by the gentlewoman from California that one of the things the Government can do is to provide you with certain kinds of intelligence. That has been discussed a great deal. My question is, do you today receive some kinds—you don't have to say what kinds—of intelligence today from FAA?

Mr. CUNNINGHAM. Yes.

Mrs. COLLINS. Did you have some prior to Pan Am 103?

Mr. CUNNINGHAM. Yes.

Mrs. COLLINS. I am not going to ask any more about that at this point in time.

One of the things that I think you mentioned in an earlier comment is that Mr. Yeffet mentioned there should be attitudinal changes about airplane security, and he talked about a number of things, and so forth.

Have you seen in Pan Am attitudinal changes about security?

Mr. CUNNINGHAM. Since I came, yes, very much so.

Mrs. COLLINS. Since you have been there?

Mr. CUNNINGHAM. Yes, very much so.

Mrs. COLLINS. Not just since Pan Am 103 but since you have been there?

Mr. CUNNINGHAM. Yes. Very much so.

Mrs. COLLINS. You saw a heightening of that awareness that you talk about so much since December 1988?

Mr. CUNNINGHAM. Yes. Absolutely.

Mrs. COLLINS. Pan Am has a history of dealing with foreign governments. Has this provided any particular benefit for Pan Am and, if so, how would you characterize your relationship with German officials?

Mr. Cunningham.

Mr. CUNNINGHAM. I think being the largest carrier in Frankfurt certainly is in a very good position to be in but also has some problems. It means we have a much more visible and vulnerable operation than any other carrier there merely because of size. I would characterize our relations with the Germans as generally very good, what they firmly believe in their programs of security and sometimes have trouble with us telling them that we must do certain things there.

Mrs. COLLINS. Well, shortly after the 103 incident, Pan Am modified security requirements. Briefly, what were those changes and how did the authorities in both London and Frankfurt react to those modifications?

Mr. Cunningham.

Mr. CUNNINGHAM. Briefly, the changes involved increased screening of both personnel and luggage, and I think they generally accepted them. Their concern is that another government is coming abroad and telling them in their country how to do business and what—infringing on what they feel is their role for safety. A problem I have with that process is that most of it requires us to go to the German authorities and say here is what we are being required to do.

Can we do that? If the case is that they say no, you cannot do that, it is up to us then to go back to the FAA and say we have this problem and here is what we are doing to comply. I have no problem changing our methods to comply and setting up an alternative system to comply but I think that is a role of government to deal, government-to-government, saying here is what we need.

Maybe in this particular airport you can help us do it a little differently.

Mrs. COLLINS. My time has expired.

Mr. Nielson.

Mr. NIELSON. Thank you.

Mr. Cunningham, just to follow up a little bit on earlier statements, other than Israel, the U.S. Government is said to have the most stringent security requirements. Do you agree with that?

Mr. CUNNINGHAM. Yes. I think that is true.

Mr. NIELSON. Mr. Yeffet disagreed when you said U.S. airline security is better than that of foreign airlines; you thought U.S. carriers are doing more than the others.

He took the opposite point of view.

Are there some other countries which are pretty good or pretty bad?

Mr. CUNNINGHAM. Yes. I think the levels vary, according to what their attitude is as well. I think if you go aboard an aircraft from France, from Germany, from Great Britain, or from Spain, I think you will see a noticeably different level of security than you will getting aboard a U.S. carrier, whether it be in the United States or overseas.

Mr. NIELSON. Mr. Ford, you were in charge of security at the time the KPI study was made. How did you react to that study? How did you react to what Alert was doing as compared to what was advertised and what actually happened?

Did you make any protest that perhaps Alert was a public relations gimmick that wasn't really forthright?

Do you have any comments of that nature?

Mr. FORD. Going back to May 12, when—of 1986—when Alert was formed——

Mr. NIELSON. Did you approve of Alert, by the way?

Mr. FORD. I felt the concept was extremely important to restore credibility to safety of travel across the Atlantic, yes.

Mr. NIELSON. Do you think it worked?

Mr. FORD. It didn't get a chance to work.

Mr. NIELSON. Why not?

Mr. FORD. Again, I go back to the two schools of thought. There was a group that felt this was overly aggressive, beyond the parameters of parts 107 and 108. There was an internal discussion within the company as to the merits of parts 107 and 108 versus the threat of gridlock, if the recommendations of KPI were adopted.

There was, to my recollection, not a great deal of discussion as to which parts of the KPI report, their initial survey, could be introduced without creating passenger gridlock, and the proponents of parts 107 and 108 was what we are required to do and that is adequate, they prevailed in that argument.

Mr. NIELSON. Let me ask you for tomorrow, so you will be planning ahead, why you no longer are security director at Pan Am and some of the other things.

I will ask that in the closed session.

Mr. FORD. I will tell you—let me clarify. I was the president of Alert when it was created to get the project started and to acquire the necessary technology and personnel to put it into place. There was another gentleman who was the actual director of security of Pan Am at that time.

Mr. NIELSON. Mr. Koch, this is a question you may or may not want to answer. It is a natural followup from your testimony and I am going to ask the question.

You stated in your testimony that terrorist acts fall in the framework of low intensity conflict. If that is the case, should the United States consider ourselves technically at war with those countries which promote terrorism?

Mr. KOCH. Yes, sir. I think it would greatly simplify the response of the executive branch and the authorities in the executive branch that have to provide for the national defense if that were the case. Having said that, it doesn't seem to me to be a very practical possibility.

We would, first of all, have to come to you folks up here and get your concurrence with what would be the practical effect of a declaration of war on these countries which would include Iran, Iraq, Syria, and Libya, at least. I am not sure that that is something we can do.

So we need some intermediate position that let's us respond to these provocations.

Mr. NIELSON. What would you suggest doing with these countries which harbor known terrorist groups?

Mr. KOCH. Well, there is some——

Mr. NIELSON. I am leading you a little.

Mr. KOCH. We are looking for exotic solutions. Why don't we go bomb Damascas and things like this.

Mr. NIELSON. I am not suggesting bombing anyplace. How do we handle it?

Mr. KOCH. Let me suggest in the wider terms of the debate, that is always something that is suggested. We have the Bonn declaration which is a protocol agreed to by various nations that provides sanctions against countries sponsoring this sort of activity or that interfere with the free operation of civil aviation.

Mr. NIELSON. Could we perhaps deny them landing rights in our country?

Mr. KOCH. That is anticipated under the terms of the Bonn declaration.

It is virtually impossible to enforce it.

Mr. NIELSON. Why do you suppose, Mr. Koch, people choose a foreign carrier in flying to and from this country rather than Pan Am or TWA?

What are the reasons?

Mr. KOCH. Why they fly a foreign flag rather than American?

Mr. NIELSON. Because of schedule advantages? Do they feel they are safer? They don't want the inconvenience our American carriers put them through?

Mr. KOCH. I am not sure that I——

Mr. NIELSON. Or pick another number. None of the above.

Mr. KOCH. You are suggesting people fly foreign flag for purposes of security. I am not sure the numbers would show you have a lot of people flying foreign flag in preference to an American flag carrier.

Mr. NIELSON. Mr. Cunningham, would you like to comment on that?

Mr. CUNNINGHAM. I think the answer would probably be all of the above.

Mr. NIELSON. All of the above? And in which proportion?

Mr. CUNNINGHAM. I am not sure I can answer that. I think very definitely there is some concern. There is another some concern about the security procedures. But I think it could be a variety of other reasons as well.

Marketing issues, service issues. I can't tell you a proportion. I think all of them are accurate, though.

Mr. NIELSON. Thank you, Madam Chairwoman.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Thank you, Madam Chairwoman.

I want to get back to this Alert. As I understand it—correct me if I am wrong, Mr. Ford—this operation, this company, Alert, this whole new system, there were big ads about it, was opened with great fanfare. It is my understanding from the staff research that in essence, what happened is that Wackenhut, the former contractor, merely sent Pan Am employees who were there before, for additional training. In fact there wasn't any separate operation, they just went back to the outside contractor, gave them a few more hours of training, and said they had this great operation.

Is that an incorrect——

Mr. FORD. I think from a management standpoint, it is inaccurate, because the management of Alert was totally separate from and did not at that time include hiring any of the Wackenhut top management personnel.

There was, in fact, a large percentage of the Wackenhut security guards who were in place prior to the formation of Alert. I would say there were at least 60 percent of the Wackenhut screening agents on June 11 were—left the employ of Wackenhut and became employees of Alert. But the supervision was entirely different.

Mrs. BOXER. So, what kind of training did these people get?

Mr. FORD. People received training in the basics, the same training they received at Wackenhut. I do believe it was more intense and more detailed.

Mrs. BOXER. Do you believe that?

Mr. FORD. I know for a fact it was more intense and more detailed than they received at Wackenhut.

Mrs. BOXER. How many hours of additional training did they get?

Mr. FORD. I can't say for certain, but I believe it was close to 40 hours.

Mrs. BOXER. You believe it was 40 hours of additional training.

Mr. FORD. I cannot say for certain. I was not involved directly with the training of the screening agents.

Mrs. BOXER. OK.

Mr. Yeffet, Mr. Koch says in his testimony—and I am quoting—"The carriers should be responsible for safety, and they are. They do it superbly. Security is a separate problem far beyond their competence, and it shows."

He goes on to say that what we need to do—and I am quoting—"The terminal operators ought to have at least as large, if not a larger responsibility for security than the carriers."

Do you agree with that? Yes, sir?

Mr. YEFFET. No. I disagree. I believe the airlines must be responsible for the security. They have to get help from the Government by asking them what kind of procedures we have to follow; somebody has to teach the airlines how to build a security system if they don't know how.

But it is their business as they run their airlines to make sure that the flight will always remain safe and secure, and not to think that somebody else has to run their security.

Mrs. BOXER. So, you feel very strongly that the airlines should be the major party responsible, and that is the major, I think, contradiction of Mr. Koch and Mr. Cunningham. I just want to say for the record, Mr. Ford, that your comment that there was totally different management seems to be in question here between Alert and Wackenhut, because Alert's current president, Mr. LeBlanc, was a former Wackenhut executive.

Mr. FORD. That is correct. But I didn't hire him. I believe he was hired after Pan Am 103.

Mrs. BOXER. I am not looking to blame anyone. I am just saying that currently, that is the situation——

Mr. FORD. Management hired for Alert in June 1986, was entirely separate from Wackenhut. I would just like to make, if I may, one additional comment on the training. Even if there were 80 hours or 40 hours or 120 hours of training really doesn't make much difference. Because the training was based on what part 107 called for, and I think that is the essence of this argument.

Part 107 is inadequate.

Mrs. BOXER. Well, we certainly do have to look at part 107.

I would like to change the focus to the minimum wage issue here, and again, Mr. Koch is very, very eloquent on this. He says put minimum wage people on a million-dollar machine, give them little or no training, manage them like entry-level people, and you get minimum wage performance out of our million-dollar machine.

I would like to ask Mr. Cunningham is he agrees these people ought to be paid more. If so, why aren't the airlines paying more?

Mr. CUNNINGHAM. I agree with Mr. Koch's statement. That is very definitely true. I think that if that were the attitude of the airlines back several years ago, I really don't think it is today. Because airlines certainly see that is the result you are going to get. I don't think there is any carrier out there today who is looking for the cheapest contractor, who will provide people, who will provide bodies to sit there.

In fact, there are many discussions going on as to what you have to give these people, or what you have to give the people you are hiring to get better quality.

Mrs. BOXER. What do you pay?

Mr. CUNNINGHAM. It varies. It has to vary by area. We have a package that is going to be above the minimum wage, will include benefits, health, life insurance benefits as well, and will include travel benefits.

Mrs. BOXER. Do you support our raising the minimum wage?

Mr. CUNNINGHAM. Yes, very definitely do.

Mrs. BOXER. Good. I am going to quote you in our argument with the President on this.

Madam Chairwoman, will we have one more opportunity?

Mrs. COLLINS. This is the last.

Mrs. BOXER. May I ask for 1 additional minute?

Mrs. COLLINS. I yield to the gentlewoman 1 additional minute.

Mrs. BOXER. I flew all night to get here.

Mrs. COLLINS. That is why I am being so lenient.

Mr. NIELSON. I flew all night also to get here.

Mrs. BOXER. This is good. This is upping the ante.

Let me ask a question to anyone who feels they can answer it. I don't know which one of you wants to answer this question. But if the State Department received a threat and reported it to its employees, and then told the airlines about the threat, that the airlines have a responsibility to inform the passengers, just as the State Department personnel had an opportunity to have all the facts and make a judgment? Yes, Mr. Yeffet?

Mr. YEFFET. I think it would be a mistake to publish a threat, and I hope that tomorrow in the closed session, I will have the opportunity to go into more details to answer your question, ma'am.

The fact that Government employees, diplomats, or anyone else took the information and told his relatives or his friends about the information to warn them, I think it is a violation, it is discrimination, and the authorities should investigate all those employees who received this information to find those who violated, that they were dishonest by using confidential information to their close friends or relatives.

Mrs. BOXER. Isn't it a pretty human thing to do?

Mr. YEFFET. No. Excuse me. It depends—it depends on what we are talking about. If it is a human thing to do, why don't the airlines, have the right to publish it? Why doesn't everybody have the right to publish it because it is a human being attitude. We are talking about security.

We are talking about life. And we cannot mix emotion with security. We have to be careful not to mix emotion with security, and to let the information remain confidential and let the right people who are in charge of the security to take the right steps and to be ready to surprise terrorists and not to let the terrorists surprise us.

Mrs. COLLINS. The time of the gentlewoman has expired.

Mr. NIELSON. I know, since you don't think threats should be published, you don't think any one group should have knowledge that they can use for their exclusive benefit, what steps should the airline take, knowing that they were warned in plenty enough time? There was the warning regarding a lady from Helsinki. What could they have done that they didn't do?

Mr. YEFFET. On a regular basis if airlines won't build their security to be able to stop terrorists or criminals on the ground the moment they come to attack us or to send explosives into the aircraft, we know they—the security—don't have any right to exist why do we need them?

Ninty-nine point nine of passengers are not terrorists or criminals.

Mr. NIELSON. Let me ask a specific question, though. What could they have done that they did not do with all this information?

Mr. YEFFET. I think we will discuss it tomorrow in closed session.

But, in general, I can say that 99.9 of the passengers are not criminals and are not terrorists.

Our problem is we don't have information, so we have to build our security system to look for the one that is coming to attack us. That is why we are checking all the 100 percent of the passengers.

If we cannot on a regular basis, to give the answer, I don't think that we have the right even to say even that we are the security of this airline and we-are in charge of securing the flights.

Mr. NIELSON. I look forward to further elaboration on that point tomorrow.

I yield back the balance of my time.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Thank you, Madam Chairwoman.

I would like to get back to Mr. Koch, if I might.

I was impressed that your testimony highlighted the fact that our civil aviation system simply isn't ready for what now confronts it in the realm of terrorism.

The entire notion of terrorist attacks embodies a randomness. Terrorists have attacked discotheques; terrorists have attacked airplanes; they have attacked Olympic villages. There is no telling what generally unprotected site they might attack next, but they seem fixated upon airlines.

We have got now to take a system not designed for war and deal with it in that context.

Recognizing this, you have described the terrorist attacks on civil aviation as "low intensity conflict," as that term is used in Pentagon analysis.

You said that means we ought to use the military in dealing with terrorist attacks on civilian aviation.

Do you want to elaborate on that?

Mr. KOCH. I don't have that in front of me, Mr. Cox. What I said in there, if it means we ought to use the military in certain instances, indeed we ought to.

That does not mean to use them in force opening, although that may be deemed useful in some situations.

We have a fair amount of capability in the military services, particularly those people who deal with terrorism, to function on an emergency basis in airports where we know that there is a very high that level and we can use those kind of capabilities.

You see, you are moving into very, very dangerous areas here because you are suddenly taking capabilities that are designed to defend the country in war or in extreme circumstances, in a hostage incident or something of this nature, and making screeners out of them, in effect. Yet, that expertise does rest there.

In certain circumstances we might find it is useful to resort to it. I think there is a number of other areas we can turn to for assistance before we turn to the military.

Mr. COX. Mr. Cunningham, getting back to the problems we have overseas with governments operating airports and airlines—the latter of which, by the way, are competitive in some cases with our own airlines—what problems specifically are we running into when we, Americans, try to implement our own security procedures in somebody else's airport?

Mr. CUNNINGHAM. The biggest problem we as a carrier face is we are conveying to them, to the foreign government, the impression we don't think their program is adequate, that we know better.

The reaction we generally get back is, well, you run your airline, and we will be responsible for the safety of our citizens in our country and don't tell us how to do it.

They feel that we are showing them up and that we——

Mr. COX. Do you want to name some countries where this is occurring?

Mr. CUNNINGHAM. I think it occurs in a number of places. Sometimes it is merely we can't conduct a search of a bag, sometimes we can't conduct a background check.

Mr. COX. Has this occurred in Frankfurt?

Mr. CUNNINGHAM. On occasion, yes, yes.

Mr. COX. Is it possible that the United States might negotiate treaties or protocols with foreign governments to tighten this up?

Mr. CUNNINGHAM. Yes, very definitely.

Mr. COX. If we were to do that, what specifically ought we to seek in those negotiations?

Mr. CUNNINGHAM. We are all on the same wave lengths and we can see what the minimum procedures will be done and we will go beyond that.

Mr. COX. In Germany do they do redundant searches?

Mr. CUNNINGHAM. In some places, yes.

Mr. COX. In the Frankfurt Airport?

Mr. CUNNINGHAM. In Frankfurt, we do them.

Mr. COX. Not you, but say, Lufthansa, for example.

Mr. CUNNINGHAM. No carrier other than U.S. carrier does redundant searches.

Mr. COX. How do we get them to accept our notion that that is important?

Mr. CUNNINGHAM. I don't know, quite honestly. I think that is a function that has to be dealt with on a government-to-government basis.

Mr. COX. Before my time runs out, if I might ask Mr. Yeffet to respond to that?

How can we get governments that don't accept the need for redundant screening to do so?

Mr. YEFFET. From my experience, sir, I don't think we will face any problems to get permission from the local authorities in each country to search any luggage we want——

Mr. COX. No, no, I am not talking about how we get permission to do it ourselves.

How do we get them to do it so that when we are competing against a government-owned airline they can't get their passengers through faster?

Mr. YEFFET. You mean they will do it for us?

Mr. COX. No. How do we get a host government to agree that our more stringent procedures are necessary for their airlines as well?

Mr. YEFFET. I think we can talk with any government about what we need for our American carriers. I don't think that we can tell them in the country what we want them to do when it has nothing to do with our flight and our passengers.

Mr. Cox. So we are left at a competitive disadvantage then?

Mr. YEFFET. They can do whatever they want. We are responsible for our flights, for our passengers, for our catering and so on, and so on.

If we will come to the local authorities and we will ask them for assistance to solve our problems, when we cannot do everything by ourselves?

For instance, if we need to protect the concentration of passengers around the check-in counter when we have——

Mr. Cox. I am going to have to interrupt just because my time is running out. I want to point out that American travelers, yours truly included, often times fly on foreign carriers.

So in protecting American citizens, I think we ought to focus not only on what American carriers are doing in those foreign terminals, but also what foreign carriers are doing.

Mr. Ford, do you have any thoughts on this subject?

Mr. YEFFET. I think this is something——

Mr. Cox. I am sorry.

Mr. Ford.

Mr. FORD. I think if it is done in a manner that is not interpreted as showing up the foreign government, that is entirely achievable.

It will be more difficult in certain countries than it is in others. I think it is, as—but I do think it is achievable.

Mr. Cox. Mr. Cunningham.

Mr. CUNNINGHAM. I think the only way to do that is by the regulatory process in the United States and tell a foreign government if our citizens are flying your carrier to our country, these are the rules you should follow, period.

Mr. Cox. I yield back.

Thank you.

Mrs. COLLINS. There was some earlier discussion about part 107. I wanted to point out, just for the record, that part 107 deals with airport security, whereas part 108 deals with security measures to be taken by the air carrier.

I hope you will keep those things in mind as we progress with this hearing.

I thank all the panelists for coming before us at this particular time.

I thank you for your testimony.

Again, your full testimonies will be made a part of the record. Thank you.

Our next panel, Mr. Ray Salazar, Director of the Office of Civil Aviation Security and Mr. Monte Belger, Associate Administrator for Aviation Standards. Both are FAA.

We will have those two gentlemen come forward at this time.

Mr. Salazar, Mr. Belger, would you stand, please.

[Witnesses sworn.]

Mrs. COLLINS. Mr. Salazar, would you identify who is with you, please?

STATEMENT OF RAY SALAZAR, DIRECTOR OF CIVIL AVIATION SECURITY, FEDERAL AVIATION ADMINISTRATION, ACCOMPANIED BY MONTE BELGER, ASSOCIATE ADMINISTRATOR FOR AVIATION STANDARDS, AND GREG WALDEN, CHIEF COUNSEL

Mr. SALAZAR. I would like to introduce the FAA's Associate Administrator for Aviation Standards, Mr. Belger. To his left, Mr. Greg Walden, our FAA chief counsel.

Mrs. COLLINS. Thank you.

You may begin your testimony at this time.

You know we will follow the 5-minute rule, as we will be for the remainder of this hearing.

Mr. BELGER. Thank you. I will summarize very briefly a prepared statement which I understand will be provided fully in the record.

Mrs. COLLINS. yes.

Mr. BELGER. The tragedy of Pan Am Flight 103 shows clearly the seriousness of the threat of terrorism to civil aviation, and necessitates that we do all that is technologically and humanly possible to reduce that threat to the traveling public.

We must continue to demonstrate a firm and unwavering resolve to counter whatever new measures might be instituted by the criminals who would hold our air transportation system hostage and threaten the lives of our citizens.

In 1985, Congress called on the FAA to initiate a major program to make assessments of the security of foreign airports used by U.S. air carriers.

This legislative thrust, contained in the International Security and Development Cooperation Act, significantly expanded the FAA's "global" presence in security matters and represented a measured response to a growing international threat against American aviation interests.

Additional steps were taken at that time to increase funding for FAA security research and development work and to bolster security inspection and Federal air marshal staffing within the FAA.

Following the Pan Am tragedy over Scotland, FAA instituted a series of strengthened security measures to tighten U.S. air carrier security requirements at airports in Western Europe and the Middle East.

These procedures focus on screening checked baggages for small parcels. We can talk in more detail about this tomorrow afternoon.

These measures impose a cost on our air transportation system and are not lightly taken by the FAA. But we have not and will not hesitate to tilt the balance toward improved security when it is necessary to protect our citizens.

In February of this year, I had the opportunity to accompany Secretary of Transportation Skinner who led the U.S. delegation attending a special session of the Council of the International Civil Aviation Organization [ICAO] in Montreal. The special session was called as a result of a joint U.S./U.K. initiative to specifically address the sabotage of Pan Am flight 103.

As a result of that meeting, the ICAO Council unanimously adopted a resolution setting out a high priority plan of action that is currently reviewing existing international standards applicable to all operations to determine what changes are necessary.

ICAO also agreed to expedite research and development on the detection of explosives and explore the possibly of establishing an international regime for the marking or "tagging" of explosives to facilitate detection.

The ICAO assembly, to which the council reports, is meeting now and will consider just these issues, along with other efforts to make international air travel even safer. We are arranging to have two FAA security experts seconded to ICAO to help with this work.

The agreement between ICAO and the FAA should be signed shortly in Montreal. The first expert will be available around November 1 and the other should be in place by the beginning of next year.

We amended part 129 of the Federal Aviation Regulations to require foreign airlines to submit their security plans to FAA for acceptance.

The standards and recommended practices contained in annex 17 to the ICAO convention are being used as a yardstick against which those plans are measured. We are in the process of evaluating the plans that have been submitted and have been generally satisfied with the quality so far.

In taking this action, the FAA will be better able to insure that the security precautions followed by foreign airlines serving the United States are adequate to meet the level of threat ascribed to those operations.

We have taken a variety of steps to improve security. In June, we established new screening procedures for portable electronic equipment before it can be checked or carried aboard an aircraft.

In July, after a careful examination of the way we handle security bulletins, which as the subcommittee knows are sensitive documents intended to alert air carriers or potential security threats, we made significant changes.

Bulletins, now called security directives, contain specific requirements for operators to follow.

Further, carriers must acknowledge receipt of the directive and advise us of what steps they are taking to deal with security threats. These measures have strengthened our processes for disseminating aviation security threat information.

We also issued a new rule which enables the FAA to require U.S. airlines to install automated explosive detection systems [EDS] for screening checked luggage on international flights at airports here and abroad.

We will spend a great deal of time tomorrow on some of the technical issues and I will reserve my comments for tomorrow.

I think that our decisions are a reflection of our commitment to insure the traveling public benefits from the best equipment available.

I think the fact you are going to hear tomorrow from a variety of manufacturers and research folks is a tremendously healthy signal.

This fiscal year we are increasing our civil aviation work force by an additional 56 personnel and we have requested 120 additional personnel for fiscal year 1990. These additional employees will facilitate our efforts to respond to the international threat and continue to improve security here in the United States.

The added staffing will enable us to improve the FAA presence in the most pressing areas of the world, and we have worked closely with the Department of State to facilitate the placement of additional personnel overseas.

In closing, Madam Chairwoman, I would like to emphasize the strength of our commitment to stop the threat of criminal actions directed against civil aviation.

It is a difficult challenge, but one that we must meet.

We are in for the long haul. We don't have all the answers yet. We are, however, committed to requiring the use of the best available equipment.

We are committed to continuing aggressive research and development. We are committed to assisting our U.S. air carriers in implementing required procedures outside the United States.

That completes the summary of my prepared statement. Of course, we will be glad to answer questions.

[The prepared statement of Mr. Belger follows:]

STATEMENT OF MONTE BELGER, ASSOCIATE ADMINISTRATOR FOR AVIATION STANDARDS, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE COMMITTEE ON GOVERNMENT OPERATIONS, SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION, CONCERNING AVIATION SECURITY. SEPTEMBER 25, 1989.

Madam Chairwoman and Members of the Subcommittee:

I am pleased to appear before the Subcommittee today to describe briefly for you the FAA's efforts to combat the threat of terrorist activity against civil aviation. With me are Mr. Raymond Salazar, FAA's Director of Civil Aviation Security, and Mr. Gregory Walden, FAA's Chief Counsel.

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The tragedy of Pan Am Flight 103 shows clearly the seriousness of the threat of terrorism to civil aviation, and necessitates that we do all that is technologically and humanly possible to reduce that threat to the traveling public. We must continue to demonstrate a firm and unwavering resolve to counter whatever new measures might be instituted by the criminals who would hold our air transportation system hostage and threaten the lives of our citizens.

To respond to the threat of terrorism, the FAA works closely with intelligence agencies to identify potential threats against civil aviation, and then to apply the appropriate measures necessary to counter those threats. It is an ever changing process because, as technology and political objectives change, so does the threat.

In the early 1970's, for example, we revolutionized the civil aviation security system by instituting a sky marshal program and by implementing a highly effective passenger screening system designed to stem the wave of hijackings being experienced at that time. But as the level and nature of the threat to the traveling public has varied, so has our response. We have continued to make changes to that system, through heightened expectations of what the system must be able to detect and through improvements to equipment, techniques, and personnel. And the system has worked remarkably well for over a decade and a half.

In 1985, Congress called on the FAA to initiate a major program to make assessments of the security of foreign airports used by U.S. air carriers. This ~~new~~ legislative thrust, contained in the International Security and Development Cooperation Act, significantly expanded the FAA's "global" presence in security matters and represented a measured response to a growing international threat against American aviation interests. Additional steps were taken at that time to increase funding for FAA security research and development work and to bolster security inspector and Federal Air Marshal staffing within the FAA. Further, the United States worked within the International Civil Aviation Organization to strengthen international security requirements, and the FAA took actions to enhance security requirements for U.S. carriers operating abroad.

Following the Pan Am tragedy over Scotland, FAA instituted a series of strengthened security measures to tighten U.S. air carrier security requirements at airports in Western Europe and the Middle East: (1)

- o Airlines must now complete 100% x-ray or physical inspection of all checked baggage.

- o Passengers may not have access to the contents of checked baggage following the security inspection.

- o Airlines must perform a positive match of passenger and baggage to ensure that unaccompanied bags are not loaded onto the aircraft.

- o Airlines must take additional measures to preclude unauthorized access to baggage from check-in to loading on board the aircraft.

- o An increased number of passengers is to be randomly selected for enhanced screening. Checked baggage of the persons identified for enhanced screening must be physically inspected.

o Small packages and parcels that are shipped through passenger ticket counters must be x-rayed or physically examined prior to shipment.

These measures impose a cost on our air transportation system and are not lightly taken by the FAA. But we have not and will not hesitate to tilt the balance toward improved security when it is necessary to protect our citizens.

I had the opportunity to accompany him)

In February of this year, Secretary of Transportation Skinner led the U.S. delegation attending a Special Session of the Council of the International Civil Aviation Organization (ICAO) in Montreal, called as the result of a joint U.S./U.K. initiative to specifically address the sabotage of Pan Am Flight 103. As a result of that meeting, the ICAO Council unanimously adopted a resolution setting out a high priority plan of action that is currently reviewing existing international standards applicable to all operations to determine what changes are necessary.

ICAO also agreed to expedite research and development on the detection of explosives and explore the possibility of establishing an international regime for the marking or "tagging" of explosives to facilitate detection. ~~In fact,~~ the ICAO Assembly, to which the Council reports, is meeting now and will consider just these issues, along with other efforts to make international air travel even safer. We are arranging to have two FAA security experts seconded to ICAO to help with this work. The agreement between ICAO and the FAA should be signed shortly in Montreal. The first expert will be available around November 1 and the other should be in place by the beginning of next year.

In March, ~~to make~~ certain we know what all carriers serving the United States are doing to protect their operations against criminal and terrorist ~~acts,~~ we amended the Federal Aviation Regulations Part 129 to require foreign airlines to submit their security plans to the FAA for acceptance. The standards and recommended practices contained in Annex 17 to the ICAO Convention are being used as the yardstick against which those plans are measured. We are in the process of evaluating the plans that have been submitted and have been generally satisfied with the quality so far. In taking this action, the FAA will be better able to insure that the security precautions followed by foreign airlines serving the United States are adequate to meet the level of threat ascribed to those operations.

On April 3, Secretary Skinner announced several new aviation security initiatives after an intensive internal review of the U.S. aviation security system and after meeting with the families of the Pan Am 103 victims, Members of Congress and the President. We have made a great deal of progress on the most important of those initiatives as I will describe.

We have taken a variety of steps to improve security. In June, we established new screening procedures for portable electronic equipment before it can be checked or carried aboard an aircraft. This requirement for pre-flight screening includes radios, cassette players, laptop computers and other electronic devices to ensure they are not being used to hide an explosive device, and covers flights operated by U.S. carriers departing from cities in Europe or the Middle East. The security requirements include a careful screening process for all passengers transporting electronic equipment using criteria designed to identify "suspicious" articles. All such items are then subjected to close examination by security personnel under a system of progressively greater scrutiny until cleared. Any item that cannot be cleared will be kept off the aircraft.

In July, after a careful examination of the way we handle security bulletins, which as the Subcommittee knows are sensitive documents intended to alert air carriers of potential security threats, we made significant changes ~~to our security bulletin process~~. Bulletins, now called Security Directives, contain specific requirements for operators to follow. Further, carriers must acknowledge receipt of the Directive and advise us of what steps they are taking to deal with security threats. These measures have strengthened our processes for disseminating aviation security threat information.

We also issued a new rule which enables the FAA to require U.S. airlines to install automated explosive detection systems (EDS) for screening checked luggage on international flights at airports here and abroad. We plan to require initial installations at approximately 40 airports over the next several years. Our performance specifications are based on a Congressional mandate that explosive detection systems must be as capable as the Thermal Neutron Analysis (TNA) device, which has shown the highest degree of explosive detection currently possible for detecting known explosives. Any system approved by the FAA must be automated, detect defined quantities and configurations of FAA-defined explosives, and be safe for operators and baggage.

Our rulemaking on EDS followed three years of FAA-directed research on the TNA explosive detection system which can detect all commercial and military explosives which might be concealed in checked baggage and air cargo. Prototype TNA systems were tested at the Los Angeles and San Francisco Airports during June 1987-March 1988 with good success. We have accelerated the delivery of six TNA units for evaluation at six airports here and abroad, and installation of equipment has begun.

We believe the TNA unit shows great promise for operating effectively in screening passenger luggage. Our experience examining over 40,000 bags using thermal neutron analysis demonstrated that it could screen baggage with both a high detection rate and a low false alarm rate. The high detection rate was attained finding minimal quantities of explosives, and would be higher with larger amounts of explosive material. The radioactive elements of the TNA system are well within prescribed safety levels and pose no threat to system operators or passengers. The first TNA system has been installed at New York's John F. Kennedy International Airport.

Research also continues on an explosive vapor detection system for checking people for explosives. More work is necessary to improve the sensitivity of this system and the times it takes to process people and baggage in an air transportation environment. We hope to have an improved device available for testing next year.

We also are continuing work to develop improved weapons detection capabilities, including efforts for the detection of plastic weapons, and are conducting an evaluation of state-of-the-art detection equipment which is commercially available. I encourage new ideas from the scientific and academic community which will help us develop even better explosive detection systems.

We are also continuing an aggressive program of foreign airport assessments called for in the International Security and Development Cooperation Act. Since the inception of this program in 1986, we have conducted more than 800 visits to 216 foreign airports in 107 countries. We have generally encountered a cooperative approach by host governments, and believe this program has aided in attaining additional security improvements at many foreign airports. The current Act enables us to conduct assessments, provides general guidance concerning the nature of assessments to be conducted, and prescribes a workable and appropriate approach toward public notification of uncorrected problems at foreign airports, all in a manner which highlights the need for a cooperative rather than unilateral approach toward solving security problems.

Clearly, to accomplish fully our aviation security responsibilities, we must have adequate numbers of trained, security inspectors. With regard to our security staffing posture, this fiscal year we are increasing our civil aviation security workforce by an additional 56 personnel, and have requested 120 additional security personnel in our FY 1990 budget, which will bring the total security force to almost 700. These additional employees will facilitate our efforts to respond to the international threat and to continue to improve security here in the United States. The added staffing will enable us to improve the FAA presence in the most pressing areas of the world, and we have worked closely with the Department of State to facilitate the placement of additional personnel overseas.

In closing, Madam Chairwoman, I would like to emphasize the strength of our commitment to stop the threat of criminal actions directed against civil aviation. It is a difficult challenge, but one that we must meet. We look forward to continuing our work with you on these key issues which are so important to the traveling public.

That completes my prepared statement, Madam Chairwoman. I would be pleased to respond to any questions you may have at this time.

Mrs. COLLINS. Thank you very much.

Mr. Salazar, during the testimony of Mr. Yeffet, he mentioned—these are some of the things he said. The FAA does not monitor well. That the FAA has ignored that—PSA, for instance, ignored FAA regulations.

He mentioned, too, it seems air carriers in violation of the law or FAA recommendations have immunity. What is your response to that kind of testimony?

Mr. SALAZAR. Well, in response, Madam Chairwoman, certainly those events, for instance, the Pacific Southwest Airlines event prompted the Department of Transportation, the FAA to a significant rulemaking effort when it realized that many of the access points around our airplorts need additional protection.

We refer to that as the automated access rule.

In response to air carriers who wantonly violate, there was legislative action, that allowed the FAA to take significant penalties, raising the maximum civil penalty to $10,000 per violation.

We have exercised that authority, Madam Chairwoman, in numerous cases for alleged violations by air carriers. I think we have those tools available and we have been using them.

Mrs. COLLINS. He mentioned one of the things the FAA might do would be to deny landing rights to some of the carriers, and so forth.

Has anything been done in that regard at the FAA, either of you?

Mr. Salazar.

Mr. SALAZAR. That certainly is one of the tools available to us.

Mrs. COLLINS. Have you ever used that tool?

Mr. SALAZAR. We have imposed sanctions, yes, ma'am.

Mrs. COLLINS. Have you done so recently?

Mr. SALAZAR. Not recently, no, ma'am.

Mrs. COLLINS. How long ago?

Mr. SALAZAR. I can't recall the exact date.

Mrs. COLLINS. Within the last year or two?

Mr. SALAZAR. It has been beyond that.

Mrs. COLLINS. A long time ago. There was some mention made, too, about attitudinal changes.

There is a great deal of emphasis on attitudinal changes. Have there been attitudinal changes within the FAA regarding the security of the flying public?

Mr. SALAZAR. I think there have been attitudinal changes throughout, Madam Chairwoman.

Certainly we recognize the threat has changed and the threat evolves, attitudes have changed commensurate with those particular threats.

I think you will see in evidence today tougher standards.

Mrs. COLLINS. Do you also see more monitoring, more careful monitoring and screening of activities going on by our carriers?

Mr. SALAZAR. Absolutely, Madam Chairwoman, both domestically and internationally. Our work force has increased.

We have additional resources and we have deployed them to those areas where we feel the threat to be commensurate with increased inspection activity.

Mrs. COLLINS. What have you done to increase, as Mr. Cunningham kept talking about, the level of awareness of security measures within each air carrier, at the screening checkpoints in the airport, and so forth?

Mr. SALAZAR. Certainly those events haven't necessarily gone ignored by the carriers. To their own credit, they have recognized that these particular threats are easily transferable and have done much on their own initiatives. Within FAA we have number of initiatives underway.

Within the area of training, we have large contracts that are revising totally our training material that we provide to the carriers to deal with the particular threat.

We have new standards in effect. U.S. air carriers are required to implement additional standards overseas to ensure the safety of the traveling public.

Mrs. COLLINS. Before I go any further, let me back up and say I do commend you for some of your initiatives you have taken to strengthen security measures.

They have certainly been welcomed by all of us who sit on this particular subcommittee and the full committee as a whole.

However, one of the things we find repeatedly is that charges are made against the FAA that it has been more reactive than proactive.

How would you respond to that kind of criticism, Mr. Salazar?

Mr. SALAZAR. Madam Chairwoman, unfortunately, as the threat does change it seems as though that many times when we build a 12-foot wall, the criminal will find a 13-foot ladder.

We have attempted to instill mechanisms within the FAA to better gauge that particular threat. We have expanded our intelligence capability considerably, as you are well aware, Madam Chairwoman.

We do have professional analytical capability with our intelligence division that measures with the rest of the intelligence community, those threats. We attempt to develop countermeasures against those threats.

As technology evolves, it is sometimes very difficult. The challenge we are facing is that of a criminal element. It is not unsafe conditions caused by inadequate maintenance or other things of that sort.

This is somebody who is designing a system to defeat us. I takes particular skills to be able to then gauge within our own organization those particular countermeasures, and then once we think that they are adequate, to continually balance them against the needs of the American traveling public to be able to move millions of people a day in virtual safety and security, Madam Chairwoman.

Mrs. COLLINS. Mr. Belger, you have responsibility as the associate administrator for aviation security to implement all the initiatives that have been made at this time.

What sort of system do you have set up to make sure that these initiatives are being vigorously followed by the airlines?

Mr. BELGER. If I could, just for the record, I am the Associated Administrator for Aviation Standards which includes more than security. As you know, last January and again in April we made several announcements of new initiatives, new requirements.

Mrs. COLLINS. We know about the announcements. I want to know how vigorously the programs are being implemented.

Mr. BELGER. I think they are. As I said in the statement, we have already put in place final rules that changed our security directive system, and a final rule which enables us to require the use of explosive detection systems.

We are near completion of a study to look at the capabilities of metal detectors that are in use today in response to a congressional mandate. We plan by the end of this year, or early next year to have changes in the airline screening program which will require state-of-the-art x-ray machines.

We are continuing an aggressive research and development program. I think if we had not been proactive several years ago we would not be where we are today with the explosion detection programs.

One area we must focus on is the perception of the ineffectiveness of the passenger screening system in this country.

That is an area where we absolutely must continue to focus on. It is a very high priority with me.

Mrs. COLLINS. Mr. Nielson.

Mr. NIELSON. Thank you. I would like to ask Mr. Belger some questions.

On page 3 of your testimony, you mention the things that you are doing to tighten U.S. security, requirements of U.S. carriers operating at airports in Western Europe and the Middle East. Among those, you say airlines must perform a positive match of passengers and baggage to ensure that unaccompanied bags are not loaded onto the aircraft.

I mentioned the system where passengers have to physically identify the bags before they are loaded on the plane. How do you suggest doing it?

Mr. BELGER. That is a way to do it, a physical matching of the bag and passenger. That is not a common way.

Mr. NIELSON. How else is it done?

Mr. BELGER. We can discuss it in much more detail in closed session. Some airlines have computerized systems and some have mechanical systems.

Mr. NIELSON. How do you track me if I am a terrorist? I check my bags and I check in; how do you know I actually got on the airplane?

Mr. BELGER. The carriers have automated systems. They vary from airline to airline. We know what those systems do. The airlines have a system so at the last moment before the airplane leaves, they must be sure the passenger and their bags are on that airplane together.

Mr. NIELSON. If the passenger is not on?

Mr. BELGER. They are required to take the baggage off.

Mr. NIELSON. Thank you.

You talk about the ICAO, I guess that is the International Civil Aviation Organization. They have some recommendations. They have some general guidelines for encouraging uniformed security. How effective are they?

Mr. BELGER. ICAO, the International Civil Aviation Organization, can be effective. The experts of the world meet there. I wish we could do things more quickly in the international arena. I think the answer to some of the questions Mr. Cox was getting to earlier have to do directly with our ability to set consistent, thorough, international standards.

Mr. NIELSON. What about the International Civil Aviation Committee?

How does it differ from the ICAO? How do they compare? What role does the United States play in either of them?

Mr. BELGER. The Council is a part of ICAO. The Council is a smaller group.

ICAO has smaller bodies which focus on security issues.

Mr. NIELSON. Do they go into research and development, too?

Mr. BELGER. Yes, sir. ICAO is responsible on an international scale for security standards.

Mr. NIELSON. What do you do about foreign carriers? What do you do about a foreign carrier which does not protect the American citizen flying on that carrier? What do you do at FAA?

What influence do you have?

Mr. BELGER. In response to the 1985 legislation, which requires us to do airport assessments at foreign airports, if we should see an airport which does not live up to the international ICAO standards, there is a very clear process that we would go through to formally notify that country of our findings.

That country has a time, which again is defined in the statute to correct the problems. We would work with that country during the period of time.

If not corrected, the Secretary of Transportation in coordination with the Secretary of State would issue a public advisory. We would use a variety of public means to notify the public that this airport does not meet minimum national standards.

Mr. NIELSON. What does that do to the pilot who has to fly in and out of that airport? Does that jeopardize his job? If you publicly say that airport is not working properly, what happens to that man who has to fly in and out of that airport?

I am talking about the pilot, not the passenger.

Mr. BELGER. In the one case where we have made that public decision, the deficiencies were corrected very quickly.

Mr. NIELSON. One last question. You said also airlines must take additional measures to preclude unauthorized access to baggage from check-in to loading it onboard the aircraft. This has reference to the incident in California in which a former security officer got in by flashing an expired badge and was able to plant something.

Mr. BELGER. I think the particular reference in the statement had more to do with, checked baggage being processed through a security checkpoint and then being in the possession of the passenger.

Mr. NIELSON. You have that one, too. This one said unauthorized access to baggage. I presume from someone who is not authorized to load it or to work with it.

Mr. BELGER. We are talking about two different things. The statement speaks to passengers having access to their bags after it has gone through screening.

The other is much more difficult to deal with, quite frankly. As you know, large international airports are basically cities in and of themselves, with thousands of employees. It is an extremely difficult process for airport operators to insure only authorized folks have access to certain areas. That is precisely why we have an aggressive rule on the books now to require state-of-the-art procedures to insure that only authorized people have access to certain areas, that we know when someone is no longer authorized to be in that area, that you can make real time corrections in the system to insure that a person no longer gets in that area and that you have some type of audit system to know who was in that area.

It is extremely difficult, but it is something we have to work on.

Mr. NIELSON. Thank you.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Yes.

Mr. Salazar, as Director of Civil Aviation Security, I am sure you have made an analysis of airlines across the world to see which one has the best security system. Do you feel that there is an airline that is a model?

Mr. SALAZAR. I think you will find, Mrs. Boxer, that each airline will be responsive and its security system will be dynamic. It will respond to the threat that is presented to it.

Mrs. BOXER. That is not my question.

Mr. SALAZAR. I don't have a list to give you of the best or the worst. We have refrained from assigning a category such as that because if we did begin that process, we might tell the bad guy exactly where to go in order to commit his criminal act.

Mrs. BOXER. I am not clear on what you just said. My point is, if there are airlines in the world that have good records, that have good systems, do you emulate those systems? Do you try to recommend those systems to our airlines?

Mr. SALAZAR. I am sorry, I misunderstood the question.

Yes, we study each of them.

Mrs. BOXER. Which are some of those airlines that you think do have good systems?

Mr. SALAZAR. Clearly El Al, dealing with the threat, it has a very good system, from which we have picked up various security systems.

Mrs. BOXER. As you look at El Al, do you think it is the dollars that go into the system? Is it the fact that the government may be more involved than we are? Is it competence of the employees? Why do you think that they have a better system than most?

Mr. SALAZAR. It is a combination of all of that, Mrs. Boxer. That particular airline, representing that government, is virtually in a state of war, and it protects itself accordingly.

Certainly many of those measures that are taken are very labor intensive and they have ingrained in them much government support in their activities.

There are those that would argue that basically El Al is not a commercial airline. It is treated differently by its government.

Mrs. BOXER. Well, the reason I am raising this with you is that I don't want to have a system in this country that is second to any other country, OK? I think for the people who lost relatives on that Pan Am flight, this is war. They are dead as surely as if they went to war and were killed. So I think that given what is happening with the Colombia situation now, given some of the recent comments from people associated with Iran—many of these comments are aimed at this country.

Madam Chairwoman, I don't want to sit here and think that because we are not "in a state of war" that we will settle for a second best system.

I would hope that the FAA and you in your capacity, sir, would fight against for that. Maybe it is going to mean that we have to put a charge, a security charge on each bag. Surely if someone can afford to fly in this country, with the prices that we have to pay, you can pay a little more.

But the fact is, we do have a model. I don't want to settle for anything less than that model. I would look to you to really push that point.

Let me just finish with a question on the Colombian situation. We have had comments coming out of there that they are going to look to us. Are you and the FAA right now planning for that possibility?

Mr. SALAZAR. We have access to the intelligence reports that flow from that country. We also have implemented additional security measures for the U.S. air carriers that service that part of the world.

In response—if I may, Mrs. Boxer, in response to your previous statement, I don't want to leave an impression that we are second best to anyone. Clearly the United States is preeminent in its civil aviation security throughout the world. There is a commitment within this administration clearly articulated by Secretary of Transportation Sam Skinner, followed exactly as well by our Administrator. This is a top priority item within this administration.

Mrs. BOXER. Well, I am very glad to hear those words. I was also very glad about the words about the war on drugs, and I am glad about the words about kinder and gentler, and I am glad about the words about education.

But I look behind the words in all of these circumstances. I haven't seen the commitment in hard core dollars. And anyone who can tell me that you can't equate dollars with security, I would really question their judgment. I know you did not say that. I am not saying you did.

In terms of this administration, I would hope in this arena they will make a determination to be second to none. If it means we learn from the El Al experience and commit those kinds of resources, I think the flying public is ready to help. I certainly do believe that the Congress is as well. We will join hands with you on that.

Mr. SALAZAR. I couldn't agree with you more, Mrs. Boxer. And in regards to the funding issue, there are mechanisms currently in place for additional fees to be charged and collected for international departures to be attributed directly to security.

Mrs. BOXER. When will that go into place?

Mr. SALAZAR. It has been into place for almost 2 years.

Mrs. BOXER. Is it enough? What is it raising?

Mr. SALAZAR. I don't know the exact figures. Currently the charges are $5 per ticket, which means for a round trip fare between the United States and Europe, it would be an additional $10 per passenger.

Mrs. BOXER. I would like to know for the record, Madam Chairwoman, if I might, what the budget has looked like for aviation security over the last 5 years. What those fees are. I would like a comparison, if we can, as to what is paid per passenger at El Al, if it is possible for us to get those numbers.

[The information follows:]

SECURITY SURCHARGE

In the spring of 1987, international air carriers operating to and from the United States were granted tariff approval to increase fares up to $5.00, a surcharge, to cover the additional cost of providing enhanced passenger, cargo, and aircraft security measures.

The Office of International Transportation and Trade within the Office of the Secretary of Transportation (OST) is conducting a survey among the U.S. carriers who provide international service to determine the amount of funds collected via the $5.00 security surcharge. To date, all but one U.S. carrier have responded to the OST's request for information. All carriers who have replied have indicated that more money has been spent on the extraordinary security enhancements than has been collected from the $5.00 surcharge. Only five U.S. carriers have implemented the surcharge to date.

Information on security fees charged by El Al is unavailable to the FAA.

FAA Security Funding

FAA funding for aviation security has been provided for the civil aviation security staff, and for the research and development of the vapor detection system and the thermal neutron analysis (TNA) units. Funding is shown in the table below:

($ in millions)

	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988
Operations	$9.9	$25.8	$17.2	$15.8	$24.5	$24.4	$27.9
F&E	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$8.5
RE&D	$1.1	$0.9	$2.4	$7.4	$12.0	$13.9	$9.6
Total	$11.0	$26.7	$19.6	$23.2	$36.5	$38.3	$46.0

Note: Excludes funding provided from the Grant-in-Aid for Airports program totalling $36 million.

Mrs. COLLINS. We have a vote on in the House of Representatives. What we would like to do is to come back. Mr. Cox, we will come back directly to you.

We are going to recess for 10 minutes. Thank you.

[Recess taken.]

Mrs. COLLINS. The hearing will reconvene at this time. May we have quiet, please.

I believe when we recessed, the gentleman from California was going to be allowed some time.

Mr. Cox.

Mr. Cox. Thank you very much, Madam Chairwoman.

Mr. Belger, one of the things we will be covering soon in these hearings is current technology and future technology for explosion detection devices. One current technology, the so-called TNA device, is priced at about $1 million per copy. The FAA is interested in moving forward with this technology as soon as possible across the country. I have a question about the rate at which we deploy this new technology. Is it wise (a) to use FAA's current authority, which is discretionary, to deploy these machines at airports around the country as quickly as possible, or should we use certain airports as laboratories to see how this technology best operates; and (b), to permit some room in the marketplace for new and hopefully even more advanced technologies rather than saturating it with one technology?

Mr. BELGER. I think it is wise at this point to go ahead and require the use of this technology. We have a great deal of experience in testing the TNA system with well over 40,000 bags in San Francisco and Los Angeles. We made the decision in the FAA, I think, in August of last year to purchase five machines from which we were going to use to get some operational data.

Subsequent to Pan Am 103, we increased that to six. We made some other modifications in order to get those machines delivered much more quickly.

I think we can require the use of these machines, which, as you know, at this time are the only ones that meet our criteria and meet our standards for explosion detection capability.

I think we can do that on a limited scale, which obviously will be, constrained by the ability of the manufacturer to produce the machines. But I think it is wise on our part to go ahead and require their use. They are the best available.

At the same time, and we can't lose track of continuing a very, very aggressive research and development program to develop systems that are cheaper, faster, more sensitive, mobile, less expensive. I think that is extremely possible in the very near future.

I think, as I said earlier, the fact that you have a variety of manufacturers here to testify tomorrow reflects the fact that there is a great deal of interest in trying to help us produce better security systems.

In my opinion, absent the decision from the FAA to require their use, we would not have seen this type of quick interest in the industry.

Mr. Cox. I want to add that I support that. My question relates only to the rate at which we mandate their deployment across the country and presumably around the world. This leads to a topic more directly related to today's testimony—as opposed to tomorrow, when we will get to the manufacturers—that is, the degree to which we can stop terrorists through technology, on the one hand as against the degree to which we must rely on intelligence literally to capture these people before they do something on the other hand—or, in the worst case, at least after the fact to capture them, punish them, and execute them.

I was impressed when I toured the security facilities at JFK Airport in New York at the magnitude of the problem. As was mentioned, between 1.5 and 2 billion passengers are moving via U.S. carriers per year.

The Pan Am explosion itself was caused by a bomb placed in a radio cassette recorder stuck in somebody else's Samsonite piece. Isn't it the case that when you have intelligent people who are planning carefully in advance to kill innocent civilians, that they are going to try and stay one step ahead of this technology?

Shouldn't we be focusing more on intelligence?

Mr. BELGER. I absolute agree with you. The explosive detection system, the TNA system, is only one tool we might have.

Mr. COX. Let me ask the question more directly, because we had an excellent witness on the preceding panel, Mr. Noel Koch. He said that our intelligence-sharing mechanism in the U.S. Government doesn't work—and particularly that FAA doesn't get what it should have.

What kind of intelligence operation, if FAA were to have one, would you want FAA to have? What should Congress be looking at in the way of intelligence gathering and sharing authority for FAA?

Mr. BELGER. We would be willing to participate in any further discussions about that. However, in my opinion, the question is not so much does the FAA need its own intelligence gathering capability. I think the United States, from an aviation security standpoint, has a very sophisticated, very well-managed intelligence collection, assessment, and dissemination program.

I think maybe where Mr. Koch is coming from, and I have talked to him about this, is that through our ability to have people overseas in the most vulnerable parts of this world, we improve our ability to informally get information, to be closer to the pulse of information.

Mr. COX. Is there a way to formalize that? We talked a little bit about how we might get foreign governments to improve their own security in airports where our American carriers operate. We might do that by treaty and protocol and so on.

Is there also the opportunity to do the same thing with intelligence gathering? Can we require that, as it were?

Mr. BELGER. I think there are many opportunities. You are absolutely right in that we have not only bilateral opportunities, which I call both formal and informal. We also have multilateral, universal opportunities through ICAO which we must continue to follow.

We have a proposal now to place additional FAA security specialists in Europe, and in the Middle East. Twenty-seven additional people. These people would have various responsibilities.

Probably the most important responsibility would be to provide a point of aviation security liaison between the FAA, the Federal

Government and foreign countries. These people would also be the single focal point to assist our carriers in implementing security requirements outside the United States.

I think there are a lot of things like that we can do which will allow us to work closer with foreign governments, to allow us to perhaps get information, particularly the very nonsensitive type of information, maybe a little more quickly. It is critical. It is absolutely critical that the FAA increase our presence in certain parts of the world.

Mr. Cox. We are going to be able to speak in executive session about some of the intelligence issues that surround our war on terrorism in the skies. Without breaching any of that confidentiality, I will refer to an article in yesterday's Washington Post which discussed the western intelligence operation, operation autumn leaves.

Does FAA have the capability to conduct that kind of operation? Further, if you had the choice to spend your money on explosive detection devices or those kinds of operations, where would you put it?

Mr. Salazar. If I may, Mr. Cox, I believe, without reference to that specific article, that U.S. civil aviation is well served by the intelligence community. What needs to be done is perhaps improve that access a little bit more. That clearly is one of our agenda items, to make that information flow better.

That is occurring. We are not denied access to any information, but at times, the intelligence community isn't, or hasn't been directly involved—I think Mr. Koch made this point as well—hasn't been directly involved with threats against civil aviation.

Perhaps it is also a learning curve to be able to focus on specific areas in intelligence that we in aviation see as key to developing better countermeasures.

Mr. Cox. How would you respond to Mr. Koch's suggestion that FAA have its own intelligence gathering capabilities?

Mr. Salazar. Well, sir, we are not intelligence collectors. We have a role of fostering aviation and certainly regulating aviation. I think we do that very, very expertly. The U.S. Government, again, is served by an excellent intelligence community. As long as we have access to that information, I don't see a need for us to duplicate any of those areas whatsoever.

Mr. Cox. So you would respond by saying no, you don't want this capability? My time has expired. Thank you.

Mrs. Collins. Mr. Salazar, when was a review of Pan Am 103 completed?

Mr. Salazar. I am sorry?

Mrs. Collins. When was the review of what happened on Pan Am 103, relating to Pan Am, completed?

Mr. Salazar. Our regulatory investigation?

Mrs. Collins. Yes.

Mr. Salazar. It was completed the latter part of January.

Mrs. Collins. The latter part of January?

Mr. Salazar. Yes. That is the investigative process. Our actual investigation was completed about that time. There is a formal legal process that goes beyond that.

Mrs. COLLINS. When was everything done that you needed to do prior to this fining for Pan Am, the proposed fine for Pan Am?

Mr. WALDEN. If I may respond to that, Madam Chairwoman? It was a matter of practically the same day that it was issued, September 19, although developed over a matter of weeks and days. The agency came to a final conclusion on it right around the time that it was issued. The usual practice is not to—the agency does not come to a conclusion on whether a civil penalty is appropriate and what the sanction is until the time it is issued.

Mrs. COLLINS. Thank you very much.

Mr. Salazar, based on the GAO review of the air carrier standard security program, training of security personnel continues to receive little attention by the FAA. Is this an accurate statement?

Mr. SALAZAR. I don't think I would quarrel too much with that, Madam Chairwoman. It is an area that we would see greater accomplishment in both developing additional training sources for those airports where extraordinary security measures are taking place, and more active monitoring of that training as it occurs overseas.

Mrs. COLLINS. When do you hope to begin doing that sort of thing?

Mr. SALAZAR. Certainly we have already initiated efforts. We routinely try—we will make as part of our inspection process in the future efforts to gauge when training courses are in fact being conducted, to monitor those more carefully.

Mrs. COLLINS. Are you going to develop the training standards yourself, FAA, for the entire industry, or will you assign this to some consulting group or something?

Mr. SALAZAR. We will work in a number of ways. Because training affects the entire air carrier industry, we see this as the perfect opportunity to begin a cooperative effort. The carriers have specific needs they would like to address, and FAA should take those fully into account.

By the same token, we have specific requirements we want to see conveyed. We see that probably done collectively.

Mrs. COLLINS. How do you currently satisfy yourself that the training standards are being properly implemented, Mr. Salazar?

Mr. SALAZAR. To the degree that we have looked at them, there in fact is much to be accomplished. In terms of testing, and testing knowledge retained and those kinds of things. We have looked into different training scenarios where we might employ interactive training methods.

We have looked at testing subsequent to those kinds of training, to see if knowledge is in fact being transferred.

Mrs. COLLINS. The question was whether or not you currently—how do you currently satisfy yourself at the FAA the training standards are being properly implemented?

Mr. SALAZAR. We approve the training programs, Madam Chairwoman, for those, and they are incorporated into the air carrier security program.

Mrs. COLLINS. You approve the program?

Mr. SALAZAR. Yes, ma'am.

Mrs. COLLINS. Do you have any kind of monitoring devices set up to see the program is being implemented properly?

Mr. SALAZAR. Yes. We do. Our principal security inspectors have an active role in assisting the carrier in developing those programs and training them. To the extent we can, we schedule sessions where we are present during the training process.

Mrs. COLLINS. Some discussion has taken place on the TNA. I believe I read in the newspapers—which was the source of my information—there were going to be six TNA machines installed between June 1989, and January 1990.

Can you tell me how many have been installed up to today's date?

Mr. BELGER. One has been installed at Kennedy. A second is on site in Miami. We are negotiating with Pan American Airlines to reach a final agreement for that machine to be operational. We have announced we would like to place a third system in Gatwick. We have a group going to London next week.

I believe we will be able to reach an agreement with the British airport authorities so the system can go to Gatwick in late October.

We also would like to place a system in Frankfurt. We have had continuing discussions with the Federal Republic of Germany. We are also talking with Northwest Airlines and the Detroit Airport Authority and with United Airlines at the Dulles International Airport.

Mrs. COLLINS. I am curious about what happened—some of the things that happened on Pan Am 103. It is my understanding—correct me if I am wrong—perhaps there was intelligence as to the possibility of something horrible happening to Pan Am. Was the FAA aware of any of that? Did your intelligence system alert anybody about this?

Mr. SALAZAR. If I may, Madam Chairwoman, there was no specific threat against Pan Am Flight 103. Now, there was intelligence information that was, in fact, being processed, one dealing with the Helsinki threat, as we—it has been—come to be termed. That was dealt with in the security measures that were already in place in Frankfurt.

Mrs. COLLINS. There are certainly other questions I am going to ask when we are in executive session regarding that. At this time, I yield to the gentleman from Utah, Mr. Nielson.

Mr. NIELSON. Yes. I have a lot of questions, also.

First of all, considering the number of international flights that travel between the United States and other countries every day, it is surprising there aren't more terrorist attacks. Are we just lucky? Or good? Doing a pretty good job? Or are we just lucky?

Mr. BELGER. Concerning the U.S. airlines today in Europe and the Middle East, particularly—which is the geographic part of the world where we require the most stringent security procedures—I have no reservation in saying that the procedures used by the U.S. carriers in that part of the world are more comprehensive, more thorough than any other commercial carrier.

Mr. NIELSON. Is there any relationship between the Pan Am 103 flight and the recent one where the wife of the Ambassador to Chad was killed?

Mr. BELGER. Not to my knowledge.

Mr. NIELSON. You don't tie those together at all?

Mr. BELGER. I have seen no information that ties those together at this point.

Mr. NIELSON. We talked about passenger screening and checking baggage and so on. That is the area to which we have reference now. What about freight? Isn't that a possible area of sabotage as well? If so, what are you doing about that?

Mr. SALAZAR. If I could, Mr. Nielson, indeed it is. There are particular safeguards built already into the transportation of freight, but it is becoming more and more active; and now, with additional services presented to customers for overnight delivery, it is one area that does give us some concern.

So, we have implemented additional studies to look specifically at the security measures and safeguards that currently exist, with an eye toward improving them.

Mr. NIELSON. Mr. Salazar, could you give me a rough estimate of how many attempts there have been to smuggle weapons or bombs upon United States-bound flights? Have any idea how many we catch, for example?

Mr. SALAZAR. We keep ongoing statistics, sir, for all activities involving U.S. air carriers.

Mr. NIELSON. How many do we catch?

Mr. SALAZAR. As I recall, within the last 5 years, on U.S. carriers, there were 60 incidents domestically where there were intercepted attempts to carry explosives, incendiary devices aboard.

Mr. NIELSON. How many on international flights?

Mr. SALAZAR. I don't have that figure readily at hand, sir.

Mr. NIELSON. If the answer were 60 that you caught, how many do you think escaped detection?

Mr. SALAZAR. That is difficult to measure, sir, to begin to measure a negative. We would like to think, sir, we were able to intercept them all. We certainly are not blind to the fact this is a very difficult area of detection.

It speaks directly to our areas of research and development.

Mr. NIELSON. Could you get information for our closed hearing on that tomorrow? I know you have information you may not be able to reveal here.

I have a question concerning Mr.——

Mrs. COLLINS. Let the record show the response to your question now is yes.

Mr. NIELSON. Mr. Belger, you mentioned the fact you are negotiating with Germany and other places to get some help on the program to detect—to implement TNA. You didn't tell us how successful you were in pushing that point across in Germany.

Mr. BELGER. I think——

Mr. NIELSON. West Germany.

Mr. BELGER. As you might suspect, there is reluctance, as in this country. We are talking about a new technology. The officials we talked to in the Federal Republic of Germany, however, have been very cooperative.

Mr. NIELSON. Aren't there certain factions within West Germany—the green party, particularly—who object on environmental grounds to bringing in something of a radioactive nature? If so, how do we overcome that political opposition?

Mr. BELGER. There have been questions asked about the safety of the equipment. I think we have pretty successfully dealt with those questions. The Germans have indicated they want to come over and look at the machine in use at JFK before they give us a final decision.

That seems to be fair to me.

Mr. NIELSON. I have a number of other questions. I will yield back the balance of my time at this time, and submit other questions in writing.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Thank you, Madam Chairwoman.

Were there security deficiencies filed in your inspections of Pan Am at Frankfurt in October? I am not asking you to describe anything. I am just asking you if there were deficiencies?

Mr. BELGER. October 1988?

Mrs. BOXER. Before the Pan Am crash.

Mr. BELGER. October 1988. As a result of that inspection, we asked Pan Am to provide us some clarifying information as to their procedure for screening individuals.

Mrs. BOXER. So, in essence, the answer is yes, there were security deficiencies found?

Mr. BELGER. In that sense, yes.

Mrs. BOXER. And have you changed some of your approaches as a result of this? Or is it just a matter of finding one carrier—in other words, is there anything you can do to be tougher or stronger or more unambiguous?

Mr. BELGER. I think there is a lot we can do. I think there is a lot we have done. We, as I said earlier, have put the U.S. carriers in some instances in a posture of having to deal as a private organization with a foreign government in order to get the space, the facilities, or the people to implement our Federal requirements.

It was clear to me months ago that the Federal Aviation Administration has to take a more active role—working with the State Department obviously—but we must take a more active role in trying to facilitate the implementation of our requirements outside the United States.

That is something that we are committed to. Our ability to do that, I think, in part is tied to our ability to have folks over there in that part of the world. That is why we have the request, which is adamantly supported by Secretary Skinner and Administrator Bussey.

We also, I think, have to work toward a capability to have more standard and more consistent inspection capability outside the United States.

Mrs. BOXER. May I interrupt you there? I couldn't agree with you more, yet Mr. Salazar, in his—in one of the earlier questions, made the statement—and I was surprised, and I wrote it down—that the systems vary from airline to airline.

Mr. SALAZAR. Foreign versus United States, Mrs. Boxer. That was your question.

Mrs. BOXER. In other words, we already have standardization for all of our carriers, to your——

Mr. SALAZAR. They all operate under the provisions of a security program approved by the FAA. It is referred to as the Standard Security Program. It is standard for all air carriers to comply with.

Mrs. BOXER. There is no deviation from airline to airline?

Mr. BELGER. Not from the standards. The performance expectations, as Ray said, that are in the Standard Security Program, are the same for all U.S. carriers.

Mrs. BOXER. Are you satisfied that the standards are as strong as they should be?

Mr. BELGER. No. Absolutely not. I think we should always be looking to improve them. It is not so much a question of——

Mrs. BOXER. Do you think Congress should get involved in that part of it? Or do you think we should wait for you to come forward with recommendations? Can you handle it without legislation?

Mr. BELGER. I think we need to work together. I don't know that legislation is necessarily the answer. But I think the Congress, the FAA, and Department of Transportation, the State Department—which has an integral role outside the United States—and the carriers need to work together.

Mrs. BOXER. You issue such regulations. I am inquiring of both of you: You feel the standards aren't tough enough and you are going to work toward tougher standards?

Mr. BELGER. I was going to expand on the use of the word "tough." I don't think it is so much a question of, are they tough enough? But are they as smart as they should be?

For example, some of the airlines, most of the U.S. carriers, to their credit—I take my hat off to them—in Europe, in the Middle East, are using a risk profile system—my words—which in many cases goes beyond what we require at this moment.

The FAA has developed an automated profile system which is being used by at least one carrier, and perhaps will be used by others at one station right now. It is a smarter way to do business.

Mrs. BOXER. Wait a minute. I thought we were standard. Now you are saying one carrier is using it.

Mr. BELGER. What we said was the Federal requirements are standard.

Mrs. BOXER. OK. Well, again, I get back to my original line of questioning. I think we don't have to reinvent the wheel. We know what airline is the model. And I think we know what to do. I am waiting for you, and I hope that you will, as a result of these hearings and others, come forward with those standards.

Thank you, Madam Chairwoman.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Thank you, Madam Chairwoman.

I would like to follow up on some of Congressman Nielson's questions. It is my understanding, Mr. Salazar, that approximately 12 incidents per year over the last 5 years have occurred in which airline security has picked up somebody trying to get a contraband item on board: a gun, an explosive, what have you.

How many in the last——

Mr. SALAZAR. Explosives and incendiaries. The track record for weapons is about 3,000 weapons a year domestically discovered in the airport screening process resulting in about 1,500 to 1,600 arrests a year.

Mr. Cox. How many people—without being picky about definitions—terrorists have we apprehended through airport security during that same period?

Mr. SALAZAR. Well, I think here domestically, sir, we can say——

Mr. Cox. Don't limit your answer to domestic travel. If you can respond internationally, so much the better.

Mr. SALAZAR. OK.

Mr. Cox. How many terrorists have we apprehended who are there to blow up an airplane, hijack it, something similar?

Mr. SALAZAR. There are no terrorists that have been—that are currently in custody—we have apprehended as a result of the preboard passenger screening process. Again—if I can emphasize, Mr. Cox, the system we have in place is to prevent criminal acts.

It is a system of barriers that we attempt to put up in order to thwart criminal acts against civil aviation.

Mr. Cox. So, it is a deterrent. The fact that you catch none suggests at least the possibility that it might be operating as a successful deterrent?

Mr. SALAZAR. Well, that is certainly our conclusion, sir.

Mr. Cox. Yet the fact that notwithstanding these procedures, bombings do take place, suggests that the terrorists are paying attention to what our security measures are and are going one step beyond so they will succeed—isn't that correct?

Mr. SALAZAR. There is no question in my mind the terrorist element has their own research and development program.

Mr. Cox. Because, for example, the TNA machine is described in the newspaper, and what it picks up and what it doesn't is described in the newspaper, do you think it is likely that terrorists who intend to be successful will not plan around the TNA machine?

Mr. SALAZAR. That is possible.

Mr. Cox. Isn't it more than possible? Isn't it almost a certainty?

Mr. SALAZAR. I think if we begin wholesale announcements where these devices are, there is a consequence that we could drive the criminal element to areas where they are not.

Mr. Cox. I guess what I am getting to is if you have unlimited resources, you don't need to worry about things like how much it costs. But since we don't, we need to worry about where it is most efficacious to focus our resources.

The TNA machine costs $1 million. It ought to be used in conjunction with a $150,000 x-ray machine, is that correct? Are my numbers about right?

Mr. SALAZAR. Correct, sir. It ought to be used in systems—it ought to be used redundantly with other areas that are effective, as Mr. Nielson pointed out, for example, the positive passenger reconciliation.

That is another feature that we ought to pay close attention to while we also are adopting technology.

Mr. Cox. So, say, it is about $1.1 million per detection site. Is it, in your view, economically feasible to put that kind of detection equipment at most gates on most airlines throughout the United States and the rest of the world?

Mr. SALAZAR. I think absolutely yes. I think the consequences that we are attempting to prevent clearly state——

Mr. COX. How many gates are we talking about? Just roughly speaking?

Mr. SALAZAR. I am sorry?

Mr. COX. How many points are there? It is my understanding from touring airport security facilities that it is best to put magnetometers at the gate, because you have the best use of the machine if you do that. If you put these machines at every gate, how many gates are we talking about throughout the United States and the world that we would have to cover with $1.1 million each?

Mr. SALAZAR. In our rulemaking effort, we addressed that deployment. Our estimate was that we would cover the busiest, the most active airports first on a graduated scale. We would address the specifics of their location and their use within each air carrier's security program.

Mr. COX. Without going beyond my allotted time, my reaction to this is that we are talking about a boat load of money—literally hundreds of millions, if not billions, of dollars—and that that amount of money and resources directed toward intelligence, toward finding out where the terrorists might be operating, where the popular front for the liberation of Palestine general high command is figuring out where to put the next bomb, would perhaps be a better use of our resources.

Mr. SALAZAR. It is certainly equal.

I do want to clarify one point about intelligence organizations. Information is fragile indeed. We distill well over 20,000 pieces of information, mostly classified, a year within our intelligence organization. And it becomes more, in its analysis, more of an art than a science. There isn't an exact formula for predicting the next terrorist event.

It is more trends and notives and it is an examination of some relatively soft pieces of information that we then react to and build preventive measures into.

Mrs. COLLINS. The time of the gentleman has expired.

Mr. Owens.

Mr. OWENS. Mr. Salazar, I don't want to be redundant. There is some clarification needed. You have been asked a question about your familiarity with the El Al security program. I think you said it is the best, one of the best, or the best; am I correct?

Mr. SALAZAR. One of the best; yes, sir.

Mr. OWENS. They don't rely on the super technology we are talking about here. They don't rely on inventions that are to come. What will it take—what is the difference in cost? Why can't we move to a system which is as effective as theirs is right away without waiting for new technology?

Mr. SALAZAR. It involves the scopes of operation Mr. Owens.

The fact is the Israeli carrier is a small operation and they focus and rely heavily upon a human element in its questioning, its interrogation, and its profiling.

In fact, it is very effective. With the scope of operations we presently look at—and we are talking presently 1.2 million people a day using the U.S. system—we are talking about billions of people being screened each year, four times the population of the United States.

It is impractical to be able to incorporate that kind of extensive manpower or person power into that kind of questioning and still result in the transportations system we have today.

So our philosophy deals more toward attempting to facilitate to the extent we can without interfering over-duly with the transportation system we have. We see technology as one of the leading areas.

Mr. OWENS. Dealing with just international flights, would it be feasible?

Mr. SALAZAR. International flights, sir, are quite frankly in the area of 1,800 departures a day, several hundreds of thousand passengers. It is still the same. Still the same dilemma.

Mr. OWENS. Have you costed it out? Surely you studied it and looked at it from many angles.

What would it cost?

Mr. SALAZAR. I am sorry. I can't give you an exact figure right now. I do know in our direct comparisons of the systems presently in use by El Al, it would be very, very expensive for a carrier with a scope of operation as some of the U.S. carriers to implement exactly.

So what we do is we take what we think to be the best from those systems and we attempt to incorporate those into U.S. standards. Profiling. We use those now. Questioning. We use that now. We use measures of redundant screening.

So we have attempted to take some of those best elements that fit best in the U.S. system and incorporate them.

Mr. OWENS. Volume is not all negative. In fact, we have a much greater volume that can be turned into an advantage.

Because with many more passengers, you could pay for a better system. After all, we are talking about life and death matters. I am sure most people individually wouldn't mind paying a little more to get a better system, a system which approaches the El Al system.

The consultant who spoke this morning, the former head of the El Al security system, spoke of the tremendous differences, which would almost make our system bankrupt and dangerously ineffective. He spoke specifically about the caliber of personnel that we use to do the things that we are doing, to read the x-ray machines, et cetera.

He spoke about the fact that most of these people are on the minimum wage. We know that to be a fact. Have you thought about raising the standards and requiring that there be more specialization, that these people get better training, more training, more hours, at least there would be some mix in the personnel so that one person at all times would be a specialist and would know how to read the x rays and would know how to profile people and a number of other things? You can't get that at the minimum wage, even if we get the increase in the minimum wage.

You can't get that. So it seems to me that as part of your standards, you have to talk about upgrading the personnel and establishing some kind of specialization that would offer better protection without these super machines.

Mr. SALAZAR. I would agree with you, Mr. Owens.

It is certainly not just the people issue. It is the equipment and the procedures as well. All have to be looked at together.

There are a number of initiatives underway in order to address that. We have looked at incentives necessary to get better human performance out of this particular system. We have ongoing development efforts for computer enhancements to x-ray imaging that would cause a screener to pay more attention and be able to measure that productivity more exactly.

At the same time, the carriers have looked at this very closely as well. The Air Transport Association has a very effective program that has been approved that deals specifically with improving human standards and performance. So all of these things, I think come together and hopefully—and I would hate to condemn the minimum wage, sir. There are many people out there working at 1,200 security checkpoints across the United States that are presently drawing that and some of them doing excellent jobs for the wages they receive.

So it isn't just the financial issue.

Mr. OWENS. I know. I ride planes all the time. I see the faces changing all the time. I am sure if you work at the minimum wage you are looking for another job that pays higher. It is a good entry level job for people, but that doesn't meet the need of safety we are talking about.

Madam Chairperson, may I have just 1 more minute? What is the equivalent in Great Britain, let's say—forget about El Al—for the kind of person being used to screen baggage, the kind of person on the front line. What is the difference between the United States employee doing that and Great Britain? The level of person? The requirements for that job?

Mr. SALAZAR. In terms of standards? I am not clear on the question, Mr. Owens.

Mr. OWENS. What kind of training does that person have? What must he be required to have in the London airport versus the people we have in our airports?

Mr. SALAZAR. There are international standards that have been developed through ICAO in order to have minimum air carrier training requirements.

Mr. OWENS. Do they have 8 hours, too? Are more than 8 hours required in Great Britain?

Mr. SALAZAR. If you want me to respond to the U.K. requirements, I can provide those to you. I am not aware right now.

Mr. OWENS. Does anybody know? Do we do comparisons with places like England, France?

Mr. BELGER. If I can give you my perspective without being specific as to Great Britain, I think the fundamental difference you would see in many European countries is that the airports themselves, and in some cases the carriers, are either owned or tremendously subsidized by the government. In many cases——

Mr. OWENS. So there is a great difference then?

Mr. BELGER. In many cases, the screening itself is done by government employees.

Mr. OWENS. Civil servants?

Mr. BELGER. In many cases it is done by military employees. In many places, it is done by the police. A fundamental difference in the way we do business in the United States and the way it is done in many European countries.

There is no question of that.

Mr. OWENS. Mr. Salazar, you have never looked at that.

Mr. SALAZAR. Of course we have looked at it, sir. In my view, it isn't who does it more than it is, what is being done. It is the function that we should be concerned about in elevating. We have proposed a significant agenda to the international community to get those standards raised to assure that this aviation system that interconnects worldwide, we can rely on those same standards.

But I would hate to dwell on the person or the authority that does it. It is more the function itself.

Mr. OWENS. I don't want us to be guilty of having the weakest link.

Mr. BELGER. If I can follow up on that, the reason that the Federal Aviation Administration requires U.S. carriers to do redundant screening outside the United States is that the primary screening which is done in many of these countries does not meet our standards.

It has nothing to do with who does it, whether it be the police or the military or an airport employee or an airline employee.

It is that the standards, what is expected of them in that part of the world, doesn't meet our standards. That is why we put this very burdensome requirement, this very onerous requirement, on our carriers to screen after the host country screens.

Mr. OWENS. Thank you, Madam Chairperson.

Mrs. COLLINS. It had been my intention to call the next set of witnesses, but I notice we are moving along at a time when many people want to relax or stretch for just a minute.

Therefore, what we are going to do is recess and come back at 2:10.

When we return, our panel will be Mr. Billy Vincent, former FAA Director of Security, Mr. Bert Ammerman, president of Family of Victims of Pan Am 103, and Mr. Daniel Cohen, who is with Survivors of Pan Am 103.

We will recess until 2:10.

Will the FAA please stay because there might be some questions we want to ask after the testimony?

Mr. SALAZAR. Absolutely. Yes, ma'am.

Mrs. COLLINS. Thank you.

[Recess taken.]

Mrs. COLLINS. This hearing of Government Activities and Transportation will reconvene at this time. The panelists are Mr. Billie Vincent, a former FAA Director of Security; Mr. Bert Ammerman, the president of the Families of Victims of the Pan Am Flight 103; Mr. Daniel Cohen, who is also working with a group called Survivors of Pan Am Flight 103.

Mr. Vincent, why don't we begin with you?

Mr. Vincent, will you stand, please.

[Witness sworn.]

Mrs. COLLINS. Now, you may begin, Mr. Vincent.

Let me restate for all who might not have been here earlier. I am sure you are all aware, the House operates on a 5-minute rule. We will give you 5 minutes to summarize your testimony. Your entire testimony will be made a part of the record.

You may begin, Mr. Vincent.

STATEMENT OF BILLIE VINCENT, FORMER DIRECTOR OF CIVIL AVIATION SECURITY, FEDERAL AVIATION ADMINISTRATION

Mr. VINCENT. Thank you.

Sitting here this morning, listening to the testimony, I am somewhat frustrated, perplexed, and distressed at some of the things I hear said. I certainly don't agree with many of them and will take the opportunity that this presents to give my differences over the next several minutes.

I appear before the committee today with the hope that these hearings will result in the building of a civil aviation security system that will prevent more Pan Am Flight 103 tragedies. The recent unsettling news about the loss of the French UTA DC-10 with 171 people adds impetus to the task of correcting the deficiencies in the U.S. civil aviation security system. Unfortunately, I am also a realist, after having spent over 30 years working for the U.S. Government. My expectations about what this Government is inclined to do are somewhat less than what I believe is necessary.

First, let me say the obvious—the U.S. civil aviation security system is seriously deficient. it did not prevent the Pan Am Flight 103 tragedy from happening, and more important, what has been done since December 21, 1988, will not prevent another similar tragedy. My full statement for the record will illustrate my position and the reasons why I believe this to be true. That statement is now available.

My remarks will focus primarily on the international arena because that is where the greatest threat to civil aviation exists.

U.S. civil aviation security is a shared responsibility between the civil aviation industry and the U.S. Government, with the passengers and U.S. taxpayers paying for the system. A simple way to state the philosophy under which the civil aviation security system operates is that the FAA makes the rules and requirements and the U.S. air carriers and airport operators are responsible for application of these rules and requirements.

Outside the United States, the host government is usually responsible for civil aviation security. The U.S. carrier is to compensate for deficiencies on the part of the host country. An effective system has to contain certain elements. These elements must work in harmony to produce the protection desired. An overabundance of security, provided it contains the essential elements and these elements are effectively executed, should provide a satisfactory countermeasure to any given threat level. An overabundance of security, if it does not address the threat, will not provide the security protection required to counter a specific threat level. In addition, an underabundance of security, or one that contains all the essential elements but is ineffectively executed, will not provide any positive level of security for any given threat level. Most of my comments will be based in relation to a threat level.

In the late sixties and early seventies, the hijacking threat to civil aviation worldwide increased to such proportions that the United States developed and implemented a security system to prevent or deter hijacking of U.S. airlines.

The nature of the threat to U.S. civil aviation changed from one of hijacking to a sophisticated sabotage threat in the early to mid-

1980's. The precursor to this threat change were the two Pan Am bombs in August 1982 which I will describe in a moment. In the same time period, the incidence of hijacking of the U.S. airlines dramatically decreased.

Unfortunately, unlike its action in the early 1970's to protect against hijackings, the U.S. Govenrment has not yet required the development and implementation of a comprehensive civil aviation security system to protect against sophisticated bombs.

The terrorist only has to be lucky once to achieve his purpose, that is, the destruction of an airliner in flight. Like the IRA terrorist said after the Brighton, England bombing that almost killed Prime Minister Margaret Thatcher, "we only have to get lucky once. She has to be lucky every time." We in the United States must stop relying on luck and build a security system that protects U.S. civil aviation against sophisticated bombs.

In my statement for the record, I have described in words and pictures the nature of the threat against U.S. civil aviation. It is not enough to enumerate the incidents and expect the initiated to understand the level of the threat against civil aviation. It is necessary that the types of sabotage devices be known, their ease of concealment, difficulty of detection, and their destructive potential be described. In each of these categories, the level of sophistication of the threat to civil aviation dramatically increased beginning in the early 1980's.

Madam Chairman, and members of the subcommittee, I am prepared to illustrate the sophistication of these bombs and answer your questions at your convenience.

Thank you for the opportunity to participate in these hearings.

[The prepared statement of Mr. Vincent follows:]

STATEMENT BY
MR. BILLIE H. VINCENT
BEFORE A
SUBCOMMITTEE OF THE
COMMITTEE ON
GOVERNMENT OPERATIONS
HOUSE OF REPRESENTATIVES
SEPTEMBER 25/26, 1989

Madam Chairwoman and Members of the Subcommittee:

I appear before this Subcommittee today with the hope that these hearings will result in the building of a civil aviation security system that will prevent another Pan American 103 tragedy.

The recent unsettling news about the loss of the French UTA DC-10 adds impetus to the task of correcting the deficiencies in the U.S. civil aviation security system. Unfortunately, I am also a realist after having spent over 30 years working for the U.S. Government, and my expectations about what this Government is inclined to do are somewhat less than what I believe is necessary. Nonetheless, anything you can do to move the Bush Administration towards taking a systems approach to the development and installation of a comprehensive, dynamic, civil aviation security system which, when fully implemented, will prevent another Pan Am 103 tragedy will be applauded by all who travel by air. My remarks will be directed towards this objective.

First, let me say the obvious; the current U.S. civil aviation security system is seriously deficient. It did not prevent the Pan Am 103 tragedy from happening, and more important, what has been done since December 21, 1988 will not prevent another similar tragedy. I intend to present information to illustrate my position and the reasons why this is true.

My remarks will primarily focus on the international arena because that is where the greatest threat to civil aviation exists. I will conclude with a suggested outline-for-action, and describe the essential elements of a security system that will, if properly implemented, prevent another Pan Am 103 tragedy.

Let me acknowledge, at the outset, that while I may directly question the political and managerial acumen of the Administration's political leadership, on some of the issues discussed in this statement, I hold the FAA security staff in the highest regard. It was my distinct pleasure and privilege to work with them as Director of the FAA Office of Civil Aviation Security for over four years. I have never found a more dedicated or motivated group.

Before we can establish the level of the U.S. civil aviation security system needed, we must first establish the requirement for a civil aviation security system. This is true for any security system, regardless of its nature. To establish this need, we must assess the threat level against U.S. civil aviation.

Up until the early 1980s, it can be said that the principal threat to U.S. civil aviation was hijacking. Prevention of hijackings was largely dependent on the detection of weapons. The civil aviation security system established in the U.S. and elsewhere in the world in the early 1970s was keyed to the detection of weapons, i.e., the prevention of hijackings.

In late 1982, the nature of the threat to civil aviation changed principally to one of sabotage, in fact, to one with the use of sophisticated sabotage devices. This fact was recognized by FAA officials prior to 1986, contrary to public utterances made by some FAA officials since the Pan Am 103 tragedy.

Unfortunately, the civil aviation security system in use around the world, with one notable exception, is still largely directed at weapons detection. A few airlines have instituted measures to enhance their capability to detect sabotage devices. Nevertheless, the civil aviation security system, with the one exception noted above, is not keyed to detect the sophisticated explosive devices that have been directed against civil aviation since August 1982.

I. INTERNATIONAL THREAT TO CIVIL AVIATION

There is a substantial amount of data available in the public sector on which to base an assessment of the threat level to U.S. civil aviation. The following are selected items involving sabotage to civil aviation worldwide. It should be noted that these are not an exhaustive listing of the sabotage acts against civil aviation available even in the public sector.

Item 1 August 11, 1982

An explosion occurred on a Pan Am B-747 enroute from Narita Airport, Tokyo, Japan to Honolulu Airport, Honolulu, Hawaii. The explosion killed a Japanese national and injured 15 other persons.

Note: The bomb was subsequently thought to be identical to the one found on a Pan Am B-747 in Rio de Janeiro on August 25, 1982 (see next item and Attachment A).

Item 2 August 25, 1982

An unexploded, improvised explosive device (IED) was discovered on a Pan Am B-747 at the Rio de Janeiro Airport on August 25, 1982. The FAA and FBI were given custody of the bomb and returned it to the U.S. for examination and testing. The bomb's triggering mechanism contained an *electronic timer*, a *barometric sensor*, and two AAA batteries. The explosive was a 4 by 10-inch sheet of 1/8 inch thick SEMTEX (approximately 300 grams (2/3 lb)(see Attachment A)).

Item 3 September 23, 1983

A Gulf Air B-737 departed Karachi, Pakistan after security personnel discovered a person had purchased a first-class ticket for the flight about an hour before the scheduled departure time, but failed to board the flight to Abu Dhabi. A bomb subsequently exploded in the aircraft cargo hold and the aircraft crashed in the desert killing all 112 persons on-board.

Item 4   December 1983/January 1984

A British national unknowingly carried a bomb concealed in the lining of her suitcase from Athens, Greece to Tel Aviv, Israel, to London, England, and back to Athens. The suitcase bomb failed to detonate as designed and was recovered by the Greek Police. The bomb's *triggering mechanism* contained an *electronic timer* and a *barometric sensor.* The suitcase had 1/8 inch *sheets of SEMTEX explosive* concealed inside the lining of the suitcase. The bomb was *cleverly concealed* and very difficult to detect. After confiscating the suitcase, the Greek Police did not at first realize that it contained a bomb (see Attachment B).

Item 5   December 29, 1983

A terrorist attempted to check a piece of luggage on an Alitalia flight from Istanbul, Turkey to Rome, Italy and then interline the bag to a Pan Am B-747 flight to New York. The Turkish Police removed the bag and discovered a bomb after the passenger failed to board the Alitalia flight to Rome.

Item 6   January 18, 1984

An Air France B-747 departed Karachi, Pakistan and suffered a loss of pressurization while climbing through 18,[illegible] [illegible] after the aircraft safely returned to Karachi, a three by six foot hole was discovered in the aft cargo hold on the right side of the aircraft. Subsequent examination of the evidence by the FAA and FBI led to the conclusion that a bomb in the bag of a UNESCO official detonated causing the hole in the B-747. The bomb was thought to have contained less than one pound of explosive - probably 2/3 lb.

Item 7 March 10, 1984

A bomb exploded aboard Flight 772, a DC-8 of the French Airline, Union des Transports (UTA), with 100 persons aboard during a stopover at N'Djamena Airport, Chad. Twenty-four passengers were injured. The flight originated in Brazzaville, Congo, and was bound for Paris, France with another stop at Bangui, Central African Republic. Reportedly, the bomb exploded in the DC-8's central luggage compartment twenty minutes after landing. The aircraft was completely destroyed. Responsibility for the explosion was claimed by an opposition political group calling itself the "Idriss Miskine Group".

Item 8 May 18, 1984

Two men were arrested at the Leonardo Da Vinci International Airport after explosives, without detonators, were discovered beneath false bottoms in their suitcases. Additional searches of their carry-on luggage revealed detonators and false Iraqi passports. The two arrived in Rome via Syrian Arab Airlines from Damascus, Syria. They were making a connection with an Iberian Airline flight to Madrid, Spain.

Item 9 June 25, 1984

Police in West Berlin, acting on a tip that Palestinian terrorists may attempt to transport suitcases filled with explosives into the city, searched an apartment in the U.S. sector and found two suitcases. Each suitcase contained approximately two pounds of explosives [illegible] in sheet form inside the lining of the suitcases. The bombs had electric blasting caps for initiators, although no power sources were found. It is believed that the two suitcases were being transported for use at another location, possibly for an aviation target.

Item 10 August 2, 1984

As many as 40 people were killed and 19 injured when a suitcase bomb exploded in the International Arrival Hall at Madras International Airport, Madras, India. The powerful explosion ripped apart the airport terminal and caved in the ceiling of the arrival lounge. The bomb was inside a suitcase of an individual who purchased a ticket to Sri Lanka, checked two bags, obtained a boarding pass, but never boarded the flight. A passenger/bag match isolated the two bags, which were taken to the customs area for disposition. Officials speculate that the bomb had been placed in the suitcase by supporters of the Tamil Separatist movement in Sri Lanka.

Item 11 November 7, 1984

Security forces at the Frankfurt International Airport arrested a Palestinian with a forged Tunisian passport attempting to board a Lufthansa flight to Athens, Greece. Physical examination of his suitcases revealed a false bottom containing approximately three pounds of plastic explosives. There were no detonators found.

Item 12 December 29, 1984

A Lebanese woman was arrested at Beirut International Airport after a security official discovered explosives in her luggage. The suitcase contained one kilo of explosives and two detached detonators. The [illegible] who was scheduled to travel to Athens, [illegible], on [illegible] East Airlines, claimed that she had bought the suitcase enroute to the airport and that she had no idea that the suitcase contained explosives. Reportedly, the woman was also carrying a false passport.

Item 13 February 19, 1985

Authorities at Frankfurt International Airport discovered a suitcase and carton containing bomb components and apprehended a passenger who was transporting these items from Damascus, Syria to Barcelona, Spain. The 10 1/2 kilos of explosives were concealed in the suitcase and detected by a security dog searching for drugs in the baggage area. The passenger had in his possession two passports, which appeared to have been falsified. The primer found was identified as a primitive device, which, in the past, had been used by followers of the "Abu Nidal" group.

<u>Item 14</u> <u>March 9, 1985</u>

A young man was arrested at the Dubai International Airport, Dubai, United Arab Emirates, after a bomb exploded in the baggage compartment of a Royal Jordanian Airlines (ALIA) Tristar aircraft. The explosion occurred as airport workers were unloading a cargo container from the aircraft which stopped in Dubai on a flight from Karachi, Pakistan to Amman, Jordan. Reportedly, the youth stated that he had been recruited by an Arab country, supplied a false passport, and had received one month's training for this attack. He also stated that the suitcase containing the explosive was handed to him by a man in Karachi.

<u>Item 15</u> <u>June 23, 1985</u>

An Air India B-747 was lost in the Atlantic Ocean southwest of Cork, Ireland killing all 329 persons on-board. Subsequent investigation by Canadian and Indian authorities led to the conclusion that Seikh terrorists checked a bag on-board the Air India B-747 and another bag on-board a Canadian Pacific aircraft to Tokyo that was to be interlined to another Air India B-747 in Tokyo. The terrorists received boarding passes for both Canadian Pacific Flights, but neither passenger boarded their aircraft.

An Indian Court of Inquiry subsequently concluded from circumstantial evidence that a bomb was responsible for the destruction of the aircraft southwest of Cork, Ireland.

Item 16 June 23, 1985

Within one hour of the loss of the Air India B-747 (previous Item), a bomb detonated in the baggage handling area of the Narita Airport, Tokyo, Japan, killing two baggage handlers and injuring several others. A bag, which contained the bomb, was being transferred from a Canadian Pacific flight to an Air India B-747. The explosive device was concealed in a radio. The amount of explosives is thought to have been around one pound.

Item 17 July 1, 1985

Fifteen baggage handlers were injured when a bomb, apparently contained in a suitcase, exploded at Leonardo Da Vinci Airport. The explosion occurred in an open-air luggage bay under the main airport building, shattering glass and causing minor structural damage. The bomb scattered dozens of suitcases over the tarmac. Since the baggage had not been sorted at the time of the explosion, authorities were unable to determine where the suitcase came from or its destination.

Item 18 October 15, 1985

Two individuals arriving from Baghdad, Iraq aboard an Iraqi Airlines aircraft were arrested in Rome, Italy. One of the two, arrested at the Rome Airport with a 20 pound bomb concealed in the false bottom of his suitcase, was quoted as saying that he intended to use the device against Israelis and Americans [illegible] Italians. The second man was arrested as he got off an airport bus at the central train station where a similar bomb was found in his suitcase.

Item 19 February 1986

A sophisticated suitcase bomb was discovered by the Israeli authorities at one of their security screening points. This bomb had SEMTEX explosives molded into the sides, corners, bottom, and top of the suitcase concealed beneath the lining. *The bomb had a barometric sensor, an E Cell timer, and an electric blasting cap either entirely or partially embedded in the SEMTEX explosives.* A connector was provided to attach the batteries for the power source. An arming switch permitted the suitcase bomb to be safely transported (see Attachment B).

<u>Item 20</u> <u>April 2, 1986</u>

A bomb exploded in the cabin of a TWA B-727 enroute from Rome, Italy to Athens, Greece killing four persons. It was later concluded that the bomb had an *electronic timer* and a *barometric sensor* and was probably placed on the aircraft by a passenger who boarded the aircraft on an earlier flight departing from Cairo, Egypt. *This bomb is thought to have been identical to the device that exploded on the Pan Am B-747 on August 11, 1982 (Item 1), and the bomb found on the Pan Am B-747 on August 25, 1982 (Item 2).* The bomb was believed to contain approximately 300 grams (2/3 lb) of SEMTEX explosive (see Attachment A).

<u>Item 21</u> <u>April 17, 1986</u>

An Irish national attempted to board an El Al flight at the Heathrow Airport in London, England on April 17, 1986. She was discovered to be unwittingly carrying a functioning bomb in a handbag.

The bomb detonating mechanism, including the initiator (electric blasting cap), a small amount of SEMTEX explosive, and timer, was contained in a fully functioning calculator. The calculator was lying on the bottom of the bag. Concealed inside the false bottom were approximately 3 pounds of plastic explosives.

The bomb was discovered through the diligence and the highly professional security examination by El Al security agents. The bomb had already cleared through the Heathrow security system without being detected (see Attachment C).

Item 22 May 1, 1986

A Japanese national who resided in Athens, Greece, was arrested by Dutch authorities after components of an explosive device were discovered in his luggage at Schiphol Airport, Amsterdam. Concealed in the suitcase in separate containers were approximately one kilogram of explosives (possibly TNT) and several primers. Reportedly, the individual arrived in Amsterdam from Belgrade, Yugoslavia, via Yugoslavia's national carrier JAT. The suspect indicated his objective was to attack Americans or Israelis in the Netherlands.

Item 23 May 3, 1986

An explosion on a Sri Lankan L-1011 on the ground at Colombo, Sri Lanka cut the aircraft in half killing 16 persons and injuring more than 40 others. It was later determined that a large amount of explosives (several pounds) was loaded into the aft cargo hold with the assistance and knowledge of a Sri Lankan Customs official. The aircraft was late in departing and as a consequence was destroyed on the tarmac rather than in flight.

Item 24 June 26, 1986

A suitcase bomb exploded at the El Al Airlines check-in counter Barajas International Airport, Madrid, Spain. The bomb began to smoke while the suitcase was open and was being inspected by a member of the El Al security team. A warning shout by the El Al security inspector alerted bystanders and probably saved lives. The individual transporting the suitcase was arrested, and a Palestinian associated with the Abu Musa group was later apprehended. The Spaniard carrying the suitcase was reportedly duped into thinking that he was transporting illegal drugs. If the bomb had escaped detection and if the timing device had functioned properly, it would have exploded two hours after takeoff.

Item 25 1986

An individual was detained at the Beirut International Airport with a false-bottomed attache case containing a high explosive. The individual was attempting to board a Middle East Airlines flight to West Germany.

Item 26 January 13, 1987

West German authorities arrested Mohammed Ali Hamadei at the Frankfurt International Airport when he was found to be carrying a powerful liquid explosive concealed in liquor bottles. Hamadei had flown to Frankfurt from Beirut, Lebanon on a Middle East Airlines flight and was carrying a false passport when arrested. The intended destination of the explosive is not known. Hamadei has since been convicted of the 1985 hijacking of TWA flight 847 from Athens, Greece to Beirut, Lebanon.

Item 27 November 29, 1987

Two North Korean agents planted a bomb consisting of explosives concealed in a liquor bottle and small radio. The timer, electric blasting cap, power source, and approximately 350 grams (approximately 3/4 lbs) of plastic explosives were concealed in a radio. The radio and liquor bottle of explosives were placed next to each other in an over-head luggage bin above seats 7B and 7C. The two agents left the airplane, leaving the bomb in the over-head compartment, at the Abu Dhabi airport in the United Arab Emirates. The bomb exploded about seven hours later while in flight over the Andaman Sea enroute to Bangkok, Thailand, killing all 115 persons on board (see Attachment D).

Item 28 October 26, 1988

Federal Republic of Germany (FRG) Police (BKA) raided a suspected Middle East terrorist "safe house" in West Germany. The BKA found what subsequently proved to be *several cleverly concealed sophisticated explosive devices. One bomb was concealed inside a Toshiba BoomBeat 453 radio. This bomb had its own power source (batteries), independent of the batteries that powered the Toshiba radio. The bomb initiator included a barometric sensor.* The bomb contained approximately 300 grams (2/3 lb) of SEMTEX explosives (see Attachment E).

Item 29 December 21, 1988

On December 21, 1988, Pan Am Flight 103 was destroyed by what was subsequently determined to be a bomb shortly after the aircraft departed Heathrow International Airport in London, England. All 259 persons on board, plus 11 persons in Lockerbie, Scotland, were killed. Authorities from the United Kingdom and the United States have said publicly that Pan Am 103 was destroyed by a bomb located in the left forward section of the forward cargo hold. The FAA has said that "Evidence indicates that the bomb was concealed in a radio/tape recorder being shipped in checked baggage." An FBI official is quoted in an interview as saying that the bomb was in a Toshiba cassette-recorder and that the explosive was SEMTEX (see Attachment E).

Item 30 April 15, 1989

BKA investigators discovered in another PFLP-GC safehouse in West Germany three more bombs hidden in electronic equipment. Two stereo tuners and another electronic device were confiscated and removed to BKA offices. A BKA officer, investigating one of the two stereo tuners, was later killed and another officer was severely injured.

I include in my statement the FAA's own documents (4) covering explosions aboard aircraft from May 7, 1949 through December 31, 1988. These documents are replete with examples of explosive devices detonating on civil aircraft all over the world. In addition, I incorporate by reference, all classified data available to the U.S. Government, past and present, concerning the threat or threats to civil aviation.

II TYPES OF SABOTAGE THREATS

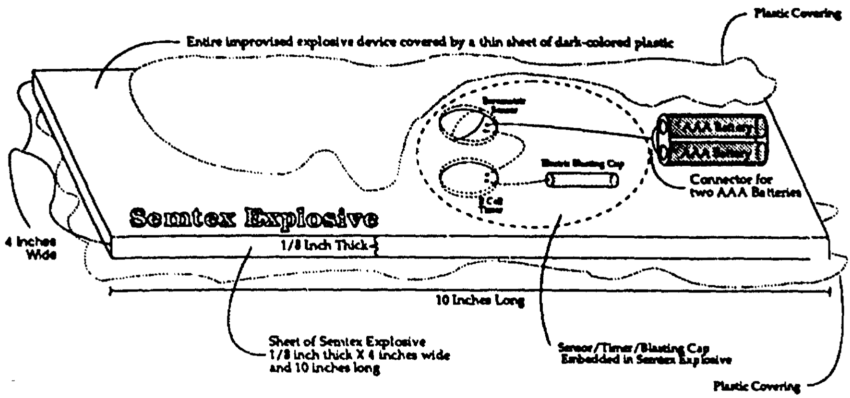
It is not enough to enumerate the incidents (known to the public sector) and expect the uninitiated to understand the level of the threat against civil aviation. It is necessary that the types of sabotage devices be known, their ease of concealment, difficulty of detection, and their destructive potential be described. In each of these categories, the level of sophistication of the threat to civil aviation dramatically increased beginning in the early 1980s.

The bombs noted in the first two items in Section I of this statement involved a previously unknown type of improvised explosive device (IED). The actual physical configuration, timing system, and power source of the August 11, 1982 bomb could not be determined from the forensic analysis following the explosion onboard the Pan Am flight from Tokyo to Honolulu (Item 1).

After finding an unexploded bomb on a Pan Am 747 in Rio de Janeiro on August 25, 1982 (Item 2), the physical configuration, timing system, and power source for the August 11 bomb became known. A Federal Aviation Administration aircraft was dispatched to Rio de Janeiro with two FAA security experts (one explosives and [illegible]rt/airline security specialist) and two FBI explosives experts. The bomb was returned to the U.S. where the FBI and FAA explosives experts analyzed the device.

The Rio bomb was replicated, e.g., explosive size and content, and tests were conducted in a section of a DC-10 fuselage at the FAA Technical Center in Atlantic City, New Jersey. These tests resulted in similar damage on the DC-10 fuselage to that suffered on the Pan Am 747 from Tokyo to Honolulu on August 11 (Item 1). An anthropomorphic dummy placed in a window seat was thrown across two seats into the aisle in a manner similar to the way the Japanese youth was killed on the Pan Am 747.

Under-The-Seat-Cushion Bomb used against
Pan Am (Item #1 & #2) and TWA (Item #20)



Attachment A

The August 25 Rio bomb consisted of a 4 X 10 X .15-inch (approximate) sheet of SEMTEX explosive. Imbedded in the SEMTEX was an E cell, an electric blasting cap, and a barometric sensor. The power source for the bomb was two AAA size batteries.

The E cell served as a timer. I am informed that, theoretically, an infinite amount of time can be programmed into the E cell. The barometric sensor served as a switch, which activated the bomb when it was flown above a certain altitude. When the aircraft descended below this altitude, the bomb would become inactive even though time might still be remaining in the E cell timer. When the bomb was again carried above the pre-determined altitude, the barometric sensor would activate the timing system again. This sequence would repeat itself until the time expired on the timer and the bomb would explode. This timing and barometric sensing system guaranteed that the device would only explode while the airplane was flying!

The bomb also had an arming switch. This switch was apparently designed to enable a courier to safely carry the device in the event the barometric sensor malfunctioned and activated the bomb. The arming switch simply ensured that the timing circuitry remained in an open condition. Once the arming switch was enabled, and the power source was attached, the device became a fully functioning bomb.

The appearance of the sophisticated bombs noted in Items 1 and 2 against civil aviation was an alarming new development. This level of sophistication and concealability had never been used against aviation before. Compared to previously known devices, these bombs were devastating. They could be easily carried by an individual in any number of ways to evade detection. The bombs were small enough to be concealed inside a man's western-style suitcoat pocket, a woman's purse, a carry-on bag, etc. The two AAA size batteries to power the bomb could be disguised in any number of legitimate electronic devices, e.g., radios, cassette players, etc., carried by passengers.

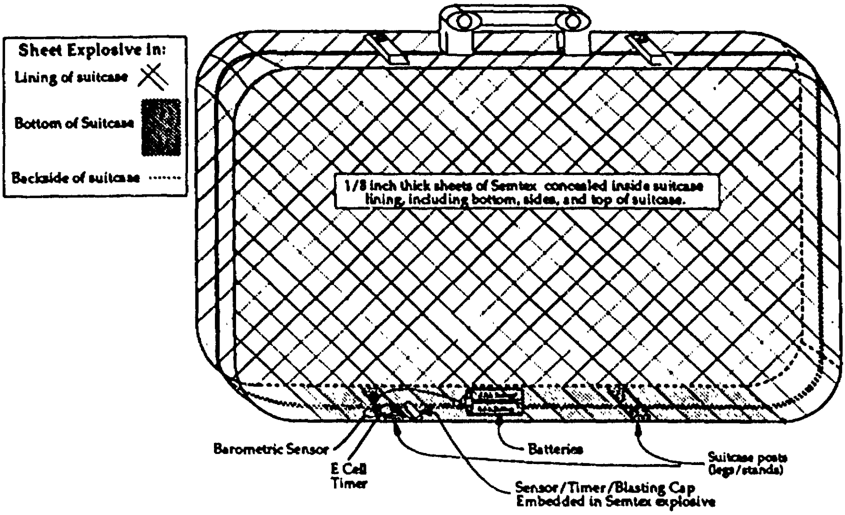
An example of this ease of concealability is thought to have occurred on April 2, 1986, when a Lebanese female is suspected to have planted the bomb on TWA Flight 840 (Item 20). This flight actually originated in Cairo in the early morning of April 2, as TWA Flight 841, flew to Athens, Greece, and then to Rome, Italy. The flight changed to TWA 840 in Rome and was descending to make an intermediate stop in Athens before [illegible] to Cairo whe[illegible] bomb exploded under seat 10F.

The Lebanese female suspected of planting the bomb under the seat cushion (see Attachment A) on seat 10F was observed to be listening to a cassette tape player during her flight from Cairo to Athens. She is thought to have connected the batteries to the device when she visited the lavatory just prior to landing in Athens. After returning from the lavatory, she could easily have left the now-armed and powered device under the seat cushion of her seat (10F) without being observed. To plant such a device takes only two to three seconds.

TWA Flight 841 is then thought to have flown to Rome with the armed device under the seat cushion of seat 10F. The barometric sensor activated (closed an open switch) the bomb's E Cell electronic timer after the aircraft had climbed above a pre-set altitude. Once the aircraft descended below this pre-set altitude the barometric sensor deactivated (opened a switch) the bomb. While TWA Flight 840 was on the ground at Rome, the bomb remained deactivated; however, after the aircraft departed Rome and climbed above the pre-set altitude, the barometric sensor once again reactivated the bomb. As the B-727 approached Athens, the time programmed in the E Cell timer expired and the bomb exploded.

The work of the terrorists who developed, transported, and planted this bomb cannot be described in these clinical, sanitized terms and still convey its impact in human terms. When the bomb exploded, the legs of the man sitting in seat 10F were virtually severed; this man, the small child in her mother's lap in seat 11E, her mother, and her grandmother in seat 11F were all sucked out the hole made by the explosion in the side of the aircraft next to seat 10F. One can only imagine the horror of these individuals as they plummeted to their deaths from 15,000 feet. This is what terrorism means. This is the true face of terrorism! Terrorists who carry and plant these bombs know what they are doing. Because the bomb must be armed and planted, an unwitting (dupe) carrier cannot be used with this type of bomb.

Suitcase Bomb with Semtex explosive, Barometric Sensor, E Cell Timer, and Blasting Cap concealed inside lining on bottom, top, ends, and sides of suitcase (See Items 4 & 19)

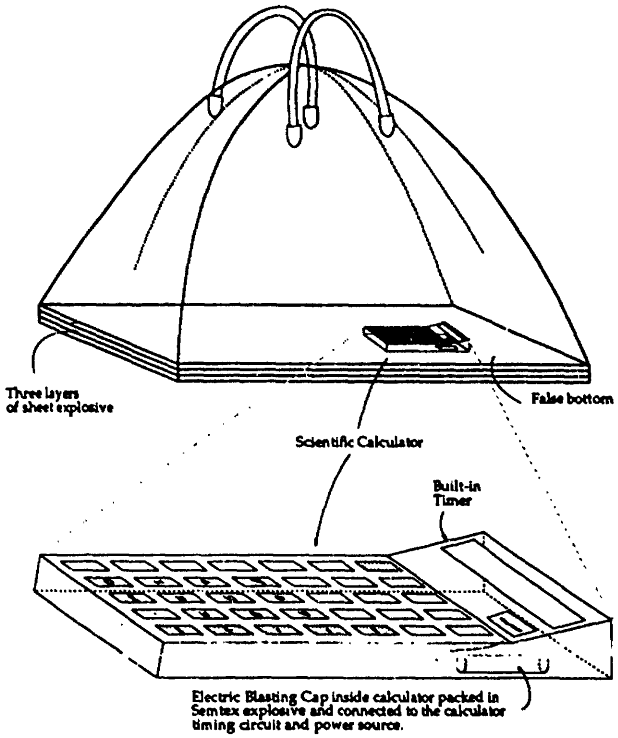


Attachment B

Let's return to our clinical, sanitized description of sophisticated terrorist bombs. The suitcase bomb noted in Items 4 and 19 contained the same sensing, timing, arming, and detonating system as described above for Items 1,2, and 20. The barometric sensors, E Cell timers, and electric blasting caps were all fully or partially embedded in the SEMTEX explosives concealed in the sides, corners, tops and bottoms of the suitcases. The transference of this highly concealable technology to a suitcase represented the second alarming development of these sophisticated bombs. Fortunately for passengers traveling on aircraft where these suitcase bombs were used, they failed to function as designed. Nonetheless, they were, and remain a formidable threat because of their concealability and the inadequate security measures protecting U.S. commercial aviation.

These suitcase bombs can be unwittingly carried by passengers who are given the suitcase for ostensibly legitimate reasons. The woman who carried the suitcase bomb (Item 4) from Athens, Greece to Tel Aviv, Israel, to London, England and then back to Athens in December 1983 and January 1984 did not know that she was carrying a bomb. She was given the suitcase bomb by her boyfriend (Jordanian passport holder) to take with her to carry religious artifacts she planned to acquire in Israel. Similar tactics have been used several times to obtain the cooperation of unwitting carriers.

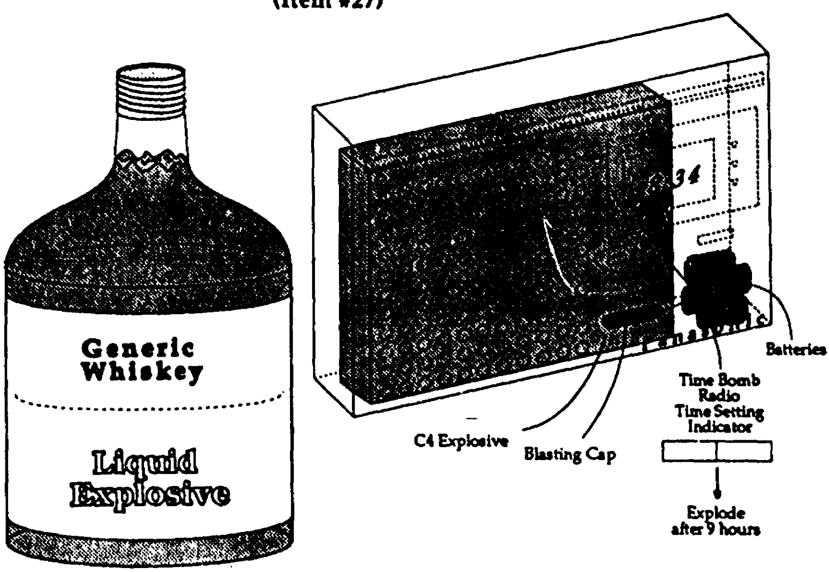
Bomb Built into a Hand-Carried Bag
(Item #21)



Attachment C

Another sophisticated bomb appeared on April 17, 1986 (Item 21). This bomb contained over two pounds of SEMTEX explosives in sheet form concealed beneath a false bottom of a carry-on bag. The timer, initiator (electric blasting cap), and power source were contained in a small scientific calculator. This bomb did not contain a barometric sensor. It did contain a timer set to detonate approximately 3 hours after it was activated. This bomb represented another approach to concealing explosives within what appeared to be an innocuous piece of passenger luggage. The carrier was an unwitting female who had been given the bag by her boyfriend. The boyfriend was assisted by Syrian intelligence in planning and executing this terrorist act.

Liquid Explosive Bomb
(Item #27)



Attachment D

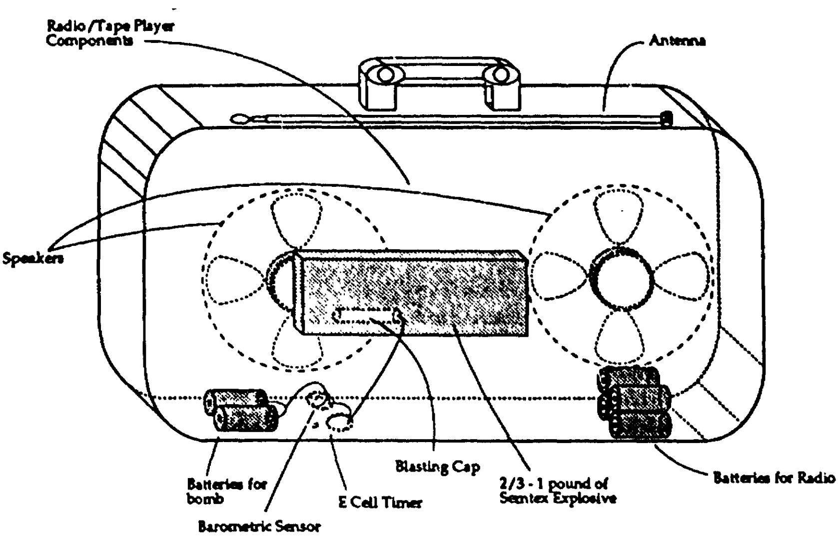
The bomb that destroyed Korean Air Flight 858 represents yet another variation of concealment (Item 27). Approximately one pound of liquid explosives was concealed in a liquor bottle. A Panasonic radio, Model RF-082, was used to conceal approximately 3/4 pound of plastic explosives, a timer, electric blasting cap, and power source. The interior of the radio had been rearranged to accommodate the explosives, the timer, and the detonating mechanism. One battery of the radio had been wired to serve as the power source to detonate the electric blasting cap and, in turn, the explosives in the radio and the liquor bottle.

The two North Korean agents boarded Korean Air Flight 858 in Baghdad, Iraq. About twenty minutes before boarding Flight 858 in Baghdad, the agents reportedly set the timing device for the bomb to explode nine hours later. During the security scaeening process in Baghdad, it is alleged that the Iraqi security officials first confiscated the batteries to the Panasonic radio but then returned them after the older North Korean agent made a scene. The older North Korean agent supposedly turned the radio on to demonstrate to the Iraqi security officials that it was a bona fide radio. The two agents then boarded the airplane and placed the bomb in the over-head compartment above their seats, 7B and 7C.

These agents had been specifically trained for this mission and were fully conscious of the fact that they were planting a bomb, which, if successful, would destroy the aircraft and everyone on board.

The North Korean agents left the bomb in the over-head compartment when they disembarked in Abu Dhabi, UAE. They flew to Bahrain where they were subsequently apprehended. While the Bahrainain authorities were holding them at the airport for questioning, the two agents tried to commit suicide by taking poison. The older agent (male) subsequently died; however, the female agent survived and later confessed her involvement.

Toshiba Radio
(Item #28 & #29)
Rear View



Attachment E

The Toshiba BoomBeat 453 bomb (Item 28) found by the West German Police (BKA) during their raid on a PFLP-GC "safehouse" in the FRG provides yet another variation of the sophisticated concealment of bombs. The Toshiba BoomBeat 453 radio bomb *contained a barometric sensor, an E Cell timer, approximately 312 ounces of SEMTEX explosive, an electric blasting cap, and two batteries for a power source.* The SEMTEX explosive was wrapped in a foil candy wrapper. The two batteries connected to the electronic timing circuitry and electric blasting cap were independent of the batteries powering the radio. Moreover, the two batteries for the bomb were totally concealed within the radio and were not accessible unless the radio housing was opened.

It is significant that the BKA did not at first realize that the Toshiba BoomBeat radio was a bomb. This was reportedly discovered later. Other seemingly innocent items were later discovered to contain bombs. In a sequel to this find, a BKA police officer was killed when examining a suspected bomb on April 17, 1989 (see Item 30) which had been confiscated from this same PFLP-GC group at another safehouse. These sophisticated bombs fooled several BKA police officials who should have had reason to be suspicious of the confiscated articles.

The bomb which was responsible for the destruction of Pan Am Flight 103 on 21 December 1988 (Item 29) is thought by many to have been the same as the PFLP-GC Toshiba BoomBeat 453 bomb found by the BKA. Estimates of the amount of explosives in the Pan Am Flight 103 bomb vary from approximately one to as much as 30 or more pounds. The upper limit of these estimates is very doubtful because of the difficulty of concealing this much explosive material. Based on the previous history of these devices as illustrated above, it is more likely that the amount of explosives was quite small. Most of the fully functioning bombs, e.g., with timer, detonator, explosives, and power source, outlined above, with the notable exception of the Frankfurt (Item 13), Rome (Item 18), and Sri Lanka (Item 23) bombs contained less than three pounds of explosives. In fact, most contained approximately one pound or less of explosives.

Terrorists do not choose the small amounts of explosives for their sophisticated bombs by accident. The lesson here appears to be one of concealability, ease of transport, placement, etc. A small amount of explosives can still do a [illegible] of damage. One only has to watch the detonation of one pound of C4 to appreciate its potential destructive capabilities, especially if placed in a pressurized aircraft cabin.

The terrorist only has to be lucky once to achieve his purpose, i.e., the destruction of an airliner in flight. Like the IRA terrorist said after the Brighton, England bombing that almost killed Prime Minister Margaret Thatcher, **"we only have to get lucky once, she has to be lucky every time"**. This philosophy appears to be working in the civil aviation sector. It may be that the terrorists involved got lucky in the placement of the Pan Am 103 bomb aboard the aircraft.

In summary, the threat to civil aviation in general, and to U.S. civil aviation specifically, is considerable. Moreover, it is highly sophisticated and has been so since late 1982.

The nature of the threat is such that only extraordinary measures will provide an adequate level of protection. These security countermeasures must be able to detect the sophisticated bombs being targeted at U.S. civil aviation worldwide.

III U.S. AVIATION SECURITY SYSTEM

U.S. civil aviation security is a shared responsibility between the civil aviation industry and the U.S. government. In the domestic U.S., airports must provide a secure operating environment, e.g., airport perimeter and operations area, while the air carriers are responsible for the safety of anything going on board their aircraft. Airports also provide law enforcement, e.g. police officers, and the U.S. airlines conduct the screening of people and articles being placed on board their aircraft. While the U.S. airlines are responsible for the most visible portion of the security screening process, i.e., X-ray and metal detector examination of passengers and their carry-on articles, they actually employ contract security firms to staff these security screening points. Nonetheless, the U.S. air carriers are still responsible for the effectiveness and efficiency of the security screening check points at U.S. airports. If there are any discrepancies in the manner or effectiveness of these security screening check points, it is the air carriers that are responsible. The FAA deals with the responsible air carriers, not the contract security firm.

The FAA is civil aviation's regulatory body. The FAA is empowered to establish the minimum security requirements and mandate that these minimums are met. To do this, the FAA has published security requirements under Title 14 of the Code of Federal Regulations (CFR), which are issued as parts of the Federal Air Regulations (FARs).

FAR Part 107 establishes the minimum security standards for U.S. airport operators. The FAA and individual airport operators supplement FAR Part 107 by developing and signing an Airport Security Program (ASP). The ASP is a sensitive document and is closely protected by the FAA and the airport operators. Each ASP is different to some degree depending on the individual airport environment and requirements.

FAR Part 108 establishes the minimum security standards for U.S. airline operators. FAR Part 108, like Part 107 for U.S. airports, contains the overall security measures that air carriers must implement and apply. The FARs are publicly available and are not sensitive security documents.

A simple way to state the philosophy under which the civil aviation security system operates is that the FAA makes the rules and requirements and the U.S. air carriers and airport operators are responsible for their application.

The FAA and air carriers supplement FAR Part 108 by using a sensitive document known as the Air Carrier Standard Security Program (ACSSP). This document was jointly developed by the FAA and the air carriers in the mid-1970s. The ACSSP has undergone two major revisions since its original development and undergoes constant revision and up-dating as threat conditions change. The ACSSP is considered to be very sensitive because of the detailed security measures it contains. As such, the ACSSP is protected by the FAA and the air carriers from disclosure to persons other [illegible] those with a need-to-know requirement.

The ACSSP is being used in U.S. courts but any details of its contents are argued "in camera". Outside of these court cases, access to the ACSSP is severely restricted. The ACSSP is not a classified document under Executive Order 12356. It is, however, a sensitive document protected under 14 CFR PART 191, which permits the Director of the FAA Office of Civil Aviation Security to restrict its access.

FARs Parts 107 and 108 are a product of the Administrative Procedures Act which requires public notice and a chance for any interested party to comment on any proposed change. The ACSSP is the product of a "closed" group currently restricted to the FAA and the affected air carriers. The FAA Legal Counsel takes the position that it is a specific agreement between the FAA and the individual air carrier. While this may be true in the sense that each air carrier signs an individual copy of the ACSSP, in practice there is no substantive difference in versions of the ACSSP between air carriers within the same category, e.g., international, domestic, etc. The very name of the document, i.e., Air Carrier Standard Security Program, shows its common application.

The "closed" environment of the ACSSP extends to its occasional modifications to cope with increased or changed threat conditions. The same group, i.e., the FAA and the air carrier security representatives, are the only ones who meet to discuss these modifications or changes in security countermeasures. The FAA may unilaterally decree changes, but their preferred method has been to consult with the affected air carriers.

The FAA should be commended on its willingness and desire to consult with the air carriers on changes to the ACSSP. Nevertheless, a serious deficiency exists in this consultative process, in that it does not include representation from any passenger organization. The FAA, in the past, has taken the position that it represents the passenger's interest. The FAA, however, must also represent the economic interests, i.e., a cost benefit analysis of the actions [illegible]. The FAA, as a part of the Executive Branch, is also constrained by the political policies of the current Administration. I know that a number of people, particularly from within the FAA and the Administration, will challenge this assertion. Nonetheless, we all know that this is a fact of life in Washington now and has always been so.

Another aspect of the FAA is its closeness to the aviation community, e.g., trade associations, manufacturers, suppliers, etc., and its distance from the passenger sitting in the airplane. This viewpoint was characterized by a comment attributed to the previous DOT Secretary's Office: "the FAA sees aviation from the cockpit, i.e., the pilots seat; the DOT sees it from the passenger's seat". The previous two DOT Secretaries were very aggressive on changes to the civil aviation security system after they became informed of its inadequacies. It is essential that the current Secretary of Transportation subscribe to this philosophy and penchant for action.

Secretary Skinner is unquestionably faced with a very difficult job, with numerous competing demands complicating his options. He may not yet appreciate what it means to frequently fly in high-threat areas on U.S. air carriers with the knowledge that the security people screening his flight may be inadequately trained, have inadequate knowledge of the type of threat, etc. Perhaps then he would realize the need for a better "people element" and total systems approach in correcting the shortcomings of the security system protecting U.S. air carriers in these high threat areas.

The FAA's action, coupled with the need to restrict these sensitive security countermeasures to those with a need-to-know, have excluded passengers from any direct input. The FAA's consultative process with air carrier representatives may fall under the Federal Advisory Committee Act, i.e., the FAA and the air carrier representatives qualify as a committee under this Act. Failure to ensure that the membership of the committee is balanced in terms of membership, e.g., include a passenger representative, may be a violation of the Federal Advisory Committee Act. This act requires that these committees be chartered and that their proceedings be a matter of public record, with certain limitations. Provisions do exist in the act to restrict access to sensitive data. [illegible] exist to ensure that all bona fide points [illegible] accorded representation on such committees.

The FAA, after recently being challenged by representatives of the Aviation Consumer Action Project (ACAP), has advised that it is taking action to form a security advisory committee under the Advisory Committee Act. A passenger representative may be included on this Security Advisory Committee. Little will be accomplished, however, if the new Advisory Committee is restricted from access to the ACSSP and the process used in its amendment. Likewise, consideration should be given to making this Advisory Committee a part of the process of all sensitive civil aviation security procedures development. The involvement of passenger representatives in these processes can provide useful input and help ensure that the passenger's interests will be adequately taken into account.

Another set of data used in U.S. civil aviation security is classified under Executive Order 12356 covering National Security Information. Generally, this body of classified data originates in the U.S. intelligence agencies and is used by the FAA. While the FAA employs several security intelligence analysts, they generally operate on data that is already the product of intelligence analysts from the intelligence community. The FAA intelligence analysts look at the data from an aviation standpoint, translate it into a form that can be used by the aviation community, and serve as the distribution system for the U.S. civil aviation community.

Normally, the FAA will have worked with the U.S. government intelligence community to "sanitize" any classified data so that it can be issued in a non-classified form. The principal purpose of this "sanitization" is to protect any "sources or methods" used in gathering the intelligence. There is a legitimate purpose in protecting these sources and methods. If a source is an individual within a terrorist organization, and that person's identity becomes known because of a release of classified intelligence, it it highly probable that the individual will be killed. If this happens, it is obvious that this source will no longer be available to provide future information on the terrorist organization's plans or activities. This also has a chilling effect on developing new sources within [illegible] or other organizations.

Protecting methods of gathering intelligence is equally important. If you are successfully acquiring intelligence about a terrorist organization's plans or operations and the organization is unaware of your methods, they may institute protective measures. Conversely, if the organization discovers that you are acquiring data by some method, e.g., intercepts of their communications, the group will find ways of preventing you from continuing your intelligence acquisitions.

Protecting sensitive, classified security and intelligence data is a must if we are to be effective. Protecting such data can also be used to prevent others from access to perform a legitimate oversight process. Who can currently question the adequacy of the security system protecting U.S. civil aviation security? Persons such as myself perhaps? The Secretary of Transportation has challenged my credentials, stating that I have been out of the system too long and do not understand what has and is being done. While I might challenge this assertion, it serves to illustrate my point, i.e., if all parties except those few privileged individuals within the "closed system" are denied access, then who can judge the adequacy of the measures protecting passengers on U.S. airlines?

Ask any relative of a Pan Am 103 victim what they think about the adequacy of the U.S. civil aviation security system and see what answer you get? It is very personal to them. They are the ones who lost husbands, wives, sons, daughters, and other loved ones forever. That represents inadequacy by any definition or standard. Pan Am 103 is a reality. The threat outlined in this statement is a reality.

Denying me access is one thing. Denying this subcommittee, or any other Congressional committee, access to the legitimate data necessary to judge the adequacy of the civil aviation security system is something else. Secretary Skinner's inference in his April 6, 1989 letter to Madam Chairwoman that failure to protect information from unauthorized disclosure ". . . needlessly puts U.S. passengers' lives at risk . . ." (underscoring supplied) can be stated differently. [illegible] adequate [illegible] into whether the security measures protecting U.S. civil aviation are adequate can needlessly put passengers who fly on U.S. airlines at risk. My point is that so long as the Administration refrains from developing, implementing, and enforcing adequate security measures to protect U.S. civil aviation, all persons who fly on them will be at risk, not just U.S. passengers.

Many persons believe that the U.S. Government is hiding its failure to act behind its restriction of access to data. I have spoken to many of the relatives of Pan Am 103 victims. Most feel that their relatives were short-changed. The threat to U.S. civil aviation was well-known within the "closed" civil aviation security system. Moreover, the threat to Pan Am from the Helsinki warning was explicit. Regardless of whether it was a fraud or not, it was a more specific warning than any I ever encountered in my four and a half years as Director of the FAA Office of Civil Aviation Security. The issue of passing these warnings to the passengers and crew flying on U.S. civil aviation is a pertinent one as long as the adequacy of the security measures can be challenged. The comment by one of the relatives of a Pan Am 103 victim is quite appropriate to the circumstances: ***"either protect me or warn me".***

Warning passengers of credible threats against U.S. civil aviation will have several negative affects and some positive ones. First, as the Administration claims, it will encourage the "crazies" to phone in threats. Secondly, it will probably encourage terrorists to make threats for the purpose of disrupting U.S. airline operations. It may also compromise, as the Administration spokespersons claim, U. S. intelligence gathering operations. It will most certainly, at least at first, have a deleterious impact on the passenger loads on U.S. airlines in the threatened areas. All of these are highly undesirable negative impacts.

While I freely acknowledge the negative impacts, I have an overriding reason for recommending that passengers be warned of credible threats. First and foremost, it gives the passengers a choice, i.e., is my trip worth the risk I have to take? Additionally, having to warn passengers might become so onerous to the U.S. air carriers and the U.S. Government that they may [illegible] take positive security steps to protect against sophisticated bombs.

For these reasons, I believe that until the Administration develops, and the U.S. air carriers implement a civil aviation security system that will afford protection against the sophisticated threat outlined in Section I of this report, they should pass any warning deemed credible along to the affected passengers.

IV CIVIL AVIATION SECURITY OUTSIDE THE U.S.

The overall security requirements for the international community are established through the International Civil Aviation Organization (ICAO), a part of the United Nations. A total of 159 Contracting States (Nations) are members of ICAO. ICAO, headquartered in Montreal, Canada, establishes the Standards and Recommended Practices for civil aviation security. These Standards and Recommended Practices are published in ICAO Annex 17.

Outside the U.S., the host government is usually responsible for civil aviation security. The government usually recruits, selects, employs, trains, and supervises the security employees, and designs and operates the airport security system. The host country Interior Ministry is the government organization most likely responsible for the aviation security system. The local, and in some instances the national, police forces are usually directly involved in the operation of the airport security system.

Foreign air carriers play varying parts in the operation of their governments' aviation security system. In some instances the air carriers are either wholly or partially owned by their government. In those instances where the government owns, or has a partial stake in the airline, the airline tends to be more involved in their national security system. Three air carriers, Swiss Air, Lufthansa, and El Al all have significant roles to play in their own aviation security system, particularly when operating outside their national borders.

[illegible] carriers operating in the international arena [illegible] rely heavily on the host country aviation security system. The U.S. government inspects and evaluates the effectiveness of the host country's aviation security system. There are some sovereign territorial issues involved with this inspection and evaluation; however, all countries where U.S. aviation operates have thus far cooperated in these inspections. While this requirement has always existed since at least the mid-1970s, it was formally articulated in the International Security and Development Cooperation Act (PL 99-83) signed into law in August 1985.

That Act of 1985 also added specific actions required on the part of the Secretary of Transportation and the Secretary of State. Penalties associated with a finding by these officials that an international airport does not meet the security standards based on ICAO Annex 17 can be quite severe to the offending country.

The host country may meet the ICAO Annex 17 Security Standards and Recommended Practices and still not provide a level of protection adequate to detect sophisticated bomb threats to U.S. aviation outlined in Section I. U.S. air carriers are required by the FAA to take specific measures to compensate for the host country's inadequate security measures. In this event, the FAA decrees the minimum additional level of protection that has to be provided by the U.S. air carrier. Attempts are first made to secure the assistance of the host country; however, the type and level of security required cannot be provided by many foreign governments. The host country is usually quick to lend cooperation to the U.S. government and to the U.S. air carriers in their implementation of any new security countermeasures.

V U.S. AVIATION SECURITY PRIOR TO PAN AM 103

Civil aviation security was inadequate at the time of the Pan Am 103 tragedy, else why did it happen. Given the deficiencies of the Pan Am security system, as alleged in the media and the September 19 proposal by the FAA to fine Pan Am for security violations, one can also argue that Pan Am erred, not the

Other persons will probably argue that the security was adequate and that the Pan Am 103 tragedy was an aberration. These same persons would probably also be inclined to say that "you can never have 100% protection for anything, especially security". Another variation of this theme is that "total security is something you can aspire to but never achieve". Many persons will agree with this philosophy. Nevertheless, one must examine the issue in greater depth to get at the underlying truths. A Presidential Commission will be doing this in the very near future, provided however that President Bush names the Commission members in time for it to do any meaningful work by the time its Charter expires on February 7, 1990. Over the next two days these Subcommittee hearings will be gathering data on those issues within its jurisdiction that it should examine.

A critical examination of the issues associated with the quality of the U.S. civil aviation security system will provide come clarity on whether the security system was adequate prior to the Pan Am 103 tragedy. It will not be possible to examine the details of the specific security countermeasures in effect prior to December 21, 1988 because of their sensitivity. Happily, it will not be necessary to do so in the public arena in order to determine if the aviation security system countermeasures were sufficient, or if the Pan Am 103 tragedy was just an aberration. It is still necessary and appropriate that the whole issue be critically examined from all levels, and hopefully this will be done by the yet to be named Presidential Commission. The findings of the Presidential Commission should verify the findings of these hearings.

VI EFFECTIVE SECURITY SYSTEMS

Any effective security system has to contain certain essential elements. These elements must work in harmony to produce the protection desired.

Any security system, to be effective, must be based on a realistic appraisal of the threat that has to be countered. Portions of the threat (that which is publicly available) against U.S. civil aviation are outlined in Section I of this document.

An overabundance of security, provided it contains all the essential elements and they are effectively executed, should provide a satisfactory countermeasure to any given threat level. An overabundance of security, if it does not address the threat, will not provide the security protection required to counter a specific threat level. In addition, an underabundance of security, or one that contains all the essential elements but is ineffectively executed, will not provide any positive level of security for any given threat level.

I maintain that the U.S. civil aviation security system in effect at the time of the Pan Am 103 disaster on December 21, 1988 was insufficient in both content and application to provide the level of protection necessary to counter the known threat. Moreover, I will argue that this threat was sufficiently known over the past few years for the FAA and U.S. air carriers to have developed and implemented a comprehensive civil aviation security system of countermeasures.

Two U.S. air carriers have made fledging attempts to implement a more comprehensive civil aviation security system, notwithstanding the U.S. government's failure to mandate the necessary level of protection. Despite this failure in leadership by the U.S. Government, the U.S. air carriers have known the full extent and nature of the threat for several years. Outside two possible exceptions, U. S. air carriers operating in high threat areas have not met their responsibilities to their passengers. ***Air carriers who have poor security systems adversely reflect on the those who make a conscious effort to protect their passengers.***

VII A SECURITY SYSTEM TO DETECT SOPHISTICATED BOMBS

In the late 1960s and early 1970s, the hijacking threat to civil aviation worldwide increased to such proportions that the U.S. developed and implemented a security system to prevent or deter hijacking of U.S. airlines. This system was first implemented in the U.S. in January 1973. It was a U.S. Government-mandated system.

The nature of the threat to U.S. civil aviation changed from one of hijacking to a sophisticated sabotage threat in the early to mid-1980s. The precursor to this threat change were the two Pan Am bombs in August 1982 (see Item 1 & 2). As outlined in the Public Record in Section I above, a series of these sabotage bombs have appeared since that time In the same time period, the incidence of hijacking of U.S. airlines has dramatically decreased.

Unfortunately, unlike its action in the early 1970s to protect against hijackings, the U.S. Government has not required the development and implementation of a comprehensive civil aviation security system to protect against sophisticated bombs. The many millions spent by the FAA on explosives R & D were directed towards specific detection of bombs in articles, and does not address a systems-wide approach to problem solving. Outside the initial actions by two U.S. international air carriers, U.S. airlines have failed their passengers by not developing and implementing such a system themselves.

I believe that the current civil aviation security system, both requirements and application, are insufficient to prevent another Pan Am 103 tragedy.

- One significant deficiency is the lack of political and managerial leadership and resolve in the Administration to ensure that a fully adequate and functioning U.S. civil aviation security system is developed and implemented.

- Another significant deficiency is the insufficient security training of persons directly and indirectly involved in the civil aviation security system protecting U.S. air carriers.

- A third weakness of the FAA and U.S. airline civil aviation security system is an over-reliance on intelligence sources. The current civil aviation security system places too much emphasis on the anticipation that intelligence sources will provide sufficient warning for any given threat to be countered. This defies all logic.

- A fourth deficiency is the failure of certain U.S. air carriers to thoroughly and appropriately apply good security procedures and practices.

- A fifth deficiency is a failure to include a passenger representative in the security countermeasures development process.

- A sixth deficiency is the lack of sufficient procedural and process sophistication and application.

- A seventh deficiency is the lack of in-depth involvement by U.S. air carrier management in the security system development and application.

- A eighth deficiency is the lack of sufficient staff, both for U.S. agencies and air carriers, devoted primarily to the security tasks.

- An ninth deficiency is the U.S. tendency for an over-reliance on technology.

- A tenth deficiency is a failure to recognize the importance of recent developments in X-ray screening technology for the screening of electronic articles.

The actual, and perceived failures of the U.S. civil aviation security system actually invite additional attacks. As terrorists perceive that our defenses are inadequate, they increase their focus of attention on the vulnerable U.S. aviation security system. One only has to recall the Iranian Prime Minister's recent call for the faithful to attack U.S. citizens, French, etc., "because they are easy compared to attacking the Israelis". No better lesson than this can be stated. We are perceived to be inept and vulnerable, and U.S. aviation is in the forefront.

VIII IMPORTANCE OF PEOPLE SYSTEM

The U.S. Government has incrementally increased the level of security countermeasures following each intelligence threat, sabotage find, or actual sabotage act. The frightening aspect of this FAA practice is that most of the actual sabotage acts happened without any advance warning or knowledge. The events outlined in Section I, Items 1, 2, 3, 4, 6, 13, 14, 15, 18, 19, 20, 22, 23, 26 and others occurred without any specific advance warning.

If one wants to accept the December 5, 1988 Helsinki warning as bona fide, then information was available which, if properly acted on, would have prevented the Pan Am 103 tragedy. Even if the so called Helsinki Threat was a fraud, the very specificity of that threat information required any prudent air carrier to take full measures to prevent its possible occurrence.

The U.S. Government and the air carriers' reliance on advance warning of terrorist plans to target U.S. air carriers is faulty in two aspects. First, as is asserted above, the usual lack of warning information makes this practice bankrupt from the start. Secondly, even if threat information is received, insufficient time may exist to develop an adequate security response given the current state of the civil aviation security system protecting U.S. air carriers.

Some will argue that the failure in the Pan Am 103 tragedy was Pan Am's, not the security systems'. Persons inclined to argue this point-of-view may get comfort from the FAA's September 19, 1989 proposal to fine Pan Am $630,000 for an alleged failure to comply with FAR 14 C.F.R. Part 108.

It may well prove to be that misconduct on the part of Pan Am was the principal cause for the loss of Pan Am 103. A case can be made that the principal deficiency is the application of security countermeasures in the current U. S. civil aviation security system. In fact, as can be seen, U.S. air carriers are principally responsible for the actual implementation and maintenance of certain security countermeasures even in foreign countries. It follows that the principal element of the security system is people. That is precisely my point; without a fully trained and functioning "people element", no security system will be effective. The U.S. Government and some of the U.S. air carriers operating in high threat areas have willfully evaded their responsibilities in this area.

Whenever the FAA issues a threat bulletin and decrees that certain security measures must be taken, these security countermeasures usually have to be implemented immediately. The security system must be able to respond immediately. The current system is incapable of doing this to the extent required to detect a sophisticated sabotage threat. This is because the people staffing the system have been insufficiently trained in the procedures and processes that are necessary to detect these sophisticated sabotage devices. The U.S. airlines and the FAA have known this all along. As was shown above, even some police inspectors were caught unawares by some of the PFLP-GC bombs.

Perhaps the most glaring deficiency in the current U.S. civil aviation security system is the lack of required security training. Only the security training for flight crews and the Ground Security Coordinator's position is required to have specific hours of security training. Others involved in the security system, e.g., X-ray screeners, etc., are not required to have any specific amounts of training to perform a security function. Subject matter is also loosely defined, so loosely as to be totally ineffective.

By contrast, the Israeli aviation security system invests four to five weeks in each individual involved in the application of their security system before allowing the individual to apply their security measures. Contrast this with the total absence of any required number of training hours, and the inadequate definition of the security subject matter, and you can get a sense of the real inadequacy of the U.S. security system. Two U.S. air carriers operating in Europe, and now a third following the Pan Am 103 tragedy, have implemented portions of the Israeli security system. Regrettably, these airlines still only provide approximately eight to ten days of initial security training.

Taken in its totality, the lack of required training, both in the number of hours and the subject matter, is the single most glaring deficiency in the U.S. civil aviation security system. Until this deficiency is addressed, no amount of changes in the security procedures required by the FAA will result in an effective security system. Good application is the key to any task, and effective security is especially sensitive to this need. As noted earlier, under the U.S. security system the air carriers are responsible to ensure that the procedures and practices are fully and effectively applied.

IX OVER-RELIANCE ON TECHNOLOGY

The U.S. civil aviation security system has historically placed an over-reliance on technology.

It might best be said that the U.S. has tended to rely on technology to detect or deter things that the technology was not designed to detect.

As noted earlier, the first U.S. civil aviation security system was designed to prevent hijackings. The technology, X-ray screening units and metal detectors were designed to detect weapons. This still holds true today with the significant exception of the new enhanced technology X-ray systems that are capable of distinguishing between organic and inorganic materials. I will address the importance of these units in screening for explosives later.

The original screening units worked relatively well in detecting handguns, knives, etc. Hijackers then became more thoughtful and sophisticated and started using small quantities of gasoline or bombs to hijack airplanes. They took this to one additional level of sophistication by concealing the gasoline in baby bottles, etc., or better yet, no gasoline, only a threat that they had gasoline, or a bomb, etc.

This problem became quite critical in the early 1980s. The problem was managed but never completely solved. The system continued to depend on the technology designed to detect weapons. Some tentative research and development was begun to investigate the possibility of developing gasoline detectors. It was quickly realized that the airport environment was saturated with hydrocarbons, and this significantly complicated the possibility of detecting gasoline on individuals or their carry-on articles.

This problem was mitigated by the application of simple but effective profiles to detect potential hijackers to Cuba. Most hijackers in the U.S. in the early 1980s wanted to go to Cuba.

The FAA was one of the leaders in developing and using profiles to detect potential hijackers. The profiles were simple but effective. The profiles were easy to apply and required minimal training of persons applying them. The profiles were principally applied to detect potential hijackers to Cuba.

As a consequence of the profiles, the problem with the practice of over-reliance on technology was not overly significant until the advent of the sophisticated explosive devices.

The sophisticated bomb raised the ante to a new level. Not only would the technology not detect these sabotage devices, but the profiles were also rendered ineffective.

The FAA enlisted the FBI's assistance in 1985 to research the possibility of developing new profiles that could be applied to terrorists who might be carrying sophisticated bombs. The focus on these profiles did not include unwitting "dupe" carriers of these bombs. So from the start, the program did not adequately address the potential population of passengers who might carry a bomb onboard a U.S. civil aircraft. Nonetheless, a start had to be made somewhere.

The FBI completed its study to develop terrorist profiles for use in high threat areas. The results were promising, although the profiles are more complicated and require more training and procedures to apply. In addition, the ideal from a U.S. Government and U.S. air carrier standpoint is to d[illegible] procedure or process which can be applied by persons with minimal skills and training. The new profiles require more infrastructure support, training, and higher skilled people than currently available to U.S. air carriers in many high threat areas of the world. In addition, a need exists to go back and restudy the problem with more thought given to the "dupe" or unwitting carrier of bombs.

The Israeli security system provides a better passenger profiling process. The principal reason for this is because the Israeli system is a "thinking and analyzing" process. The U.S. profiling system is more likely to be administered by relatively untrained individuals by rote rather than any in-depth analysis of the passenger. Again, we encounter inadequate air carrier application of security procedures.

In the meantime, the U.S. civil aviation security system has continued to rely on technology to detect what it could not detect, i.e., explosives or bombs. The application of profiles by U.S. air carriers in the international arena has largely been ineffective. In fact, part of the process is unquestionably incorrect and allows potential "dupes" or "unwitting" carriers of bombs to remain undetected. In contrast, the Israeli profiling process, which is less by rote and more by analysis, is designed to detect these unwitting carriers.

The U.S. Government actions following the tragic loss of Pan Am 103 are perplexing but predictable. One of the first things was to announce, on December 29, 1988, that the Thermal Neutron Analysis (TNA) explosives detector would be deployed.

The U.S. Government began research and development on explosives detectors in earnest following the December 29, 1975 bombing at LaGuardia Airport in New York. On that date, a fairly large bomb exploded in an airport locker killing 11 persons and injuring scores of others. Typically, the U.S. Government reacted to an event as opposed to being pro-active, and initiated an explosives detection R & D program. The FAA eventually became the prime agency of the U.S. government running this R & D program. Sometime in the late 1970s, R & D was begun on the TNA explosives detection technology.

The U.S. Government's actions on December 29, 1988 in announcing that the TNA would be deployed was another reactive program. It must be said in the Government's defense, however, that the TNA would have been deployed in 1989 regardless of the Pan Am 103 tragedy. The technology had been developed to the point where it should be deployed for operational experience.

What was surprising, however, was the obvious public affairs slant placed on the announcement of the planned TNA deployment. It appeared to be couched in terms to soothe the public's fears concerning the safety of U.S. aviation following the loss of Pan Am 103.

The U.S. Government and air carriers typically look for a "quick fix", a bomb detector, special procedures, etc., when confronted with a problem. There are no "quick fixes" to the problem of the sophisticated explosive devices.

Unfortunately, all the actions and pronouncements since the December 29, 1988 news conference have not done anything to change this apparent intent. Fortunately, the printed and visual media have analyzed and questioned the effectiveness of a security system that appears to rely so heavily on a technology that is both inefficient and ineffective in its present form.

The TNA detectors are inefficient because a single unit will be needed just to service one B-747 at its current processing rate. The first TNAs can examine an article every six seconds under ideal conditions. TNA examination of a 350 passenger B-747, with two checked bags for each passenger will require a minimum of 70 minutes under ideal conditions. Add to this the other mass of parcel, cargo, etc., carried on each commercial airliner and you arrive at an almost hopeless situation. This presumes that it will be necessary to initially examine all articles being placed in the cargo hold of U.S. commercial aircraft.

The effectiveness of TNA raises other concerns. First, let me acknowledge that TNA's detection sensitivity can be adjusted upwards to almost 100%. To achieve this detection level, a sacrifice [illegible] made to a false alarm rate that may reach or exceed 20%. Under these conditions, every one in five articles can be expected to create a false alarm that must be resolved. There are attendant problems with operating systems with high false positives, e.g., a tendency to disregard the alarm assuming it to be false in all instances, or carelessness or perfunctory examinations.

The effectiveness concerns that are raised with the potential over-reliance on the first generation TNA explosives detectors involve their capability of detecting small amounts of explosives. As can be seen from the threat data contained in Section I, many sophisticated bombs contain less that one pound of plastic explosives. In fact, most would appear to contain less than three quarters of a pound. Add to this the fact that many bombs are made using thin sheets of plastic explosives that add to the TNA's detection difficulties. Can the TNA be expected to be effective in detecting this amount of explosive when it is in sheet form? Unfortunately, it is unlikely that the TNA at its current sensitivity levels will be able to detect small amounts (less than one pound) of sheet explosives.

Dr. Richard Morgado, a consultant to the FAA on bomb detection from Los Alamos National Laboratories, is correct in his recent comments quoted in Aviation Week & Space Technology Magazine (Sept 18, 1989, pg 128). The FAA specifications for Science Applications International Corporation's (SAIC) project to develop the TNA was the capability to detect 2.5 pounds or greater of explosives. Dr. Morgado is quoted as saying: "Its not fair that they (SAIC) have been asked to solve a different problem after the fact." He goes on to say; "TNA is still the best thing we have right now . . .", and in regard to new technologies that will be available soon, he says, "what we need is a long-term, consistent research program instead of the crisis-driven program we have."

This brings me back to the Administration's apparent obfuscation of the issues surrounding the adequacy of the current security system. The use of the TNA hyperbole to quiet the fears of the public ill-serves the best interests of the passenger flying on U.S. aircraft in high threat areas. If it is not intended to serve as a smokescreen, then the Administration should immediately clarify its intentions.

The TNA is wrongly being put forward as a cure to the ills of the civil aviation security system. It is not a cure. The TNA or any other technology can never be any more than a supplement to the civil aviation security system. This will remain so for the foreseeable future and in fact may remain so forever.

The bottom line is that the TNA explosives detector is not ready for full scale deployment as ordered by the Administration. It is, and should be, deployed on a limited basis to gain operational experience. Its initial deployment should also be used to force development of a second generation TNA system which should be more efficient and effective.

Full scale research and development should also be funded by the Congress, and a crash program begun by the FAA to develop efficient electronic generators for thermal neutrons. The current TNAs rely on a Californium 252 radioisotope source. These radioactive sources are a potential problem, both from a periodic replacement standpoint as well as the highly unlikely possibility of them contaminating an airport environment in the event of an explosion in a TNA unit. The FAA initially funded an R & D effort to develop a system to produce thermal neutrons from an electronic source. This R & D has been put on the "back burner" with the push to get the TNA operational. It needs to be renewed and reinvigorated.

With the inordinate amount of attention on the TNA technology and some vapor detector manufacturers publicizing their developmental systems some important new technologies have escaped attention. A recent article in Aviation Week and Space Technology (Sept 18, 1989 pg 128) has called attention to two of the more promising technologies, i.e., fast neutron detectors and resonance gamma ray absorption. Likewise, Madam Chairwoman of this Subcommittee included references to these two promising technologies as well as kinetically focused neutrons in her comments on FAA Docket No. 25956, Notice of Proposed Rulemaking Explosives Detection Systems for Checked Baggage.

These promising technologies should be explored as rapidly as possible. They offer greater promise in some areas than the TNA. What we may ultimately see is a combination of two or more of these technologies to get an effective and efficient explosives detector. With this distinct possibility in the immediate future, we should not be ordering the full scale purchase and deployment of a TNA system that is neither as effective or as efficient as we need to meet the threat we face.

The "stop and start" approach to the FAA's security research & development program is inefficient and ineffective. The problem is not one of the FAA's Technical Center (FATEC) personnel running the program in Atlantic City, New Jersey, for they are one of the finest group of professionals that I have ever had the pleasure of working with. It appears to be one of funding, both from the FAA's own priorities for funds allocation, and an overall R & D funding problem. Several million dollars are necessary each year to fund a meaningful long-term security R & D program as Dr. Morgado has suggested. The FAA security R & D program is being short-changed!

X SECURITY PROCEDURES AND METHODS

What was announced as "New and more stringent security measures . . ." on December 29, 1988 are neither new in most cases, nor were they the strict measures necessary to prevent another Pan Am 103 tragedy from happening. Former FAA Administrator Allan McArtor admitted as much when he responded to a reporter's question; "Is it correct then that even if all these measures had been in place three or four weeks ago, that that (sic) plastic explosive still may have likely gone on through" by stating, "Well, these are more stringent security measures. And no system, of course, is 100 percent effective. I don't know of any maintenance program or any security program that can be guaranteed to be 100 percent effective. But this certainly gives a great deal more depth to the international security program of U.S. carriers."

I believe that the critical examination of the current system by the media has been healthy. I only hope that it proves to be beneficial in serving as a catalyst in initiating reform and the development of a new civil aviation security system that will adequately protect passengers flying on U.S. air carriers.

The security procedures and processes that have been implemented since the Pan Am 103 tragedy are not sufficient to prevent another similar tragedy. The U.S. Government has continued to incrementally increase their security requirements. They have not required the development and implementation of an overall comprehensive security system that will consistently detect the sophisticated bombs noted in Section I above. In direct terms, the FAA has not taken a "systems approach" to solving the problem.

Regardless of any failure of the Administration to take action to address the overall problem from a system standpoint, U.S. air carriers operating in high threat areas are still responsible for the protection of their passengers. The U.S. air carriers have known the type, nature, and details of the sophisticated sabotage threat for several years. Only two U.S. air carriers have taken substantial measures on their own to address the problem, and one of these did so only after having one of their aircraft bombed.

The lesson here is that new and strict security measures, without similarly strict and thorough application by the U.S. air carriers will still not produce the desired results. The FAA must also step up its oversight and enforcement activities.

An example of the Administration's failure is the recent pronouncement by the FAA that it was going to examine all electronic devices carried by passengers for bombs. What was not said was the near impossibility of detecting bombs contained in a wide variety of electronic devices carried by passengers, e.g., laptop computers, radios, electronic briefcases, etc. This is where the wise use of available technology can be put to good use.

First, it has been tragically demonstrated by the West German BKA's experience that even a police officer can fail to detect a cleverly concealed bomb. What chance does an extremely poorly trained, or untrained at all, security screener have in [illegible]ing these devices?

Fortunately, there are some positive answers to these concerns. One of the first things is to require the use of a piece of technology that the FAA has chosen to ignore up to this time. Approximately three years ago, two U.S. manufacturers began marketing an enhanced technology X-ray screening unit. It must be recognized that X-ray screening units are not explosives detectors. The X-ray screening only presents images to persons who interpret their possible meaning.

The enhanced technology X-ray screening units provide operators with images that enable them to distinguish between organic and inorganic substances. This data is presented to the X-ray operator as different colors on a TV monitor. Explosives are organic substances, usually densely packed nitrogen materials. While some other materials have equal or larger percentages of nitrogen, most are not as densely packed. Organic substances are displayed in orange, inorganic substances in blue, and very dense objects that X-rays cannot penetrate are displayed in green.

Another supplier of enhanced X-ray screening units provides a black and white discrimination of high atomic weight versus low atomic weight objects. Again, explosives are low atomic weight materials while metals, etc., are high atomic weight materials. This supplier's equipment will present low atomic weight materials in bright white, which provides an excellent contrast to high atomic weight materials. This supplier also provides color representations of the same data for the operator on a TV monitor.

Organic or low atomic weight substances contained in electronic objects should raise questions when observed by X-ray operators. That is, if they have been trained to do so, and, if they can distinguish between organic and inorganic materials on the X-ray screening units they have at their disposal.

Many U.S. air carriers have purchased and use these enhanced X-ray screening units at their international locations. Some of the airlines had purchased several of these enhanced x-ray units before the Pan Am 103 tragedy; others rushed to do so immediately afterwards. The FAA has yet to recognize their utility in the examination of articles, particularly electronic systems, by requiring their use by U.S. air carriers. Why not?

After the March 1989 release by the Chairwoman of this Subcommittee of the summary of the 22 FAA security bulletins issued in 1988, the DOT took action to issue an emergency regulatory change. This emergency change was issued on July 6, 1989 and was effective July 10. The Administration believed that it was an emergency to protect sensitive security information. Why hasn't the

Administration felt the same way about requiring the use of the enhanced technology X-ray units to screen articles going onto U.S. aircraft in high threat areas? Why isn't it equally an emergency to protect passengers on U.S. aircraft?

Another country now requires the physical examination of all electronic articles going onboard their airplanes. This physical examination includes the actual opening of radios, computers, etc. The U.S. Government has not done so. Why not? Most especially why not when the DOT/FAA has not mandated the use of enhanced X-ray units for examination of electronic articles.

XI REFORMS NEEDED

The first and most important thing that must be done is for the Administration to make a political decision that clearly and firmly establishes objectives to protect passengers flying on U.S. aircraft. The decision should articulate a systems approach to addressing the total system needs. This decision must clearly articulate the U.S. Government's objectives of establishing a worldwide civil aviation security system, which:

- Clearly and unequivocally establishes the requirements for a comprehensive civil aviation security system that will detect sophisticated sabotage bombs. Any such system should establish people as the primary element. Elements should include:
  - Clear and unequivocal standards of conduct for U.S. air carrier application of the U.S. civil aviation security system.
  - Sophisticated profiling application and analysis.
  - Full-time personnel assigned to critical security functions, e.g., profiling, Ground Security Coordinators, searchers, etc.
  - Significantly increase the Ground Security Coordinators role as full-time U.S. airline employees.
  - Establish minimum security staffing requirements.

- Mandate the use of enhanced technology X-ray units capable of discriminating between organic and inorganic materials for all U.S. international screening functions.
- Mandate the use of enhanced technology metal detector walk-thru portal screening units at high threat locations.
- Establish application requirements for explosives detectors, both vapor and bulk.
- Accelerate the assignment of additional FAA civil aviation security agents to oversee host government and U.S. airline security at foreign airports.

• Include passenger representation in the development of security procedures and processes.

• Develop a plan of action for immediately implementing the overall comprehensive security system and its security requirements.

• Establish a comprehensive set of training requirements for persons directly and indirectly involved in or with the planned security system.

• Mandate minimum training standards and subject hours for:

- Classroom instruction.
- Minimum equipment familiarity.
- Threat data history.
- Profile application.
- Instruction on sophisticated bomb with simulated devices.
- On-the-job instruction and experience.
- Mandatory testing for checkout before unsupervised performance.
- Mandatory classroom involvement by airline personnel.
- Passport and passenger ticket authenticity.
- Improved techniques for searches of:
  - People
  - Personal articles and bags
  - Checked baggage

- Aircraft cargo, cabin, and cockpit areas

- Establish a U.S. national civil aviation security training academy.

- Implement and critically evaluate the new anti-sabotage/hijacking security system by:

  - Testing detection performance with replicas of past sophisticated bombs.
  - Persons conducting tests must meet varying levels of sophisticated disguises, e.g., difficult to detect false papers, false histories, etc., based on actual cases.
  - Establish stringent fines for performance failure.

- Establish and fund a long-range security R & D program.

The elements described above are essentially a subset of the Israeli security system. They are not intended to be an exhaustive listing of all the additional areas that need to be covered. There are portions of the Israeli system that are not necessary and are excluded. A comprehensive set of this system is in place at the Ben Gurion Airport in Tel Aviv, Israel.

When one suggests that a variation of the El Al security system is necessary to protect U.S. civil aviation in high threat areas the typical response is: "we can't do that because";

- It costs too much

- El Al can do it because they are a very small airline

- Other countries will not permit us to do it

- Et cetera, et cetera

I call this the we-can't-do-that-because, or the "WCDTB" syndrome, i.e., looking for reasons why we shouldn't do something. We have raised this to a high art form in the U.S. government and some U.S. air carriers.

As far as cost of such a system is concerned, no one has ever done an objective analysis of the costs of such a system. The WCDTB is a creature of organizations and individuals who are quick to look for reasons why something can't be done, don't want to see the action taken, or believe that it is not in their best interest to take the action. Unfortunately, the WCDTB syndrome as it relates to the Israeli aviation security system has become an automatic utterance of many of the U.S. officials. This unthinking and factually unsupported assertion even permeates some members of Congress and their staffs.

A case can be made for the ease of implementing an Israeli system with the small size of El Al. What most observers overlook however, is the fact that the Israeli system is applied to <u>all</u> airlines operating from the Ben Gurion Airport in Tel Aviv. In this sense it is not applied to just El Al, and it is applied successfully. Another aspect of the size factor is that there ought to be an economy of scale when applied to the multiple operations of U.S. air carriers versus the single one-a-day operations for El Al at some locations. All these factors need to be studied before any conclusions are drawn about costs and size of operations.

I had the opportunity to discuss the need for the comprehensive security system outlined above with a member of the House Foreign Affairs Committee staff appr[illegible] to four months ago. When I suggested that this was the only system that would prevent a reoccurrence of the Pan Am 103 tragedy, the staff member immediately responded "we can't do that because" El Al is a very small airline, and, besides, it would cost too much. I asked if the staff member knew of any audit and analysis of the costs? The staff member reluctantly acknowledged that they did not know of any such study. I suggested that before anyone could legitimately conclude that it could not be done because of costs, that an objective study should be made to determine what the costs actually were.

I now see that a provision has been included to do an analysis of costs associated with an El Al type system for U.S. civil aviation in the House Foreign Affairs Committee Legislation. I commend the Committee for its inclusion; however, I note that only 90 days have been allocated for the study. The shortness of the time allocated for the study may be indicative of the lack of Committee understanding of the overall problem and the comprehensiveness of such a system.

Before any worthwhile analysis can be made of such a system, a set of requirements has to be identified. This is not a trivial task. A great deal of work will have to be expended to accurately identify these requirements. This, in and of itself, will take the entire 90 days even on a crash basis. This is assuming that the current FAA civil aviation security staff has an in-depth knowledge of the Israeli system.

Unfortunately, we seem to find all sorts of reasons why we cannot do something. It is always easier to say no we can't do something than it is to make a decision and go ahead with the task. If the Administration were less inclined to this attitude, we would not now be discussing what should be done to prevent the next Pan Am 103 tragedy.

Secretary Skinner is to be commended for having made the decision to require the deployment and use of the new TNA explosives detectors. However, this issue, like the basic issue of what the overall civil aviation security system should be, has gotten mired into, "who pays for what?". This is the wrong issue. The real issue is, "what is necessary to provide the needed protection against known sophisticated sabotage devices?".

Who pays for the systems is an ancillary issue. As long as it dominates the debate, we avoid making the hard decision to develop and implement the comprehensive system required.

XII SUMMARY

In summary Madam Chairwoman and members of the Subcommittee, I believe that the only way for us to prevent another Pan Am 103 tragedy is to implement the system described above. There are obvious political, operational, and cost consequences to making a decision to develop and implement such a comprehensive system. These consequences notwithstanding, only a comprehensive security system based primarily on well-trained, motivated, and supervised people, complemented by the best technology available, will prevent another Pan Am 103 tragedy.

I cannot overemphasize the part played by U.S. air carriers in the application of any U.S. civil aviation security system. As stated earlier: an overabundance of security procedures and practices are worthless without full and complete application by the U.S. air carriers. The air carrier's have to make a full and unequivocal commitment to the security effort if any system is to be successful.

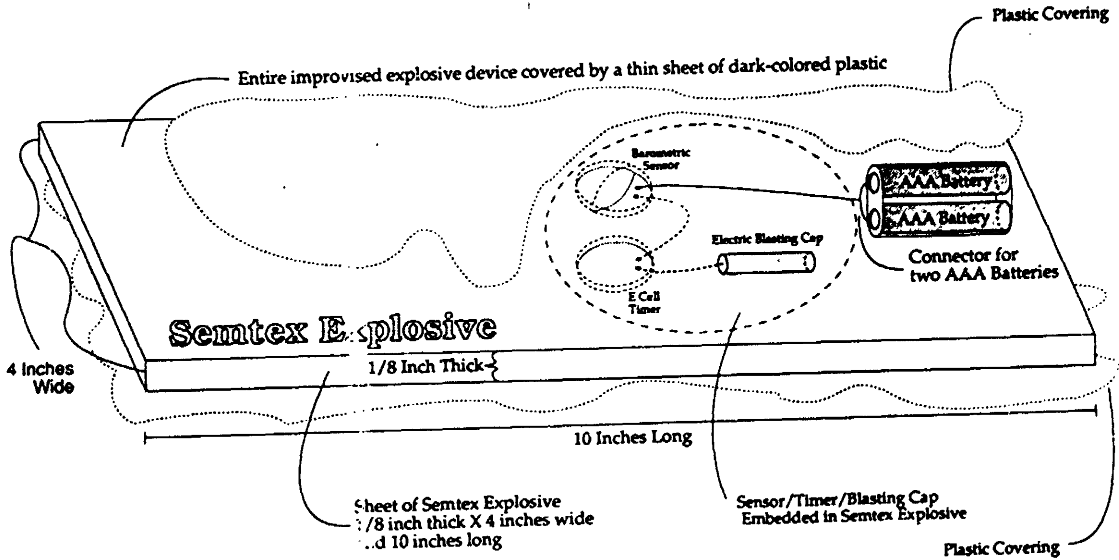
Unfortunately, even if an immediate decision is made by the the Bush Administration to build and implement this system, it will take many months of all-out effort just to get it operating in the high-threat areas. It will take two- to four-years before it actually matures. ***At the risk of stating the obvious, we may already be unable to prevent the next Pan Am 103 tragedy even if the correct decisions are made today to build the necessary system.***

We can no longer afford the luxury of delaying a decision to protect U.S. civil aviation from sophisticated sabotage devices

It is time for the Administration and some U.S. air carriers to quit applying the philosophy of horseshoes and grenades, "being close" is simply not good enough when it comes to protecting passengers on U.S. civil aviation.

Billie H. Vincent
12630 Heritage Farm Lane
Herndon, Virginia 22071

Under-The-Seat-Cushion Bomb used against
Pan Am (Item #1 & #2) and TWA (Item #20)

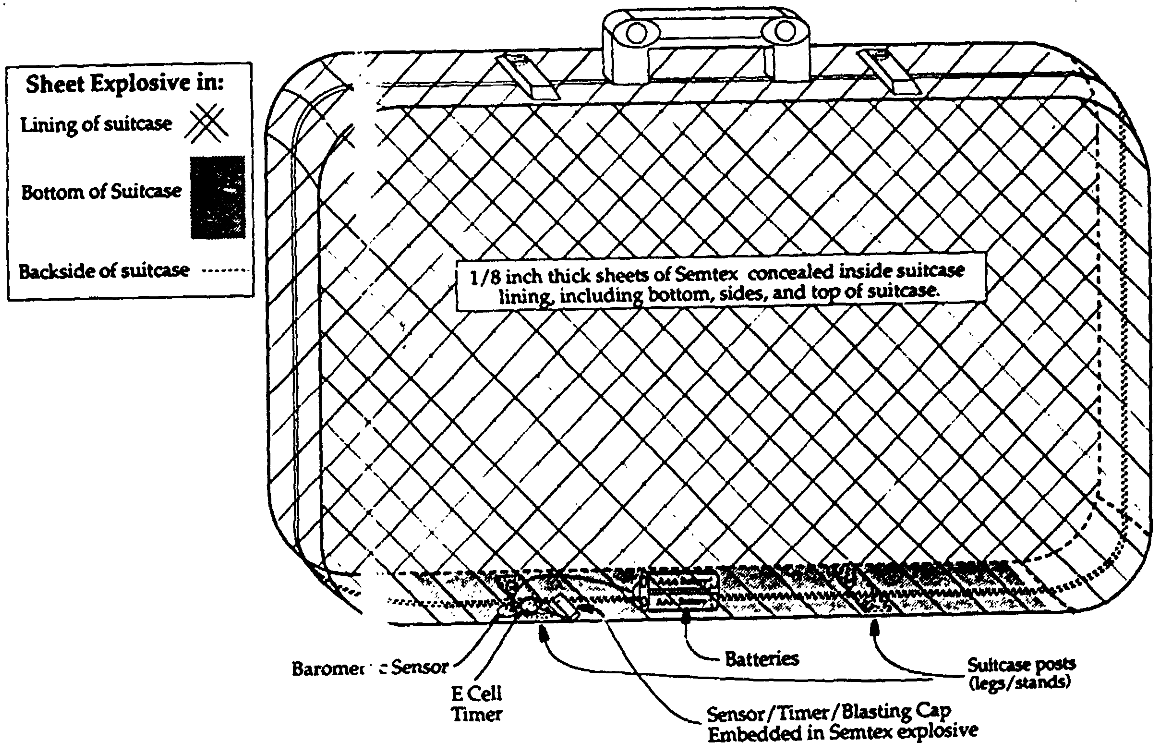


Attachment A

BHV/Bombs/Sheet Explosive

B.H. Vincent 9/25-26/89

Suitcase Bomb with Semtex explosive, Barometric Sensor, E Cell Timer, and Blasting Cap concealed inside lining on bottom, top, ends, and sides of suitcase (See Items 4 & 19)

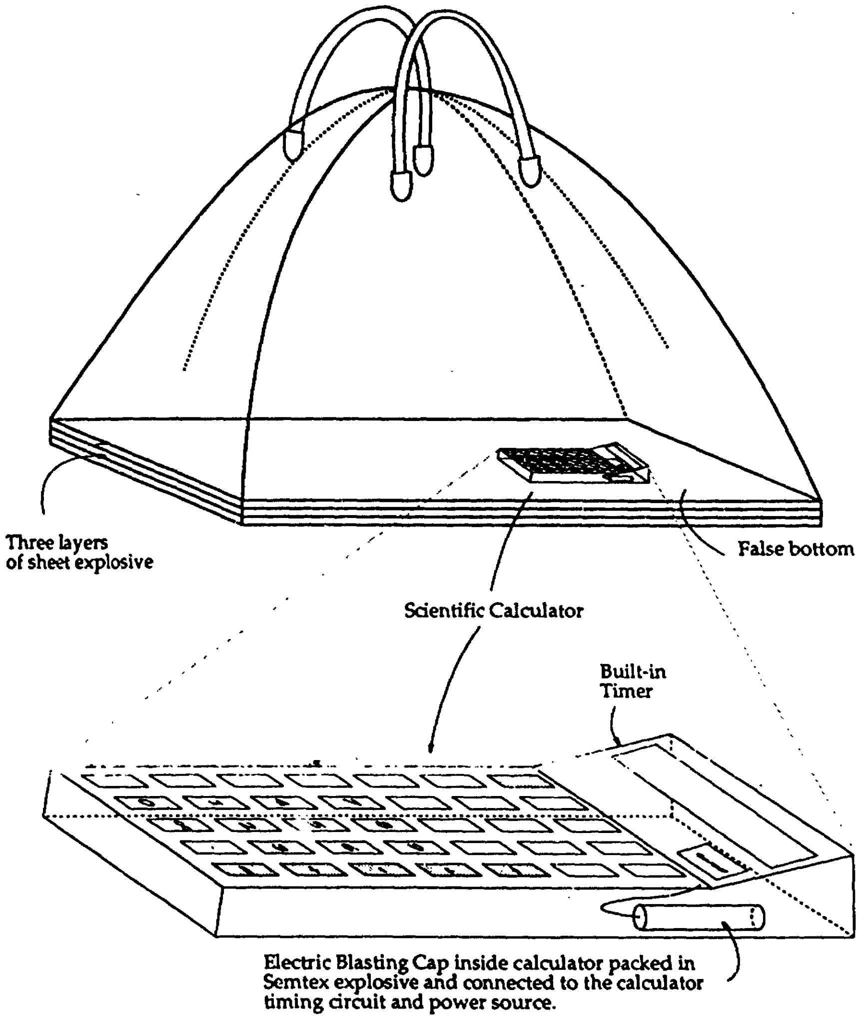


Attachment B

BHV/Bombs/Suitcase

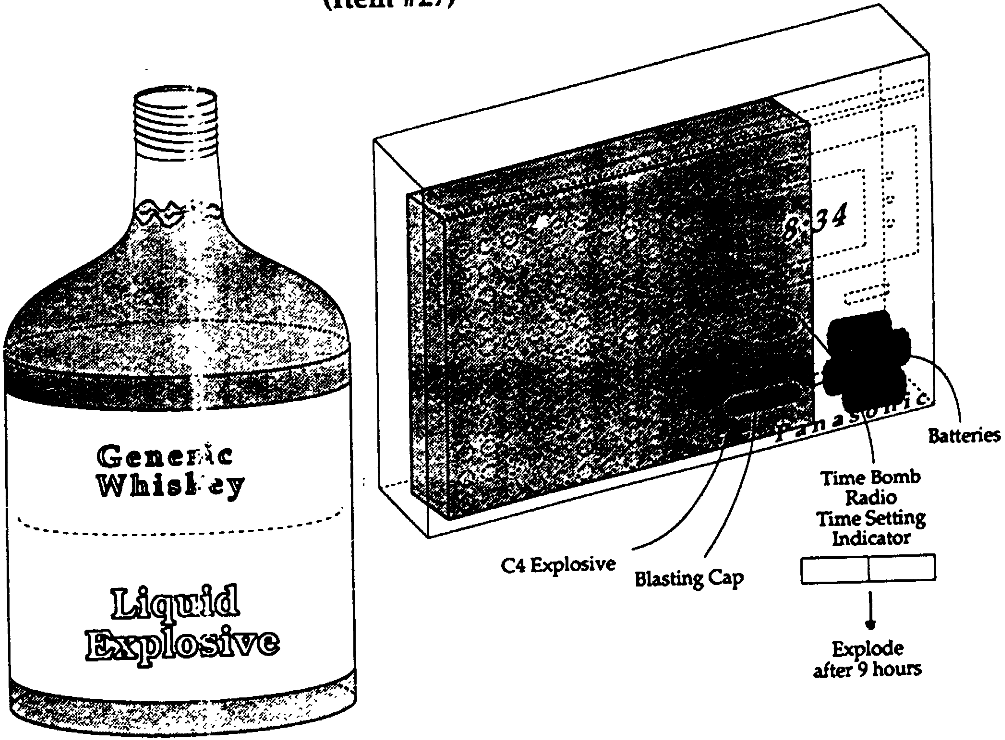
B.H. Vincent 9/25-26/89

Bomb Built into a Hand-Carried Bag (Item #21)



Attachment C

Liquid Explosive Bomb
(Item #27)



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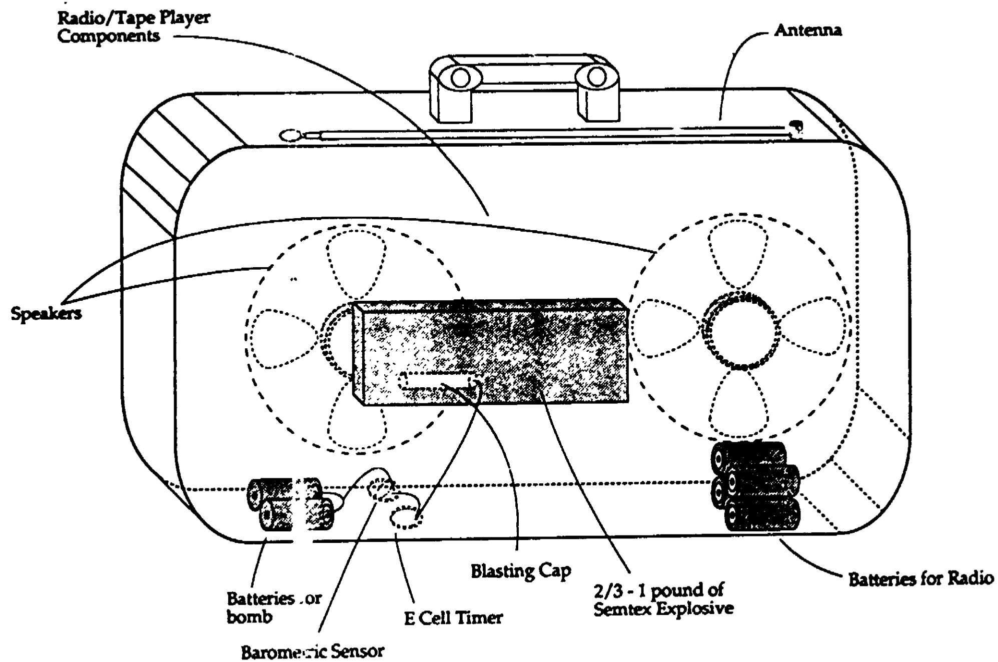
Attachment D

BHV/Bombs/Bottle & Radio

B.H. Vincent 9/25 - 26/89

Toshiba Radio
(Item #28 & #29)
Rear View



Attachment E

B.H. Vincent 9/25 - 26/89

BHV/Bombs/Toshiba Radio

Mrs. COLLINS. I understand you have some illustrations you want to make for us.

Mr. VINCENT. Yes, I would like to take a few minutes and brief the committee. I have 5 illustrations:

The first of these five, which I term as the under-the-seat-cushion bomb, was used against Pan Am on August 11, 1982, on a flight from Tokyo's Narita Airport to Honolulu, HI.

Two weeks later, a similar bomb, unexploded, was found on a Pam Am 747 in Rio De Janairo.

On April 2, 1986, what was thought to be an identical bomb once again was used against U.S. aviation. This bomb is a 4-inch wide piece of SEMTEX explosives, one-eighth of an inch thick, and approximately 10 inches long.

Now, all of these that I am going to show you are representations of the sophisticated devices. They are not the specific exact detail. The under-the-seat-cushion bomb contained an electronic timer. In the circuitry before the timer was a barometric sensor. This barometric sensor would not activate until above a flight of a certain altitude. Once that plane got above a certain altitude, it would tick time off against the timer. If the time had not expired by the time the airplane got below this preset altitude, the bomb would go inactive. When the flight took off and once again flew above the preset altitude, the device became active again.

That sequence would repeat itself until the time that had been programmed had expired and the timer would then cause the bomb to explode. It was powered by two triple A batteries. I could be carrying two of them right now. They are that easy to conceal inside a man's suit coat pocket.

The second illustration is a suitcase bomb. Both sides around the sides, the top and the bottom, were coated with SEMTEX explosives, approximately one-eighth inch thick again. The same circuitry I described for the other device was usually secreted on the bottom of the suitcase so that this would aid in confusing detection of the device by x-ray examination.

This particular one has shown up twice. The Wall Street Journal carried an article on June 29, 1984, about this bomb being transported by a British national from Athens to Tel Aviv Ben Gurion Airport, to London, and then back to Athens. It malfunctioned, did not explode.

The lady did not know she was carrying a bomb. This was carried by a dupe. The previous device I described has never been carried by a dupe. The suitcase bomb is something the individual has to know they are carrying to activate.

The second occasion for this to show up was in February 1986, when the Israelis picked up one of these in their security system. They missed the first as I just noted, but they caught the second.

The third illustration is a representation of the device that Ms. Ann Murphy tried to carry on an El Al flight on April 17, 1986, through Heathrow. She evaded Heathrow security. She did not know she was carrying an active bomb. She was detected as she was getting ready to board the airplane.

I will explain that later in detail tomorrow in executive session, if you choose.

The device consisted of two or three sheets of plastic explosives secreted below a false bottom of her carry-on bag, which her boyfriend had given her. A calculator was lying on top of the explosives with the calculator serving as a timer, the power source, the detonator, and the blasting cap. All of this was very innocuous and did not appear to be a bomb.

The fourth example is a representation of a device that was was put on a Korean Air flight in late 1987 by two North Korean agents.

It was a fully functioning radio where one of the batteries had been wired to a blasting cap which was embedded in about two thirds of a pound C-4 plastic explosives.

The other three batteries still powered the radio. The radio functioned fully. Then there was an additional amount of explosives in a whiskey bottle, liquid explosives that was set next to the device. This device did not have a barometric sensor.

This was left in the overhead bin above seat 7-B and 7-C on the Korean Air 707 that was lost over the Andaman Sea.

The last is a representation of the Toshiba radio found in the raid on the PFLP-GC safe house by the West German BKA on October 26, 1988. It had within the radio approximately 11 ounces of SEMTEX explosives wrapped in a tobler candy bar wrapper, blasting cap in that, and had essentially the same circuitry as those first two bombs I described.

It had a barometric sensor, electronic timer, an internal power source independent of the batteries of the radio. Now this gets very important when we get into procedures tomorrow, or you get into the procedures tomorrow in an executive session on what type of examinations are necessary in order to be able to detect this type of bomb. It is not a very simple thing to do.

Madam Chairwoman, and members of the subcommittee, that is my presentation on types of devices.

Mrs. COLLINS. Thank you very much, Mr. Vincent.

Our next witness will be Mr. Bert Ammerman, the president of the group called Family of Victims of Pan Am 103.

Mr. Ammerman.

STATEMENT OF BERT AMMERMAN, PRESIDENT, FAMILY OF VICTIMS OF PAN AM 103

Mr. AMMERMAN. This morning I left at 7 o'clock in the morning. We have 14 members from our group here. We paid our own way. We have all lost loved ones.

Mrs. COLLINS. I don't want to interrupt you, but may I ask them to stand because I want to give them their proper recognition.

Why don't you stand, please.

Thank you very much.

Mr. AMMERMAN. Thank you.

We have been in Washington, DC for the last 9 months monitoring and speaking and testifying at hearings. I know there is a 5-minute limit, and I know the time constraints.

However, Madam Chairwoman, I wish you could yield maybe another 2 or 3 minutes so I can get through with what I have to say because I think it will be very worthwhile. As you have listened this morning, now you will listen to the truth.

Mrs. COLLINS. Hearing no objection, you may proceed.

Mr. AMMERMAN. In August a delegation from our organization went to the United Kingdom for 5 days and had 20 meetings with government officials both in the United Kingdom and Scotland.

It is amazing that ordinary citizens through the eyes of the media have to bring the world back to where this tragedy has taken place. We will be going to Frankfurt, Germany, November 8, 9, and 10, to meet with the West German Government officials to find out when they are going to begin the process since it all started there.

Interestingly enough, we met with the managing director, Alan Proctor, of Heathrow Airport in a 2-hour meeting. the FAA sent Benjamin Demps from Brussels to be at that meeting.

It was one of the worst meetings we partook in during this 9-month chaotic excursion. Halfway through the meeting one of our members asked Mr. Proctor what lessons did you learn from Pan Am Flight 103? I will never forget his answer, and this is it.

"Lessons? Lessons? There were no lessons from flight 103. It was an incident and we made changes, but no lessons."

Those are the individuals that are responsible for security at Heathrow Airport, the British Aviation Authority.

Mr. Ford testified this morning and a few other people hoping that we don't ever have to go through another Pan Am Flight 103.

Obviously I guess a plane being blown out over the air in Africa is not Pan Am Flight 103. It was an instant replay. Same thing, terrorists, 171 innocent people blown out of the air because of airport and airline security.

Our Connecticut families just this weekend we had an organizational weekend, have put together a new button. It symbolizes this whole hearing, because I listened to Mr. Cox and I listened to politicians for almost 9 months.

It says Pan Am Flight 103, December 21, 1988, terrorism and apathy, a deadly combination. That is all I heard this morning, apathy, doubletalk.

I heard Mr. Cunningham from Pan Am state since he has taken over there has been a change in attitude.

Well, from the information and for the record, I was at JFK in June 1989, where I had to go to be told my brother was on that plane.

I watched eight people that our organization now called from nonalert because it is very unfair to say they are from alert management. It is nonalert management.

I watched six of them watch a door for 2 hours, of which no one came in or went out.

I watched two of them smoke cigarettes trying to hide them from the supervisor. And they laughed for 2 hours. If that is the change in attitude that Mr. Cunningham was referring to from Pan Am, I think we have something to be very concerned about.

With that, Madam Chairwoman, I will go into the presentation I have. In the 9 months since the bombing, many disturbing revelations have been known about security. These revelations must be addressed and dealt with.

The approach to airline security is inadequate and must be reviewed and revised. The seemingly passive approach by the U.S. Government toward dealing with international terrorism is ineffective, inappropriate, and sends a frightening message to terrorists. We will express our concerns in this testimony.

Due to the hesitancy of appropriate government agencies to be open and cooperative with family members over the last 9 months, we have been forced to become knowledgeable in the areas of airline and airport security procedures and terrorism policy.

We have found through our experience that you do not need to be an expert to understand that there are severe deficiencies prevalent in the current airline and airport security systems being implemented in many countries today. Prudent security can and must be provided.

The question is, are government leaders committed to this premise by action rather than verbiage? The air traveler who puts their faith in the airline, and government regulation of the security procedures of that airline, is making a fatal mistake. There is essentially no protection of the air traveler on U.S. carriers. Instead, it seems that the almighty dollar is what is being protected.

Airlines should be responsible for the safe operation of airplanes, while the ultimate security of the passengers must be the responsibility of government agencies. Airlines are in the business to make money. Governments are responsible for the protection of the public. Government must take an active role in structuring and maintaining security policy and procedures. We are living in an age where terrorism is a plague. In this case, we are specifically speaking of terrorism in the air. It is not going to go away because we want it to.

The government must be ready to prevent acts of terrorism. This cannot be left up to the airlines. In dealing with Flight 103, it appears that the FAA, it appears that the FAA and State Department chose not to deal with the possibilities of the bombing occurring even in light of various warnings.

And now, in the aftermath, these agencies seem more concerned with shifting accountability to others and covering up mishaps than dealing with the reality of the government's role into what led to the bombing. Someone must take charge and the finger of the American people points to the U.S. Government. By the same token, foreign governments must be held accountable for security procedures in their countries.

The FAA must attempt to regain the confidence of the traveler in its handling of security. It will be extremely difficult to regain confidence in the agency with Raymond Salazar still holding the position of Director of Security.

Mr. Salazar testified at Senator Lautenberg's hearing before the Senate Subcommittee on Transport on March 14, 1989. At this hearing, when questioned by Senator Lautenberg whether there were any other warnings besides the December 5 Helsinki warning, Mr. Salazar clearly stated that the December 5, 1988, Helsinki warning was the only warning relating to Pan Am Flight 103 received by the FAA.

Shortly after this hearing, it was announced that there were at least six other warnings which contained information that could be linked to the bombing of Pan Am Flight 103. This morning, you heard him and other people say the warnings didn't specifically go to Flight 103. The warning was a 3-week warning on a Pan Am flight from Frankfurt to London to New York before the holidays, but that is not specific enough. We can't act yet.

In a statement by the esteemed chairwoman of this committee, Representative Cardiss Collins, it was stated that "these and other FAA bulletins were sometimes untimely, sometimes dangerously inaccurate, and almost completely devoid of effective and specific instructions for countering possible threats. Some bulletins recommended actions that were pointless or even absurd."

This was in direct contradiction to Mr. Salazar's statement. It is very difficult to have confidence in an individual who was less than forthright in his testimony before a Senate subcommittee. Mr. Salazar must step down from his position in order that the FAA begin to regain credibility in the area of airport and airline security.

Finally, we cite a recent television program titled "The Reporters," shown on Fox Television. Mr. Salazar was interviewed by TV reporter Steve Wilson regarding security operations at Frankfurt. When questioned, Mr. Salazar repeatedly stated that security in Frankfurt was in compliance with FAA regulations.

When asked if, as Director of Security, he had personally followed up to insure that this was true, he simply said, "No."

We have four recommendations to put before the committee to consider. I would love to know what is going on in that closed session tomorrow, because it didn't seem too difficult for the terrorists to succeed. It would be more appropriate that they have suggestions on how to improve it.

It seems everyone knows how to break through it. The media will have television shows beginning tonight to show that.

The FAA or an appropriate agency designated by the President must be given complete responsibility and authority over airline and airport security. This agency must be responsible for the security of the passenger, while the airline should maintain responsibility for the safe operation of the plane.

The agency must be responsible for the recruitment, training, and appropriate compensation of security personnel. The funding for this program should be shared by government, airlines, and the traveling public. This approach would effectively eliminate the conflict of interest which currently exists with an airline responsible for its own security.

When it comes to protecting a precious human life, expense cannot be the primary issue. Placing responsibility of security procedures in the hands of airlines is a conflict of interest. Airlines are in business to make money. Precious dollars are cut from vital security budgets to raise bottomline profits.

Mr. Cunningham, in response to you today, said he was satisfied with the budget. Mrs. Boxer said, wouldn't you want to raise that? He said, "Yes, I would like to have more money." Then he can't be satisfied with the budget.

No corporation should have absolute authority over decisions which reflect on the safety and security of human lives. The expenses that will be brought forth with the necessary changes in security systems and procedures should be shared by the government, airlines, and passengers. The government must be responsible for insuring that minimum qualifications are set and met for security personnel.

Security personnel must be skilled professionals, not minimum wage, poorly compensated, and poorly trained individuals. Leaving security in the hands of Pan Am was a major factor which contributed to the downing of Pan Am Flight 103.

The second one is very important, based on Mr. Cox's testimony this morning. We stated this to President Bush on April 3, when we met with him. There should be a central analysis center where all intelligence information is sent, analyzed, and disseminated to all appropriate agencies at the same time.

There are conflicts, competition, and power struggles between agencies that cannot be eliminated due to faults in human nature, therefore the President must designate one independent agency or appoint an existing agency to be responsible for the gathering and disseminating of all intelligence information.

There must be a commitment for the proper mix of technology with adequately trained personnel to ensure that prudent security measures are in place and in use.

This is the most important: There must be a dual approach to international terrorism by our government. The attack on December 21, 1988—and last week in Africa—was not only a criminal act, but was a political action as well. Governments have hidden behind the facade of criminal activity so that they do not have to deal with state-sponsored terrorist acts.

The terrorists who committed this horrible attack should be identified, prosecuted, and punished. In all probability, it is said they will definitely identify the criminals, but never bring them to justice.

However, the countries that harbor these criminals and endorse these acts must be dealt with politically. We must have economic, diplomatic, and military strategies in place to counter these cowardly acts.

On December 21, 1988, we lost our loved ones in a horrific massacre at 31,000 feet. We realize that never again will we be able to talk, laugh, or cry with our loved ones. We want to prevent this senseless and preventable tragedy from occurring again to people like yourselves and your families.

Therefore, we calling upon you as our elected representatives to make certain that appropriate recommendations are made to move forward insuring the safety of our airways and that those agencies accountable for the loss of life resulting from Pan Am Flight 103 are exposed.

I also have a list of questions here that, if I have an opportunity to address to Mr. Salazar, I would love to get on record today. If that is not possible, I hope you would convey these questions to him.

The only question I would like to have on the record that Mr. Salazar answers you tomorrow or answers us today is, is Mr. Salazar or anyone else in the FAA willing to produce all the notes, documents, and memorandums in their files regarding Pan Am Flight 103?

All that the FAA, State Department, and everyone else has talked about since March is what they are doing now. The obvious question is, listening to the testimony this morning, how did the bomb go undetected? This is a Freedom of Information Act. I know it is a process we can follow through, but Mr. Salazar should show complete cooperation here by saying, yes, we can make that available.

I have other questions, Madam Chairwoman. If I have time, I would like to express them. Thank you for your leniency.

[The prepared statement of Mr. Ammerman follows:]

WRITTEN TESTIMONY OF

THE VICTIMS OF PAN AM FLIGHT 103

BEFORE THE
HOUSE FOREIGN AFFAIRS INTERNATIONAL OPERATIONS SUBCOMMITTEE

September 25, 1989

VICTIMS OF PAN AM FLIGHT 103 WRITTEN TESTIMONY

The following testimony submitted by the Victims of Pan Am Flight 103 regards our concerns involving the issues which led up to the devastating bombing of Pan Am Flight 103. This was the largest act of terrorism ever committed on American civilians. Military personnel killed in the bombing of Pan Am Flight 103 have been awarded Purple Hearts clearly showing the bombing is looked upon as an act of war by the US Military. In the 9 months since the bombing many disturbing revelations have been made known about the state of security at the time of the bombing. These revelations must be addressed and dealt with. The approach to airline and airport security is totally inadequate and must be completely reviewed and revised The seemingly passive approach by the US Government toward dealing with international terrorism is ineffective, inappropriate and sends a frightening message to terrorists. We will express our concerns and make recommendations regarding existing security policies and procedures in effect by the FAA and Pan Am. As the House Foreign Affairs International Operations Subcommittee, you have the responsibility to hear our concerns and recommendations and the power to effect positive change through exposure of incompetent systems and recommendations for change.

Our loved ones were brutally ripped from us in an untimely and preventable death. We can never bring them back, but we can work to bring about changes to prevent history from repeating itself. Therefore, as an organization one of our main goals is to advocate improvements in airport and airline security, but before this can be done appropriately the truth must be known about the events and conditions surrounding the bombing of Pan Am Flight 103.

Due to the hesitancy of appropriate government agencies to be open and cooperative with family members over the last nine months, we have been forced to become knowledgeable in the areas of airline and airport security procedures and terrorism policy. We have found through our experience that you do not need to be an expert to understand that there are severe deficiencies prevalent in the current airline and airport security systems being implemented in many countries today. Prudent security can and must be provided. The question is, are government leaders committed to this premise by action rather than verbiage? The air traveler who puts their faith in the airline, and government regulation of the security procedures of that airline, is making a fatal mistake. There is essentially no protection of the air traveler on US carriers. Instead, it seems that the almighty dollar is what is being protected.

~~The question of regulation versus deregulation must be~~ brought to the ~~fore~~. Airlines should be responsible for the safe operation of airplanes, while the ultimate security of the passengers must be the responsibility of government agencies. Airlines are in the business to make money. Governments are responsible for the protection of the public. Government must take an active role in structuring and maintaining security policy and procedures. We are living in an age where terrorism is a plague. In this case we are specifically speaking of terrorism in the air. It is not going to go away because we want it to.

The government must be ready to prevent acts of terrorism, this cannot be left up to the airlines. In dealing with ~~Pan Am~~ Flight 103, it appears that the FAA, and State Department chose not to deal with the possibilities of the bombing occurring even in light of various warnings. And now, in the aftermath these agencies seem more concerned with shifting accountability to others and covering up mishaps than dealing with the reality of the governments role into what led to the bombing. Someone must take charge and the finger of the American people points to the United States Government. By the same token, foreign governments must be held accountable for security procedures in their countries.

The FAA inspected Pan Am security in Frankfurt in October and discovered security violations, but it is not known what was done, if anything, about the violations. This is incomprehensible, especially in light of the fact that terrorists were apprehended in October in West Germany with explosive devices obviously meant to blow up a plane because of the barometric triggering device.

Anthony Broderick who is in charge of safety and security regulations for the FAA, stated on the McNeil Lehrer Report on September 20 that the FAA went to Heathrow and Frankfurt between December 22 and January 31 and did an in depth series of inspections. They found a number of technological and substantial discrepancies in the manner in which Pan Am applied their security program. Inconsistencies in the application of this program led to the conclusion that security procedures were not being used in the manner necessary. For example, the profile program had not been applied consistently. Passengers that should have been singled out according to the program for further screening, additional inquiries and searches, were not. Instead of being detained, these "profile passengers" sailed right through security onto flights. Consequently baggage was not properly searched. Another critical flaw found in the system was that passengers who did not board a particular plane were still able to check bags onto that plane and the bags were not removed before take off even though the passengers never boarded. Pan Am flew baggage without its respective passenger.

What did the FAA do as a result of detecting theses violations?. The government has issued fines against Pan Am alleging that the airline failed to properly screen passengers and cargo for Pan Am Flight 103. Unfortunately $630,000 in fines can not compare to the loss of 270 lives. On December 21, 1988 Pan Am did not match bags to passengers, left the cargo area unguarded cargo area, and was not using the Pan Am passenger profile system, also, Pan Am failed to conduct a required search of the planes cargo area before loading at Frankfurt and London. Each of these procedures, if properly implemented could have prevented the bombing of Pan Am Flight 103.

According to Anthony Broderick, the FAA is responsible for insuring the highest level of safety possible. The agency states that it sets a high standard for safety if there is a reasonable probability, even a risk that safety could be at risk, the FAA should not allow a flight to take off until corrective action is implemented if possible. The FAA is supposed to have a constant regulatory presence - where was that presence in the months and weeks before the bombing of Flight 103? Where is that presence now, 9 months after the bombing of Pan Am Flight 103? The FAA should be held accountable for monitoring security of airlines. What good is a regulatory agency if they don't do their job. Why weren't the Pan Am security breaches acted on before the bombing was allowed to occur? The FAA has deliberately attempted to blur their mistakes instead of investigating the breakdowns in their system and regaining control of the situation.

The FAA must attempt to regain the confidence of the traveler in its handling of security. It will be extremely difficult to regain confidence in the agency with Raymond Salazar still holding the position of Director of Security.

Mr. Salazar testified at Senator Lautenberg's hearing before the Senate Sub-committee on Transport on March 14, 1989. At this hearing, when questioned by Senator Lautenberg whether there were any other warnings besides the December 5 Helsinki warning, Mr. Salazar clearly stated that the December 5, 1988 Helsinki warning was the only warning relating to Pan Am Flight 103 received by the FAA. Shortly after this hearing it was announced that there were at least other six warnings which contained information that could be linked to the bombing of Pan Am Flight 103. In a statement by the esteemed chairwoman of this committee, Representative Cardiss Collins, it was stated that "these and other FAA bulletins were sometimes untimely, sometimes dangerously inaccurate, and almost completely devoid of effective and specific instructions for countering possible threats. Some bulletins recommended actions that were pointless or even absurd". This was in direct contradiction to Mr. Salazar's statement. It is very difficult to have confidence in an individual who was less than forthright in his testimony before a senate sub-committee. Mr. Salazar must step down from his position in order that the FAA begin to regain credibility in the area of airport and airline security.

VICTIMS OF PAN AM FLIGHT 103 — WRITTEN TESTIMONY

To further substantiate our belief that Mr. Salazar must step down we cite a report conducted in 1986 of Pan Am's security. It was reported that Raymond Salazar was privy to the results of this study. The Israeli consulting firm conducting the study concluded that, "Pan Am is highly vulnerable to most forms of terrorist attack. The fact that no major disaster has occurred to date is merely providential." The bombing of Pan Am Flight 103 on December 21, 1988, suggests that this report was not acted upon by Pan Am or the FAA.

Finally, we cite a recent television program titled "The Reporters" shown on Fox Television. Mr. Salazar was interviewed by TV reporter Steve Wilson regarding security operations at Frankfurt. When questioned, Mr. Salazar repeatedly stated that security in Frankfurt was in compliance with FAA regulations. When asked if, as Director of Security, he had personally followed up to insure that this was true, he simply said "No". Also, Salazar admitted that before going to inspect security procedures Pan Am was given notice to expect the FAA. Did it ever occur to the FAA that notifying security that it was coming to inspect operations might result in a less that accurate account of the day to day situation? Oliver Koch, a former security officer for Alert in Frankfurt, stated that when told that the FAA was due to come for an inspection he was instructed by his superiors that he should have "bodies in uniform" to put on a show for the FAA. 5

The program went on to clearly show that 7 months after the bombing of Pan Am Flight 103, the security personnel at Frankfurt were still inadequately managed and trained. Problems in training are as far reaching as difficulty in understanding the security manual and related video tapes because of language problems.

The following are major issues that contributed to the bombing Pan Am Flight 103:

A. While it was known in 1986 or earlier that plastic bombs in checked baggage could not be detected and were the most serious terrorist threat to international airliners, no interim effective security measures were adopted and new equipment to detect plastic bombs originally planned for installation in 1987 had still not been installed or ordered as of December 21, 1988.

B. Although the Federal Aviation Administration, the State Department, the Central Intelligence Agency, the National Security Agency, the Federal Bureau of Investigation, and airline and airport authorities must work together to protect air passengers from terrorist attacks, investigations have shown little coordination and haphazard communication among those who share responsibility for preventing air tragedies.The FAA does not seem to have the authority or the foresight to make vital security decisions. Instead, the FAA appears to leave it largely up to mid and even low-level airline employees, to act on information that is haphazardly gathered and assessed, to make vital security decisions.

C. There were at least 7 warnings that were not effectively acted upon by appropriate agencies that contributed to allowing preventable massacre to occur.

Now we will identify four areas in which we recommend either new policy or change in current policy.

1. The FAA or an appropriate agency designated by the President must be given complete responsibility and authority over airline and airport security. This agency must be responsible for the security of the passenger, while the airline should maintain responsibility for the safe operation of the plane. The agency must be responsible for the recruitment, training and appropriate compensation of security personnel. The funding for this program should be shared by government, airlines and the traveling public. This approach would effectively eliminate the conflict of interest which currently exists with an airline responsible for its own security.

When it comes to protecting a precious human life, expense cannot be the primary issue. Placing responsibility of security procedures in the hands of airlines is a conflict of interest. Airlines are in business to make money. Precious dollars are cut from vital security budgets to raise bottom line profiles. 3 No corporation should have absolute authority over decisions which reflect on the safety and security of human lives. The expenses that will be brought forth with the necessary changes in security systems and procedures should be shared by the government, airlines and passengers. The government must be responsible for insuring that minimum qualifications are set and met for security personnel. Security personnel must be skilled professionals, not minimum wage, poorly compensated and poorly trained individuals. Leaving security in the hands of Pan Am was a major factor which contributed to the downing of Pan Am Flight 103. 4

This same concept of security management should exist in the all civilized nations. The FAA should continue to extend to its authority and protection for American travelers and airlines in undeveloped countries or countries at risk.

7 There should be a central analysis center where all intelligence information is sent, analyzed and disseminated to all appropriate agencies at the same time. There are conflicts, competition and an power struggles between agencies that cannot be eliminated due to faults in human nature, therefore the President must designate one, independent agency or appoint an existing agency to be responsible for the gathering and diseminating of all intelligence information.

8. There must be a committment for the proper mix of technology with adequately trained personnel to insure that prudent security measures are in place and in use.

This is the most important

4. There must be a duel approach to International terrorism by our government. The attack on December 21, 1988 was not only a criminal act, but was a political action as well. Governments have hidden behind the facade of criminal activity so that they do not have deal with state sponsored terrorists acts. The terrorists who committed this horrible attack should be identified, prosecuted and punished ~~as criminals~~. However the countries that harbor these criminals and endorse these acts must be dealt with politically. We must have economic, diplomatic and military strategies in place to counter these cowardly acts. and last week in Africa

The following is a list of specific recommendations that can and should be Instituted immediately until prudent security measures are in place:

1. An 800 number should be set up by the FAA for the public with information regarding any threats not considered to be high level by the FAA. Passengers should then be able to contact the specific airline mentioned for details to ascertain whether they want to take the flight;

2. Passengers must be notified by the affected airline if a high level security bulletin has been issued by the FAA. With this recommendation, selective notification would no longer be an issue of concern. If this had been the case with Pan Am Flight 103 many of the passengers that were killed in the bombing might not have boarded the plane.

3. Current security equipment and procedures are at best inadequate. We must provide security systems that exemplify that prudent measures have been instituted to protect air travelers. It is imperative that the same security systems be consistent throughout the airport to insure continuity.

   Because these security systems will take some time to be properly instituted, we recommend that the following preventative safety measures be instituted immediately for all international flights by U.S. or foreign carriers to increase protection of air travelers to the highest level possible given the intolerable situation that exists with security at the present time:

VICTIMS OF PAN AM 103

a. A ban of all electrical devices large enough to contain plastic explosives that cannot be detected with current security equipment;

b. All carry on and checked baggage must be hand searched until proper bomb detection equipment is in place;

c. Implement the El-Al form of questioning of passengers using security personnel;

d. Match baggage with passengers;

e. Seal all baggage as soon as the appropriate security checks have been completed;

f. The FAA must increase their monitoring and begin testing security systems in all airports for detection of bombs as well as other weapons;

g. Unattended or abandoned baggage must be be identified and dealt with by security;

h. Late arriving passengers should either be denied entrance or go through the same screening process as the other passengers regardless of possible flight delay.

4. The captain must be notified of all threats to his flight. He has the authority to delay or cancel flights if he feels that safety cannot be guaranteed. This will insure that passenger safety is the rule rather than bottom line profit over lost ticket sales.

5. Stringent training and financial compensation for security personnel instituted. It is imperative that the same stringent training and increased financial compensation be used for the entire airline industry to insure passengers that fully trained, qualified security personnel are able to meet the challenge of airport and airline terrorism.

VICTIMS OF PAN AM 103

We demand serious consideration be given to the concerns and recommendations discussed in this testimony. Pan Am Flight 103 is a tragic example of the inadequacies of the present systems and policies used by our government to protect the airways from terrorism.

On December 21, 1988 we lost our loved ones in a horrific massacre at 31,000 feet. We realize that never again will we be able to talk, laugh or cry with our loved ones. We want to prevent this senseless and preventable tragedy from occurring again to people like yourselves and your families. Therefore, we are calling upon you as our elected representatives, to make certain that appropriate recommendations are made to move toward insuring the safety of our airways and that those agencies accountable for the loss of life resulting from Pan Am Flight 103 are exposed. Jena

Mrs. COLLINS. Mr. Cohen.

STATEMENT OF DANIEL COHEN, FAMILIES OF PAN AM 103/ LOCKERBIE

Mr. COHEN. Thank you, Madam Chairwoman.

I am not an expert on airline security, but I think important for you all to hear from the victims' family members. Statistics like 270 people killed, particularly if they are 9 months old, tend to become rather remote and abstract.

I am here to remind you that those were real people who were killed, and there are real people whose lives have been shattered beyond repair, who have been left beyond. I recognize, Madam Chairwoman, I don't have to tell you this. You know what I am talking about.

That is why I think it is very appropriate that you are chairing these significant hearings.

My daughter, Theodora, Theo we called her, would have been 21 years old the 10th of this month. She was one of the many college students killed in the bombing on Pan Am 103. The average age of those killed in that catastrophe was 27.

A lot of promising young lives were cut short on December 21, 1988. The loss of a child is the most cruel blow that can ever befall anyone. It is made even harder when you realize that this loss was not inevitable.

Pan Am 103 was an entirely preventable disaster. If only the people that had been charged with protecting the security of the passengers on that plane had been doing their job, we wouldn't have to have these hearings today.

This is also harder to handle if you suspect, and I think most of the victims' family members suspect, that there were some privileged people who were warned off this flight, while others, like my daughter, were allowed to go innocently to their deaths.

In the days immediately following the tragedy, my wife Susan and I were in sort of a daze. We didn't watch the news, we didn't read newspapers. We didn't really know what was happening.

Then, a few days after Christmas, I got a call from a reporter, and he asked me about what my opinion was on a warning about a bomb on a Pan Am flight from Frankfurt to London to New York that was supposed to be bombed some time in the weeks before Christmas, and that this warning had been posted in the Embassy in Moscow.

Now, I tend to be fairly cynical about the government, but not that cynical. Surely, if there had been that kind of a warning, something would have been done. The passengers would have been notified. I called the State Department, a special number had been given to me by my Congressman, Benjamin Gilman, connected me directly with someone who was handling the matter of Pan Am 103.

I talked to a woman. I don't recall her name now. I asked her about this warning, and she said, yes, there had been such a warning, and I was horrified. She became rather huffy. She said, "Do you know that three State Department employees were also on that plane and they were killed?"

And I said to her, did they know about the warning? She admitted, yes, they did. I said, they had a choice. They had a choice whether to take the risk or not. My daughter had no such choice, and I hung up.

That was the first and last time I have called the State Department. Since then I have had my lawyer or friends communicate with them. I will not deal with that sort of person anymore.

The obvious question comes up, why weren't the passengers warned? The first answer that came down from the administration is that there are so many threats, so many warnings that come out every year that airline travel would be paralyzed if they were all publicized.

As it turned out, there were only 25 high-level warnings during 1988. The so-called Helsinki warning was one of them. Then we were told the Helsinki warning was a hoax, a "gruesome coincidence" I think was the felicitous phrase used by an FBI man. If it was a hoax, the hoaxer must have been psychic.

In any event, the Helsinki warning was not withdrawn. Then in February it turned out the Helsinki warning wasn't the only warning. Mr. Ammerman has already talked about these. There had been specific detailed information about a bomb in a Toshiba cassette recorder that had been taken from known terrorists in Germany in October.

The terrorists were arrested and then most of them were released. This information was in the hands of the American security forces, it was in the hands of Pan Am and the other airlines.

What they did about it and what they did not do about it is obviously the subject of investigation from this committee and from other areas. Still, we were being assured that there was no two-tier warning system. Yet, Pan Am flew one-third empty at the busiest travel time of the year. They tell us that is normal, but that is a figure that still gnaws at me. Security alerts like the Helsinki warning are routinely given to hundreds and sometimes thousands of individuals at airports, embassies and foreign governments. These are not closely guarded intelligence secrets.

I image myself as a clerk at the American Embassy in Moscow and the Helsinki warning passes over my desk. I know my daughter is flying back to the United States from London on Pan Am. Although it is against regulations, I pick up the phone and I say, "Honey, switch to Swiss Air or Lufthansa."

Everybody in this room would have done the same thing, with the possible exception of Mr. Yeffet, who testified this morning. But I am sure every one of you would have done the same thing, regulations or no. I am quite sure people did exactly that.

Then I discovered the State Department has an electronic bulletin board system which provides detailed information on terrorist activities to some of the major American corporations. Some people do get warnings. I guess my daughter just wasn't important enough.

I guess Bonnie O'Connor's brother just wasn't important enough. I guess Kathie Flynn's son just wasn't important enough. I guess Paul Hudson's 16-year-old daughter just wasn't important enough. They all died on Pan Am 103.

The administration's chief spokesman, Secretary of Transportation Samuel Skinner, makes all the right noises about providing security and how sorry he is. But what really gets his juices flowing is when information is released to the general public.

Around Easter time a warning was leaked to the British tabloid press, a warning about a possible hijacking of an American plane over the Easter holidays. He went ballistic. I recall that he became somewhat apoplectic over information that came out of this committee. He even went so far, if I remember correctly, as hinting that perhaps lives were being threatened by the release of this information.

I think lives could be saved by the release of this information. Perhaps they already have been saved by the release of information. I realize my time is very nearly up, I don't want to overstay my welcome. I started on a personal note and I am going to end on one.

Theo was our only child. My wife and I are in our fifties. There are not going to be anymore children. There are going to be no grandchildren. We have very little personal stake in improved airline security.

The grim joke around our house is that we are the only people in the country who can fly Pan Am with a smile. What else can they do to us? But we are never going to have any peace, nor are the other family members until we know, until we really know what happened. We are not going to have any peace until we know that every effort to find and punish those people responsible has been made. I mean the people who placed the bomb, I mean the people who paid for the bomb, and I also mean those people whose gross incompetence allowed that bomb to be placed.

No one who boards a plane can really feel secure. No one who puts a child or other loved one on a plane should really be able to feel secure. We have been told by officials of the Government and by the airlines that they are really doing a great job. There is nothing really wrong with security, and now they fixed even what wasn't wrong.

Essentially they are saying, "trust us." We trusted them. You don't want to be where we are at now.

Thank you very much.

[The prepared statement of Mr. Cohen follows:]

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STATEMENT Of DANIEL COHEN, MEMBER, ~~SURVIVORS~~ FAMILIES OF PAN AM 103/LOCKERBIE BEFORE THE HOUSE SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION, HEARING ON THE BOMBING OF PAN AM FLIGHT 103, RAYBURN HOUSE OFFICE BUILDING, WASHINGTON, D.C., SEPTEMBER 25, 1989.

Madam Chairman and distinguished members of the committee: It has now been 278 days since the terrorist bombing of Pan Am flight 103 killed 270 innocent people, including 189 Americans. My daughter, Theodora, who was 20, was one of those. I am also here representing over 100 other Pan Am 103 victim family members of the organization known as ~~Survivors~~ Families of Pan Am 103/Lockerbie.

It is long past time for the Congress to take a hard look at what happened and whether corrective action has been taken to prevent another such tragedy. Regrettably, Madam Chairman, we must say that a business as usual lttitude by the FAA, the State Department, and the airlines has not resulted in significantly improved airline security nine months after the worst terrorist attack on American civilians in our history.

Moreover, the confidence of the flying public has deteriorated in both airline security and in the capability of our government to deal with terrorism.

The basic facts on security measures in force in December 1988 have not been released by the airline or the FAA. We are still really not sure what happened. We do know the security was somewhere between completely inadequate and willfully reckless.

What is known has largely been uncovered and brought to light by the news media or individual citizens or this committee. As you know, Madam Chairman, former Frankfurt Pan Am Security Supervisor Koch has publicly filed sworn statements stating that Pan Am took no special security precautions on December 21st, that the FAA security bulletin warning of a bombing attack on a Pan Am Frankfurt originating flight going to the United States in the two weeks before Christmas was found in a pile of papers on a supervisor's desk AFTER the bombing and was then backdated by the supervisor to make it appear the warning was not received in time. A copy of his statement which was published in Stern magazine is included as an exhibit to my testimony.

More recently in August the television program, The Reporters, on Fox Network Television, went undercover to the Pan Am security center at Frankfurt Airport, where the bomb that destroyed Flight 103 is believed to have been smuggled aboard in the checked luggage. The reporter completely --

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breached Pan Am security in July and interviewed the Pan Am chief security trainer who admitted on camera that the security was still completely inadequate to defend against another Pan Am Flight 103 bombing, that the security officers had never been told about the many official FAA warnings prior to the Lockerbie bombing, that training was still being conducted in English which many German security officers barely understood, and that the FAA always warned Pan Am when it was coming to inspect so that Pan Am could cover up its most gross deficiencies. The reporter was even permitted to walk away with the secret Pan Am security training manual without challenge. As an exhibit to my testimony I am submitting to the committee a video tape of this most incredible television program, which provides irrefutable proof of the state of Pan Am security both in December of 1988 as well as presently.

In August, an article appeared in Conde Nast Traveller magazine entitled "What the State Department Knows But Will Not Tell You" that sheds more light on the State Department's selective warning system. Since October, 1987, the State Department through its Overseas Security Advisory Council has been providing to a select group of subscribers up to the minute information on terrorist warnings and developments. This service is available to and subscribed to by over 200 large international corporations and organizations.

One condition of subscription is that the subscriber must agree not to release the information on the Electronic Bulletin Board to the public. Was this still another source of selective warnings to corporate officials to cancel their Pan Am Frankfurt to U.S. reservations in December, 1988? We do not know and the State Department is not saying.

We have now seen another example of how this policy of secrecy and withholding credible terrorist threats from the flying public works in practice. During the week of March 19th, the FAA issued a high level alert that warned of a possible hijacking of an American airliner in Europe during the Easter rush.

The substance of this warning was broadcast as a travel advisory on U.S. Armed Forces television in Europe, and leaked to the British tabloid press. The only reaction of our government was to threaten to punish the leaker to the British Press.

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The general distribution of FAA warnings precludes anything but a defacto-selective warning system. The bulletins in the Pan Am 103 case went to scores of government agencies in Europe and North America and several thousand individuals.

Incredible as it seems, the Administration's policy of not disclosing terrorist threats, even high level credible warnings, has only hardened since the Pan Am 103 bombing. The rationale has shifted from "we cannot tell you because there are so many it would stop all air traffic" to "we cannot tell you because it would dry up intelligence sources and encourage more threats." In July, the FAA codified its immoral refusal-to-warn policy by issuing regulation that imposes $1,000 fines on individuals and $10,000 fines on airlines that issue security warning information to the public.

Following this line of reasoning, the Food and Drug Administration should not have warned the public of sabotage of the drug supply in the Tylenol poisoning case, nor pulled fruit off the shelves in the recent South American fruit poisoning case.

Rather, following the FAA policy, the FDA should have alerted the grocery and drug store chains'security firms, warning them not to tell the public and leaving it up to each store as to how to react to the threatened sabotage.

There is no evidence that the airlines or the FAA have cited which shows that notifying those at risk of credible bomb threats would "dry up" intelligence sources. The sources of warnings in the Pan Am 103 case were the German police and a resident of Helsinki that freely identified himself.

More recently, the source of the March FAA warning of the possible hijacking of an American plane in Europe was reported in the press to be the PLO and Jordanian government. Does the Secretary of Transportation assert that such sources of information would dry up if people at risk were warned?

In any case, no responsible party, certainly not the relatives of Pan Am 103 victims, has called for the publication of sensitive details of terrorist threats or warnings.

The canard that notifying airline passengers of credible threats would result in a vast increase in such threats is also without a basis in fact. According to the FAA's own statistics, the number of threats to airlines has been relatively constant at 400 to 500 per year since 1983, with less than 30 of these being so-called "high level threats." And that, Madam Chairman, is out of six million flights.

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The only exception to this is the 1985-86 period, when there was approximately a 30 percent increase. Madam Chairman, you may recall this was the period of the Rome airport massacre, the TWA Athens Airport hijacking, the Achille Lauro hijacking, the Berlin nightclub bombing, and frequent public threats against Americans by Middle East terrorist leaders. The record is clear that threats increased slightly in response to actual terrorist acts, but not to empty threats.

The real reason for government and airline resistance to notification of those at risk seems to be fear of lost revenue and the exposure of the ineffective and inept security measures currently in force on international airlines.

The new measures ordered by the FAA since the Pan Am 103 bombing, which in essence consists of x-ray or hand search all baggage, are completely ineffective, because current X-ray equipment cannot detect plastic explosives and hand searching is not being conducted unless there is other cause to suspect.

No respected independent security expert inside or outside the government can be found who will testify that we can have confidence in the current security procedures preventing another Pan Am 103 tragedy. This is why IBM and other corporations have warned their employees not to fly American carriers in Europe.

Stronger measures, such as hand searching of baggage on international flights and banning of certain electronic devices, have not been adopted, although urged by security experts, and formally proposed as relulations by victim families and the Aviation Consumer Action Project. Installation of bomb detection equipment is months to years away.

In this blatant failure to protect situation, how can Americans also countenance a "refusal to warn" policy? The purpose of intelligence is to inform those at risk, as well as to help the police catch terrorists. The purpose of security is to prevent and deter. Intelligence that can only be shared with other intelligence officers is of little value.

A moral and sensible notification policy will enhance security, by first deterring terrorists who realize their plans are known; and secondly, by ensuring that security forces are taking precautions seriously in the face of high level threats.

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I might and parenthetically, Madam Chairman, that the notification policy we are supporting has been publicly endorsed by Lieutenant Colonel Corbett, former NATO counterintelligence security chief, and by Billie Vincent, a former FAA director of security, and also by a former security chief of El Al Airlines.

Furthermore, Senator D'Amato has introduced legislation to implement part of this notification policy and that legislation has been endorsed by the pilots and flight attendants unions.

In closing, I would just like to reiterate that the airline security system was and is broken. Clearly it needs to be fixed before a repetition of the Pan Am 103 occurs in the months ahead.

Within the past week, a French UTA jetliner exploded over Africa killing all 171 passengers and crew, including 7 Americans. The Islamic Jihad, a pro-Iranian terrorist group, claimed it had planted a bomb on the UTA jetliner. An AP news story has reported that the French government may have ignored terrorist warnings prior to this latest act of terrorist mass murder of innocent civilians.

However, the policies and practices which contributed to the 103 tragedy cannot be fixed unless the truth is known about what went wrong with the system on December 21st, 1988.

Families ~~Survivors~~ of Pan Am 103/Lockerbie with over 100 families of the American victims, will with the other two victim family organizations -- Victims of Pan Am 103 and Flight 103-U.K. Families -- continue to push for the truth to be known about the bombing of Pan Am 103. Since the President signed an Executive Order establishing the President's Commission on Aviation Security and Terrorism on August 4th, we have been anxiously awaiting the appointment of this commission.

We are calling on you, Madam Chairman and the other distinguished members of this committee, to add your commitment to allowing the truth to be known, for without the truth we cannot expect to see security measures adequate to meet the threat we are all facing.

END

Mrs. COLLINS. Thank you.

Mr. Vincent, you seem to be particularly critical of the FAA's ability to stay ahead of the terrorist threat. What do you think accounts for the FAA's inertia?

Mr. VINCENT. I am sorry, Madam Chairwoman. The FAA's what?

Mrs. COLLINS. Inertia.

Mr. VINCENT. The FAA is a large bureaucracy. It is a large bureaucracy that has a tendency to once they get set on a course——

Mrs. COLLINS. Move the mike closer to you.

Mr. VINCENT. I say the FAA is a large bureaucracy, and most bureaucracies tend to get started on a course, and it is very difficult to move them off of that course. What is perplexing is I think it ought to be clear to them what is necessary to correct the problem. Nothing short of what is essentially an Israeli security system will do the job.

As I illustrated a moment ago, the sophistication of those explosive devices are such that they can be secreted in virtually anything. We do not have the technology to detect those explosives yet to the degree that we need to.

We do have some promising areas. But it has to be a people system built on the order of the Israeli system. The hardest thing, it would appear, for the Bush administration to do at this point is to make that decision to develop that system and then require its implementation. That is what is needed.

Mrs. COLLINS. Do you believe the concepts of El Al system would be proper for the American aviation environment?

I raise that question because it has been said that we have so many millions of passengers going out on a daily basis and so forth and so on and passengers get annoyed if they have to stand in line another few minutes while their baggage is being checked and so forth.

What are your responses to that sort of copout, if you will?

Mr. VINCENT. It is indeed a copout. It is interesting to note that my successor as Director of the Office of Civil Aviation and Security in the FAA could not answer the questions on costs associated with such a system this morning. The problem with that goes something on the following:

We can't do that because it is either too costly, we are much larger than El Al is and on and on. That is the WCDTP syndrome I would call, looking for reasons why we can't do something instead of looking for the reasons why we should do those things and how we can get about doing them.

The issue of size of El Al can be translated in another way, and that is there ought to be an economy of scale. The system that supports the El Al system, the Israeli security system, is built to accommodate a very small airline, as people make note of. That means one or two operations at best each day at airports outside of Ben-Gurion.

If you look at the United States operation in the high threat areas, that is in Europe, the Middle East, and South Asia, you will find that it is substantially larger and you have numerous operations each day. You have an economy of scale which means you can spread the costs of such a system over a larger and much wider base. What is missing is no one has sat down and said the requirements for such a system are these and enumerate them and then run a cost analysis of it.

I will accept "we can't do that because" when this requirements and cost analysis is done and when it is proven from a factual basis that it can't be done. And I don't think that can be proven.

Mrs. COLLINS. Mr. Ammerman had asked some airport officials outside the United States what they thought the lesson of Pan Am Flight 103 was. What do you think is the lesson of Pan Am Flight 103?

Mr. VINCENT. One of the lessons of Pan Am Flight 103, the most obvious, the first one is that the airlines that do not do a good job with their security responsibilities give a bad name to those airlines who do do a good job.

The other lessons on Pan Am Flight 103, first and foremost, is that the United States cannot continue to incrementally increase the security requirements and expect to be able to stop the sophisticated explosive devices. They have to take a systems approach, take the whole universe, and look at it and say this is what we are confronted with from a threat level. Here are our options. Here are the systems that have worked successfully. Here are the things that we need to do that are effective, and then set up the system for U.S. aviation, wherever that might be.

Those are the lessons that should be learned from Pan Am Flight 103, but Madam Chairwoman, we seem to have relearned those lessons several times. I recall TWA-840, on April 2, 1986. We lost five people, four people from that incident from one of those devices. And here we are still arguing almost a year after having lost 270 more people.

It is time to sit down and do the job that needs to be done. That is the lesson.

Mr. AMMERMAN. Madam Chairwoman, may I add one lesson that has been left out? One lesson from Pan Am Flight 103 is the management security system, organizational system, that is in place now is ineffective. There is not enough sharing of information; that you cannot hold anyone accountable. This is the third hearing I have been at that I have listened to people from the governments and the airlines say it is someone else's responsibility. Where, if you ask a question, it is either classified or we have to go into private session, or that is not my purview.

I think one major lesson, if we learn anything from Pan Am Flight 103, there has to be a major overhaul of the organizational system of managing of security so that when there is a problem, our elected officials can ask the appropriate questions to the people that are held accountable right now, because there is no accountability in security in the system we have set up.

That is what these people want, because you have to walk out of here this evening very frustrated. I know I am. I wish I could spend more time down here. Most of us can't. But you people must get very frustrated in getting double answers, double talk, and moving around.

Organization is a big thing to look at.

Thank you.

Mrs. COLLINS. Thank you.

Mr. Nielson.

Mr. NIELSON. I appreciate the testimony. It is very moving. I appreciate that.

Let me ask you two questions. I asked the question earlier in the day whether or not identifying the luggage with the person who is on the plane would help. I got an answer no, it wouldn't make any difference. Then after that I got an answer that, yes, it would. It is part of the plan.

How do you feel about that?

Mr. AMMERMAN. We have a lot of respect for Mr. Yeffet, but we disagree extremely with his statement he made to this committee today that warnings should not be publicized. Warnings should not be publicized—I will get to your next question if you don't mind.

Mr. NIELSON. That was my next question.

Mr. AMMERMAN. Warnings should not be publicized if you have the proper amount of security. If prudent security was in place, proper training, don't tell us. But we are hearing this man and hearing the Government official say to us we will have the security in place anywhere from 3 to 5 years. We will get it in place. But we are still not going to tell you.

If you can't protect us, you have to tell us.

Second of all, of course, that is an excellent short-term measure that can be incorporated. It has to cut down on the possibility. I can't believe someone would say no, that is not the answer. It is not the final answer. It is not the final answer, but it is definitely a step in the right direction.

Mr. NIELSON. Frankly, when it happened to me in Amsterdam, the whole plane was happy they did that. There was the possibility of a problem. It was a Mid-East plane. They wanted to do that. No one minded the 2 hours we had to spend because they wanted to be sure the plane was OK. Let me ask you another question. We passed a bill called the Aviation Security Act last week. Does that have any merit? Is that a step in the right direction?

Mr. AMMERMAN. You are throwing more good money after bad. It is the American mentality. Money solves everything. Use the money once you have the management system in place. The bill you just passed says that the Government will make these machines; airlines, you do it.

The system is wrong. The idea and the concept is correct. You were wasting a lot more of our money by doing it this way; and I would strongly urge the Congress to say to the Government, let's do it if you are in charge and you are accountable, then you come back in a year and we will see what it looks like.

Mr. NIELSON. Let me ask you another question. You talked about user fees. How would you feel if the United States did all the checking at all the airports both here and abroad, and then charged the airline for the service?

Mr. AMMERMAN. The airlines should not be out of the picture. The financial aspect should be there.

Mr. NIELSON. The reason I asked the question, you made quite a point in saying airlines look at costs rather than results. If the Federal Government did it, set and carried out the standards, and so forth, and charged the airline and therefore the customer for the service, then that cost would not be a factor in whether you have adequate security or not.

Mr. AMMERMAN. Correct. Take it one step further. We have met with the Transportation Department in dialog. After we explained for months no one would speak to us. In our discussions they indicated many times they have problems with the foreign governments in trying to tell them what to do. When we went in August and met with the Secretary of Transportation, Cecil Parkinson, and his assistant Fortillo, on six or seven different occasions, they said that is the FAA, the FAA caused the problem.

I said, wait a minute, the FAA is telling me you are part of the problem. All of a sudden, the conversation stopped.

I agree and support that.

Mr. NIELSON. Mr. Cohen.

Mr. COHEN. I wanted to point out that before the bombing of Pan Am Flight 103, Pan Am itself charged an extra $5 on a ticket for their Alert security system, which didn't work. So if you are going to put an extra charge on, you better find out first if it will work.

Mr. NIELSON. I said supposing the United States did all the inspection——

Mr. COHEN. No. I understand your point.

Mr. NIELSON. It can be quasi-military if you want it to be. Then, charge the flyer for the service directly or through the airline. I really believe you put your finger on something. Someone has an official responsibility. FAA can propose the rules.

But ask the airline to do it, and the airline may not meet those rules. The FAA rules might be too lax. Even if they were effective and the airline doesn't follow them, you have a problem. I say if the Government makes the rules and actually enforce them, maybe you are better off.

Let me ask another question: You talked about the lessons of the bombing and so on. I don't believe we got your answer, Mr. Cohen. What lessons do you find from 103?

Mr. COHEN. The lessons of 103——

Mr. NIELSON. I hate to beat this dead horse.

Mr. COHEN. I know.

Mr. NIELSON. We really ought to learn from our mistakes.

Mr. COHEN. We really ought to learn from our tragedies. One of them is you don't—you simply cannot take either the airlines nor the FAA at its word. That is No. 1. That we have—we essentially were hustled on this. I think we have to understand one of the lessons we have to learn is that if we cannot provide the kind of security that we should have, we should, since we happen to be a democracy, allow our citizens, the flying public, to decide whether they want to take a chance on a plane or not.

Most of them would. When these warnings were leaked at Easter time, there was no chaos in the European airlines or in the American airline systems.

A certain number of people canceled out. That is just fine. Maybe if a certain number of people canceled their reservations on U.S. air carriers, maybe they would learn to take security more seriously, because they would realize that security is also good business.

If they want to say we are a little more expensive, it takes a little longer, but we are the safe airline, who would want to fly the cheaper, unsafe airline?

Mr. NIELSON. Let me ask Mr. Vincent just one question.

You said the FAA does not have the ability to stay ahead of the terrorist threat. You said the reason is, it is a large bureaucracy and bureaucracies tend to stay on course, and don't like to get moved off course.

Was that your experience when you were a member of this bureaucracy yourself?

Mr. VINCENT. Oh, I suppose.

Mr. NIELSON. Was it equally bad as a bureaucracy when you were there?

Mr. VINCENT. I wouldn't say it quite that way.

Mr. NIELSON. If so, what did you do to change it, or shake it up?

Mr. VINCENT. I don't think I quite intended to reflect totally that, but yes, it is a large bureaucracy. It tends to stay on course.

Mr. NIELSON. How long has it been a large bureaucracy?

Mr. VINCENT. Ever since its existence.

Mr. NIELSON. Since——

Mr. VINCENT. 1958, when it took over from the CAA. The FAA has a lot of good people like any organization, and they try extremely hard. They don't make the political decisions. The staff working in security, I have an extremely high regard for. I worked with them for over 4 years.

Now, in making the decision, however, it is principally a political one. You have to stand up and you have to resist a tremendous amount of pressure from the Air Transport Association and all sorts of other organizations.

And you get a lot of heat. No, I didn't succeed in changing it off that course. Incrementally, from December 23, 1983, when I issued the first emergency order to incrementally increase security in the international arena, 2 days before Christmas, I tried to sway that from its course, considering the very substantial increase in the threat level, over late 1984, 1985. I did not succeed in doing so.

Mr. NIELSON. I didn't mean to belabor the question. My time is gone. These changes and increases in security—can these be accomplished within the bureaucracy or will they have to be imposed from outside?

Mr. VINCENT. Essentially. I left Government because I could not.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Mr. Ammerman, Mr. Cohen, I really want to thank you and also Mr. Vincent, but I want to kind of zero in on the families for a moment, because I think what you are doing is very important and helpful and it is very difficult for you.

The fact that you are taking your grief and turning it into something positive is very important for us. And as members of this body—and you referred to the chairwoman's experience, as we all have experiences like this, and we are very empathetic, and I just again want to thank you.

I would be very happy to take your questions and insert them into the record as my questions, and then we will be sure that they get answered. If there is any objection from the chairwoman?

Mrs. COLLINS. Is there objection? The Chair hears none.

Mr. COHEN. Mrs. Boxer, this part is easy. It is living the rest of our lives that is the hard thing.

Mrs. BOXER. I understand. Believe me. I am the mother of two children. I understand completely what you are saying.

Mr. Vincent, I am glad that Mr. Nielson got to the point of why you left the FAA. Frankly, I wish you hadn't left the FAA. Because you are very clear in your thinking. I mean, Mr. Ammerman expressed frustration with some of the responses.

My frustration really is, that we just can't seem to get to the bottom of what to do. In other words, we can't get off-center. I think that what you have said and what we have heard today over and over again is El Al. We have the model. We know it has to be done. Yet—and yet, we are told by the FAA, head of security, that he doesn't even know what that would cost.

That seems to be a fairly fundamental issue. We ought to know what it would cost, what it would take. Then we can debate and discuss.

I couldn't agree with you all more when you say until we have a good system we feel good about, we should warn people, because it is the only fair thing to do. If we were doing our job and we felt very comfortable, and maybe there are reasons why we can't do it, then it seems to me until we have the system in place, we should know.

Mr. Vincent has a quote in here that is very harrowing, if I can put my fingers on it. It has to do with a statement by those operating out of Iran essentially saying, let's target the Americans because their system is much easier to target than the Israelis.

I mean what more direction do we need than that? It just seems to me very, very clear. If we don't even know the cost, I think we are just losing our focus here on what we should be doing.

Mr. COHEN. Mrs. Boxer, I haven't seen that particular statement. If I am not mistaken, it was made by the man, that good moderate, who is now President of Iran, Rafsanjani.

Mrs. BOXER. Well, we are going to locate it. I have it. It is on page 35, "One only has to recall the Iranian Prime Minister's recent call for the faithful to attack U.S. citizens, French, et cetera, because they are easy compared to attacking the Israelis." There it is.

The thing that is so refreshing about this panel, Madam Chairwoman, is that they are very clear. What frustrates me when I talk to the FAA is there is a lot of good intention, and Mr. Salazar said this administration is committed. I want to ask Mr. Vincent—you talked quite a bit about the lack of political leadership to do this. I wonder if you could expand upon it?

You give us a list on page 34, I believe it is, of the deficiencies; and your very first deficiency is one significant deficiency, it is the lack of political and managerial leadership and resolve in the administration to assure that a fully adequate and functioning civilian U.S. aviation system is developed and implemented.

That is a pretty far-reaching statement. Since we are in politics here, I wonder if you could expand on it? We hear the words.

We keep hearing all the good words. Is it your opinion that there are not enough resources behind? Where is this political will and leadership lacking? If it is us, tell us.

If it is in this Congress, I think we have to know that.

Mr. VINCENT. I think that clearly rests with the Secretary of Transportation and it is not quite that clear, however, what part the President plays in it.

But it is simply a decision, very simply said, that we are going to build a system to protect against another Pan Am 103. Said another way: 270 lives are worth doing this for.

Turn that around and that is what they have said by default at this point is that we are willing to risk 270 lives today, tomorrow, next month and so on.

That is what is frustrating.

Mrs. BOXER. Let me ask you this. You have stated and others have stated there seems to be a lack of information coming forward. Some have stated that the comments made to our Chair here have been off the mark, that we would be threatening security by even having this hearing, which is rediculous because we are being extremely careful not to do anything that would do such a thing.

Do you think there is a coverup going on surrounding this whole incident?

Would you go that far?

Mr. VINCENT. As bad as it might seem, no, I don't think a deliberate coverup. A good illustration is the—my description on the representation of the five bombs. Now the terrorists know about those bombs.

The FAA and the people within the system know about those bombs. And hopefully they have taken that to the point that the Pan Am screeners and other screeners down to the lowest level, when they have to search for those, know about those bombs in that way.

But Mrs. Boxer, did you know about those? Could you have described those? Who didn't know about that?

That was the people who were affected by that. Well, now I can't say that that is the FAA's problem and that they are deliberately covering that up. But somehow that information hasn't gotten out.

To me—and granted I have changed views slightly since I left the FAA on the distribution of information—unless you inform the public, unless you get that type of information out, you won't have a public that is irate and demands a change.

Mr. COHEN. In the matter of warnings and allowing information out, they say that by allowing information out, you compromise certain sources. Now look at the information about the bomb in the cassette recorder. This information was obtained by the German police who had actually arrested these guys who had the bomb in their possession.

By letting the traveling public know about this bomb, what sources would have been compromised?

The German police arrested these people. The terrorists certainly knew they had been arrested. They knew that that information was in the hands of the police. Who were the only people who didn't know? The people who were blown up.

And I wonder sometimes if as has been often stated, this bomb was brought on to the plane by a dupe, if he had been warned, he or she had been warned that perhaps a bomb might be in this kind of a device, then perhaps he would look twice at that radio that someone had given him as a gift or for some other reason, whatever way he was duped into carrying that bomb on the plane, he would have looked twice at it, had he known that this was a danger, and maybe with that kind if information out there, Pan Am 103 would never have happened.

Mr. AMMERMAN. Mrs. Boxer, I think the answer you are looking for is in the letter from Vice President Bush to President Reagan on June 2, 1987, where he stated in his letter that successful terrorism can cast a shadow of doubt on the process of Government if we do not act in a consistent and forthright way.

The 9 months that we have been involved, when this organization was formed out of frustration because of silence from the executive, State, and Transportation Department, and we told the President on April 3, there is a severe shadow of doubt on the process of our Government and the only way that this can be cleared is a true investigation to find out where the process broke down and correct it.

We are a proactive organization. We said that since day one. We cannot bring our loved ones back. What we can do is make sure they didn't die in vain. This was an attack on the American flag.

This wasn't one whacko getting on a plane. These people were professionals, supported indirectly and directly by other countries. It is 9 months now, 270 people died senselessly. Most of them Americans. What has been done? What has been done?

Mr. VINCENT. May I add one thing on information? I agree with Mr. Cohen on the specific incident he cited, but I hasten to add that there are bona fide and sufficient reasons to protect certain sensitive information, sources and methods. I cover that in my statement.

If you were in a terrorist organization and I am getting data from you and you find out about that, you are dead. I don't get any more information from you.

No one else will come over to my side either under the circumstance.

Likewise, if I am collecting information by intercepts of communications or any other things or methods and the terrorists find out about it, as one country did following the bombings of the disco in West Germany in 1986 or whatever, they shut off that method.

So there are good and sufficient reasons to protect data. But it cannot go to the extent that it would appear that it is a coverup or you eliminate proper and corrective oversight of the function and this subcommittee. This subcommittee has to have that access to that data to perform its oversight function.

I would submit you cannot afford to allow someone to block you from getting that information.

Mrs. BOXER. Thank you, Madam Chairwoman.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Thank you, Madam Chairwoman.

Let me extend to Mr. Ammerman and Mr. Cohen, in particular, my own thanks for your being here and for the energy and commitment that you are investing in behalf of airline security for not only Americans but for people around the world.

Mr. Ammerman, let me ask you to imagine for a moment that on December 21, 1988, there had been in place a fail-safe security system and we had apprehended at least one of the people that were responsible for the Pan Am bombing and that that had led to the capture of the rest of them.

What should we then do with them?

Mr. AMMERMAN. With the terrorists that committed the act, you would follow the process that is in place now. You would have a hearing, you would present your evidence, and if convicted, they would face whatever penalty our system sets up.

But that is another lesson from flight 103, because the problem is not the terrorists that put the bomb on the plane solely, it is the countries that financed it with intelligence. That was an attack on the American flag.

My brother was on that flight. They didn't know who he was. He was coming home to see his family. The system we have set up here right now is a perfect system not to do anything.

The system we have set up, this process of criminal investigation for terrorism, is ludicrous. Since 1982, and we were talking about it at lunch, I think we figured out that we might have apprehended two with all the terrorist acts that have taken place.

Maybe three. The process doesn't work, and the key here is a dual approach. If you want to go the criminal approach and go after the people that committed these murders, fine. But there is also a political approach. The political approach is we have to deal with the governments that directly and indirectly support terrorism or we will continue to lose.

The terrorists are a symptom of cancer. We all know a symptom of cancer, if you find it too late, the patient is dead. You have to remove the tumor and the tumor in this case are the countries that support terrorism.

We are doing nothing with the tumor. I have to then say a lot more patients are going to die.

Mr. COX. I'm glad to hear you say that, because it needed saying. Earlier I made reference to an article from the Los Angeles Times not long ago, written by Tom Clancy. The headline said, "Nothing is Safer for Terrorists than Killing Another American."

Let me ask you to move further along this hypothetical course. What would you do with the terrorist-sponsoring states?

Mr. AMMERMAN. It is in the testimony, but basically, our government understands the leadership of President Bush, Thatcher, now Mitterrand has to get into the game. Isn't it interesting, we haven't heard anything from the French.

Now, all of a sudden last week he has a problem. And Kohl, hopefully we will be seeing the chancellor in November. We will have nice questions for him. They have to, first of all, work together.

Our own worst enemies are allies. We can't even get ourselves to work together on this common problem. But there is three arenas we can work on. Economically, diplomatically, and militarily.

Those are the three arenas you have to deal with and the greatest thing—and the media has been our greatest ally in our cause for the last 9 months. I admit that. They have kept it on the front page. The media all wants a story.

I know a couple with pencils and pens saying get ready, he is going to say nuke the world. We have never said that. What we have said is you must deal with these countries diplomatically, economically and as a last resort, you must consider military options. It is senseless to say you will never use military.

You might as well say put another bag on the plane. Here is where to put it. We have options available to us. We have to consider them.

President Bush completely unsolicited to us on April 3, in a meeting with six of us there with him, said if the fingers of State sponsored terrorism are tied to Pan AM Flight 103, he will retaliate. That was stated to us, and he said I know in your organization there is a difference of opinion on that.

And there is. There are people in our organization that would never want to involve the military because they will say it will only bring more problems. There were others who say you have to use it as a resort. The President has said that is what he would do.

The top security advisor on the McLaughlin show said sometimes it is better that the President is not officially told something because then he doesn't have to act. Is that what we are doing right now? We are not officially telling someone what is taking place? It seems the whole world knows what took place on December 21, 1988, except for the criminal investigation and our politicians.

I don't know if that answers your question, but that would be the area we would want to see it go.

Mr. COHEN. Mr. Cox, as a very first step, I think it would be unwise to consider paying large sums of money to that country which is under the greatest suspicion of being the godfather behind the bombing of Pan Am 103. We may be able to get the hit man. I even doubt that, but the godfather back there, we should not be considering paying them a large sum of money.

Mr. COX. For the record, do you want to be explicit about that?

Mr. COHEN. Yes. The country I'm talking about is Iran. Absolutely.

Mr. AMMERMAN. We officially chastized the State Department on July 20 when we met with them saying how in God's name can you be offering $250,000 to next of kin on the Iranian flight when we have to go to court and prove this idiocy, willful malfeasance, to gain more than $100,000 for our next of kin.

Here are American citizens, some people not even going from month to month with money, we have to go to litigation that will take 3 to 4 years in the American system and prove willful malfeasance to get more money so the next of kin can survive financially. However, we will send $250,000 to this so-called moderate who held all of England hostage with the satanic verses, who makes a statement to kill five Americans for every someone getting killed.

But we will give them money because now we will be able to talk to them.

Here again it is common sense. Where has it gone? Has it disappeared?

Mr. COHEN. The French gave them money. Look where it got them.

Mr. COX. I yield back my time. We have to move on here.

I want to thank you very much for those remarks. I couldn't agree more.

Mrs. COLLINS. Mr. Owens.

Mr. OWENS. Just one brief comment or question. I want to thank Mr. Vincent for making the forthright statement in terms of what is needed to solve the problem and just ask him further clarification of that.

Did you think in view of the fact that we have had discussions of all these coming new detection devices you might want to alter your statement that we ought to move full speed ahead to imitate and duplicate the El Al system? That that is the best answer to the problem?

Mr. VINCENT. The technology that has been put forward as the answer to the problem has been given a public affairs slanting by the administration. I am referring to the thermal neutron analysis system, is not the solution to the problem.

It is a good system. It has not finished development to the degree that it ought to be deployed the way the administration has decreed it to be deployed.

It needs to get out there and get some operational experience. But no way is it ready for 2, 3, 400 units to be produced and delivered. It will not detect those sophisticated bombs that contain less than one pound of SEMTEX explosives.

There are other answers. It is a supplement to that, but it is not the answer.

Mr. OWENS. Thank you.

Mrs. COLLINS. We have a vote in the House of Representatives. So we are going to recess for 10 minutes.

[Recess taken.]

Mrs. COLLINS. While I am waiting for her, this subcommittee will reconvene at this point in time. I understand Mr. Cohen had to leave.

Mr. Ammerman, you mentioned having met with the President, I believe you said in April of this year?

Mr. AMMERMAN. Yes, ma'am.

Mrs. COLLINS. What did he say to you about establishing a group to investigate Pan Am 103?

Mr. AMMERMAN. It is sort of interesting. We sensitized the President in a 20-minute meeting that lasted for 70 minutes in four areas. We talked about the complete incompetence in the State Department in the handling of the relatives of the victims of Pan Am 103.

We implored him there had to be a major change in airline security since there was none. Then we gently reminded him he was the architect of the counterterrorism policy, which as of October 1988, it seemed that only 21 out of the 42 points had been implemented.

We encouraged him since he was now President that he could implement his own policy that he was an architect of, and that in that was this central analysis center that would eliminate this conflict of interest in this bureaucratic human weakness of power and greed. We strongly urged him to do that.

His indication was he was dismayed by the actions of the State Department in regard to handling of the victims' relatives. Since then, we have opened up dialog with the State Department. Secretary of Transportation Skinner was there. The Transportation Department has become our contact to the executive branch.

We have had some dialog with the Transportation Department. We walked out of the meeting—really, briefing—that the President understood the issues and the concerns. But I think Mrs. Boxer, this morning, put it eloquently. All we are hearing is a lot of verbiage, a lot of words.

We are not seeing any action. The President has got to move with his advisers. Scowcroft was there, the Chief of Staff Sununu and Fitzwater. It is now coming on October 3. When I met with Secretary of State Baker in April, I said to the Secretary then that right now, we are working with you, we are trying to be proactive, we are trying to affect change.

But believe me, December 21, we are going to have a memorial service, first-year anniversary, which is most likely going to be the second toughest day that we will all go through. On that day, I will have a statement to the press, nationwide and worldwide, regarding what we feel that our respective governments and agencies have done regarding relative to Pan Am 103, and there better darned well be some positive changes.

Right now, we are watching, we are frustrated, but we are not giving up. It seems that we say wherever we go, and I know you would appreciate this, Madam Chairwoman, is the fact we are not going away. I affectionately now say the government agencies, the committee think the victims of Pan Am 103 is a boil on their butt, and they have been trying to lance it for 9 months, and can't do it properly.

The only way to successfully do that is to deal with it truthfully and with forthrightness. Then, we will be successful for all Americans.

Mrs. COLLINS. Were you pleased that the President had announced he was going to create a commission to investigate Pan Am 103?

Mr. AMMERMAN. We were satisfied. Pleased might be too strong a term. The concern that we have is there is no subpoena power. The concern is that this was written into order on August 4, and he still hasn't picked the committee. We are almost 8 weeks later.

All he had to do was pick three private citizens. We hope that in due course, that he will do that. I know that some of the people from the Senate and the Representatives has been chosen. We are very pleased so far with the people, from what we understand, have been named. It is a step in the right direction as long as the issues are dealt with and followed.

One other thing, Madam Chairwoman. I think it was Mr. Nielson that asked the question about is it possible to have an effective security management system in place. I am not an expert, but I don't think you have to be rocket scientist to put an organizational chart in place where there is some accountability and where you can have an effective system that can deal with airport and airline security.

Mrs. COLLINS. Mr. Vincent.

Mr. VINCENT. Madam Chairwoman, if I might impose on the subcommittee for a couple of moments to speak to a few points that were made or not made this morning on the panel, by the FAA, one of the things being training. There is currently no specific amount of training required by the FAA, that is, the U.S. Government, for security screening personnel.

The ground security coordinator and the in-flight security coordinator are the only persons, and the cabin crews, that have minimum amounts of training required. The majority of the training for people in the U.S. Civil Aviation Security System is zero.

It is true that the subject matter in certain areas are decreed that have to be covered, but there is no minimum number of hours. This is why you wind up with minimum wage people and an extremely high turnover of people doing these functions.

Now, after I left the FAA, I guess I have had a chance to think this over. The one way that I know of substantially increasing the effectiveness of the system as it concerns application is for the FAA to decree a minimum number of hours for the security screeners and other security personnel. This would add the benefit not only of raising the level of competence, but it also would put a penalty on the airlines for allowing a high rate of turnover.

In other words, it makes the employee more valuable to the airline. Therefore, they ought to be willing to pay more money to keep the employee.

If they have to invest this amount of training in the individual, the one big deficiency in the U.S. system ought to be remedied.

Someone else asked a question about the BONN declaration and how many times it has been exercised. The BONN declaration is a result of a suggestion by a Japanese prime minister back in 1978, as I recall, in one of the Summit Seven meetings. It says in one paragraph, or at least until 1986, that if an offending country doesn't do certāin things, that the Seven Summit nations, the economic nations, will impose certain sanctions.

Those, in essence, are economic sanctions. It has been done one time, and that was in the case of Ariana in 1983 or 1984 because of the Afghan government's handling of a hijacking that went in there in about 1981 and 1982. We beat up on Ariana, a small airline that no one had any economic ties to speak of in Afghanistan, but we could not impose anything against countries like Libya, Algeria, Syria and so on who had repeated problems where they would be in violation of the BONN declaration.

Too many people—Iran was included in that—had too much to lose economically, so the BONN declaration has not lived up to original expectations. It just seems a bit disjointed. This is from a couple of notes that I made.

I would also feel more comfortable, Madam Chairwoman, about airlines commitment to good security. If I had heard their representatives when they appeared before this subcommittee actually cite the right governing regulation that concerns security. I heard repeated references this morning to FAA's part 107, which covers security for U.S. airports. Part 108 is the regulation that covers airlines. Those airline representatives who appear before this committee at least ought to know that.

I heard also the Director of Security for the FAA say that the United States is the preeminent—U.S. security system is the preeminent one in the world. That just simply is not so. The Israeli system is the preeminent one in the world. If you want to hold the U.S. system up as being preeminent, then why do we have Pan

American 103 on December 21, 1988, TWA 840 on April 2, 1986, Pan Am on August 11, 1982, Pan Am on August 25, 1982, and so on?

Rather than going back several years, we have seen nothing in the recent years that would say that U.S. security system is the preeminent one in the world, certainly not the one to hold out as a model on which to go by.

By the same token, we hear the acknowledgement that the El Al system is the best in the world. If my logic is correct, with all of those failures of the U.S. system, then why haven't we adopted the El Al system?

With that, Madam Chairwoman, I thank you very much for the opportunity to speak to those several points.

Mrs. COLLINS. I certainly thank you, Mr. Ammerman, and Mr. Cohen, for testifying before us today. Your testimony, and certainly the work that you have done in the past 9 months has heightened the awareness of the need for better airport security, both in our Nation and outside our continental limits.

I thank you for coming, and for your very candid testimony, because we certainly understand how you feel and we know the fine job you have done to try to get out and make some changes, so others wouldn't have to live the situation through which you are living today.

I apologize for being gone so long. When I left here, I was under the impression we had one vote. We had two; 15 votes that lasts for more than 30 minutes. Now we have one more vote. For that reason, we are grateful that the next panel has agreed to come before us tomorrow morning at 9 o'clock and be the first ones up. I want to thank them, too.

With that, I thank all of our witnesses today and adjourn this hearing until 9 a.m. tomorrow morning.

[Whereupon, at 4:37 p.m., the subcommittee adjourned, to reconvene at 9 a.m., on Tuesday, September 26, 1989.]

THE BOMBING OF PAN AM FLIGHT 103: A CRITICAL LOOK AT AMERICAN AVIATION SECURITY

TUESDAY, SEPTEMBER 26, 1989

HOUSE OF REPRESENTATIVES,
GOVERNMENT ACTIVITIES AND
TRANSPORTATION SUBCOMMITTEE
OF THE COMMITTEE OF GOVERNMENT OPERATIONS,
Washington, DC.

The subcommittee met, pursuant to notice, at 9 a.m., in room 2154, Rayburn House Office Building, Hon. Cardiss Collins (chairwoman of the subcommittee) presiding.

Present: Representatives Cardiss Collins, Major R. Owens, Barbara Boxer, Gerald D. Kleczka, Howard C. Nielson, and C. Christopher Cox.

Also present: Warner Session, acting staff director; Miles Q. Romney, counsel; LaQuietta J. Hardy, professional staff member; Cecelia Morton, clerk; and Ken Salaets, minority professional staff, Committee on Government Operations.

Mrs. COLLINS. Good morning. This hearing of the Government Activities and Transportation Subcommittee will come to order.

We will reconvene this hearing, which is on the subject of the bombing of Pan Am Flight 103, to take a critical look at American aviation security. We will resume by completing our panel of witnesses from yesterday's hearing. I want to thank Mr. Jackson, Mr. Arad, Mr. Boynton, and Mr. Miyoshi, for agreeing to come back today. We know it was an inconvenience, but we certainly appreciate your cooperation in coming back today.

This panel includes American Airlines, which has modeled its security after that of El Al's and is considered by many in the security field as a top notch operation. We will also hear from a representative of Sandia Laboratories, who will discuss a systems approach to aviation security, and from the airport manager of BWI where the systems approach is being implemented. Finally, a security expert will testify on needed improvements in the U.S. system.

When we move into the second phase of our hearings, we will take up the discussion of explosive detection technology, including a close look at the thermal neutron analysis, or TNA, machine, which has recently been given considerable attention and is now in operation at New York's JFK Airport. I expect to closely review the merits of this technology, particularly as it relates to the overall systems approach to aviation security. The manufacturers of TNA, as well as the manufacturers of vapor technology and x-ray machines will present testimony on capabilities of their equipment in the airport environment. I expect this discussion to be fruitful.

Let me announce after this first panel, and before we get into other matters, that were agreed to be discussed in executive session yesterday, we are going to ask for that executive session as soon as our ranking member comes. We will disrupt the hearings for a moment if he gets here, so we can get that done.

Right now, we can begin with our first panel of witnesses.

Mr. Jackson, before you start, please let me refresh in your memories. We in the House of Representatives work under the 5-minute rule and that everybody will be allowed to give their testimony, their own testimony, in 5 minutes, with the knowledge their written testimony in its entirety will be made part of the record.

Thank you.

Will you stand, gentlemen, please.

[Witnesses sworn.]

STATEMENT OF WILFRED A. JACKSON, DIRECTOR OF OPERATIONS, BWI AIRPORT

Mr. JACKSON. Thank you for the opportunity to appear before the subcommittee. Given the brief time allowed for oral testimony, let me summarize just a few of the problems and a few of the solutions proposed to enhance aviation security. The most recent aviation security. The most recent incidents involving aviation security, which have been the catalyst for hard core regulatory actions, are first, the 1987 PSA airline shooting incident, which brought about the automated access control rule, and second, the Pan Am Flight 103 bombing, which brought about the explosive detection systems rule.

It is unfortunate but true that neither of these rules, if they had been in place at the time of these respective incidents would have prevented the incidents from occurring. The obvious question which follows, of course, is why implement a rule which does not work?

The answer at least in part, is that these rules might work if they were better thought out, more realistically designed and integrated into a well defined systems approach. That has not yet happened.

The access rule is a prime example. In requiring 270 U.S. airports to computerize their identification system to control every access point to the secured portion of the airport operation area, the AOA, the FAA, declined to define the term "security area" and provided virtually no guidelines as to how such security was to be accomplished. FAA required airports to submit new security plans with vary little meaningful guidance, and they are now expected to approve or disapprove each individual program.

In essence, airports were left to do individual R&D programs in airport security technology and procedures to meet nonexistent Federal criteria. The various FAA regional offices were then left to integrate each submission individually, creating many incidents where one region approved a plan where another region rejected virtually the same proposal at another airport.

For example, one airport received approval for an elaborate $250,000 electronic protection system for its cargo area, while another larger airport obtained the FAA's approval for painted lines of demarcation on the ramp and building floors. When the FAA exempted its own en route inspectors from the airport identification for ramp access because they said the process was operationally impractical, the airport community complained loudly and the implementation of this plan was suspended.

The purpose here is not to vilify the FAA, but point out that the entire process was pursued with little regard for the comprehensive systems approach to security. A basic maxim of the security field is that the weakest link in the chain makes the entire system vulnerable. Access control alone is not security. It is a management tool which can be used as a small part of an airport's larger comprehensive security system.

I would also like to look at, for a moment, the new rule requiring explosive detection systems at major airports here and abroad. The thermal neutron analysis systems—the TNA—now being required are the very first generation equipment out of the lab and have been deemed by FAA as the best available. And they are the only means approved by the FAA in the new rule. What is wrong with it?

Well, it weighs 10 tons and takes up ramp space of about 19 by 40 feet. It is slow, has about a 5 percent false alarm rate, as tested. Now, with smaller amounts of explosives believed to be used by terrorists, the errors could go up to as high as 15 percent, or even greater, and the machine has too small an aperture for oversized bags.

It requires special training, special nuclear licenses, and no other country at this time yet has approved it, and several are developing alternatives to it.

It will cost a great deal to operate and support, including significant costs to modify access control procedures to accommodate the increase in ramp activity required by the screening of 100 percent of all international baggage.

And lastly, it will create delays and/or early check-in requirements of 3 hours or more for international flights.

Does it work? Yes.

Does it have problems? Yes, great problems.

Can the rule be fixed? It certainly can be.

Once, again, the point is not to deny the need for enhanced security. The TNA machines can help a great deal, but only as part of a broader systems approach to security. The FAA is expecting a special report from the National Academy of Sciences, which looked at explosive detection technology indepth. The report will, among other things, recommend precisely what we have advocated in our comments to the FAA's rulemaking process. The full text is attached to this.

A combination of high and low technical alternatives, which will reduce the number of bags, which truly reduces the TNA processing to a manageable number. The FAA has in both cases, the TNA and access control, isolated its attention on the technology itself rather than on the way the technology should be complemented into an overall security system, as we have suggested, with not only high and low technology combinations of alternatives, but also a fuller look at the human factors. Such aspects of security as better recruitment and training, higher pay, and better incentives must be examined.

Even with the best technology, there will still be human intervention to evaluate what the technology is reporting and to make a judgment or response on what must be done. Do we pass the bag? Do we open it? Or evacuate the terminal?

These are procedural elements of security, not technology. We must institute an intense learning process to develop these procedures with the most effective and promising approach being a pilot program or lead airport program at several lead airports.

The Airport Operator Council International and the American Association of Airport Executives have been seeking a pilot program for several years, but the FAA has been either unable or unwilling to fund it.

Mrs. COLLINS. Mr. Jackson, your time has expired. We will probably get to most of the detail in the questioning that you have left to comment on at this time.

[The prepared statement of Mr. Jackson follows:]

Oral Statement of

WILFRED A. JACKSON
Director of Operations, BWI Airport
and
Chairman, Operations, Safety & Security Committee
Airport Operators Council International

on behalf of the

AIRPORT OPERATORS COUNCIL INTERNATIONAL
and the
AMERICAN ASSOCIATION OF AIRPORT EXECUTIVES

Hon. Cardiss Collins, Chairwoman
Government Activities and Transportation Subcommittee
of the
House Government Operations Committee

September 26, 1989

- AOCI represents the governmental bodies that own and operate the principal airports served by scheduled airlines in the United States and around the world.
- AOCI member airports enplane more than 90 percent of total domestic and virtually all international scheduled airline passenger and cargo traffic in the United States.
- AAAE represents 1600 airport executives who are responsible for the planning, management and operation of 700 public use airports nationwide.

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THANK YOU FOR THE OPPORTUNITY TO APPEAR BEFORE THE SUBCOMMITTEE. GIVEN THE BRIEF TIME ALLOTTED FOR ORAL TESTIMONY, LET ME SUMMARIZE JUST A FEW OF THE PROBLEMS, AND A FEW OF THE SOLUTIONS PROPOSED TO ENHANCE AVIATION SECURITY.

THE TWO MOST RECENT INCIDENTS INVOLVING AVIATION SECURITY WHICH HAVE BEEN THE CATALYST FOR HARD-CORE REGULATORY ACTION ARE FIRST, THE 1987 PSA AIRLINES SHOOTING INCIDENT WHICH BROUGHT ABOUT THE AUTOMATED ACCESS CONTROL RULE, AND SECOND, THE PAN AM 103 BOMBING, WHICH BROUGHT ABOUT THE "EXPLOSIVES DETECTION SYSTEMS" RULE.

IT IS UNFORTUNATE, BUT TRUE, THAT NEITHER OF THOSE RULES, IF THEY HAD BEEN IN PLACE AT THE TIME OF THOSE RESPECTIVE INCIDENTS, WOULD HAVE PREVENTED THE INCIDENTS FROM OCCURRING. THE OBVIOUS QUESTION WHICH FOLLOWS, OF COURSE, IS WHY IMPLEMENT A RULE WHICH DOES NOT WORK?

THE ANSWER, AT LEAST IN PART, IS THAT THESE RULES MIGHT WORK, IF THEY WERE BETTER THOUGHT OUT, MORE REALISTICALLY DESIGNED, AND INTEGRATED INTO A WELL-DEFINED SYSTEMS APPROACH. THAT HAS NOT YET HAPPENED.

THE ACCESS CONTROL RULE IS A PRIME EXAMPLE. IN REQUIRING 270 U.S. AIRPORTS TO COMPUTERIZE THEIR IDENTIFICATION SYSTEMS TO CONTROL EVERY ACCESS POINT TO THE SECURED PORTIONS OF THE AIRPORT OPERATIONS AREA (AOA), THE FAA DECLINED TO DEFINE THE TERM "SECURE AREA", AND PROVIDED VIRTUALLY NO GUIDELINES AS TO

HOW SUCH SECURITY WAS TO BE ACCOMPLISHED. THE FAA REQUIRED AIRPORTS TO SUBMIT NEW SECURITY PLANS WITH VERY LITTLE MEANINGFUL GUIDANCE, AND THEY ARE NOW EXPECTED TO APPROVE OR DISAPPROVE EACH INDIVIDUAL PROPOSAL. IN ESSENCE, AIRPORTS WERE LEFT TO DO INDIVIDUAL R&D PROGRAMS IN AIRPORT SECURITY TECHNOLOGY AND PROCEDURES TO MEET NON-EXISTENT FEDERAL CRITERIA.

THE VARIOUS FAA REGIONAL OFFICES WERE THEN LEFT TO INTERPRET EACH SUBMISSION INDIVIDUALLY, CREATING MANY INCIDENTS WHERE ONE REGION APPROVED A PLAN WHILE ANOTHER REGION REJECTED VIRTUALLY THE SAME PROPOSAL AT ANOTHER AIRPORT. FOR EXAMPLE, ONE AIRPORT GOT APPROVAL FOR AN ELABORATE $250,000 ELECTRONIC PROTECTION SYSTEM FOR ITS CARGO AREA, WHILE ANOTHER LARGER AIRPORT OBTAINED THE FAA'S O.K. FOR PAINTED LINES OF DEMARCATION ON THE RAMP AND ON BUILDING FLOORS.

THEN THE FAA EXEMPTED IT'S OWN ENROUTE INSPECTORS FROM THE REQUIRED AIRPORT IDENTIFICATION FOR RAMP ACCESS, BECAUSE THEY SAID THE PROCESS WAS "OPERATIONALLY IMPRACTICAL." THE AIRPORT COMMUNITY COMPLAINED LOUDLY; AND THAT AMENDMENT HAS NOW BEEN SUSPENDED.

THE PURPOSE HERE IS NOT TO VILIFY THE FAA, BUT TO POINT OUT THAT THE ENTIRE PROCESS WAS PURSUED WITH LITTLE REGARD FOR A COMPREHENSIVE SYSTEMS APPROACH TO SECURITY. A BASIC MAXIM OF THE SECURITY FIELD IS THAT THE WEAKEST LINK IN THE CHAIN MAKES

THE ENTIRE SYSTEM VULNERABLE.

ACCESS CONTROL ALONE IS NOT SECURITY. IT IS A MANAGEMENT TOOL WHICH CAN BE USED AS A SMALL PART OF AN AIRPORT'S LARGER COMPREHENSIVE SECURITY SYSTEM. THE EMPHASIS IS ON SYSTEM, WHICH IS DEFINED AS CONTAINING NOT JUST NUMEROUS INDIVIDUAL AIRPORTS, BUT ONE INTEGRATED AIR TRANSPORTATION SYSTEM OF AIRPORTS, AIRLINES, THE FAA, AND THE INTELLIGENCE COMMUNITY.

I WOULD ALSO LIKE TO LOOK FOR A MOMENT AT THE NEW RULE REQUIRING EXPLOSIVES DETECTION SYSTEMS AT MAJOR AIRPORTS HERE AND ABROAD. THE THERMAL NEUTRON ANALYSIS MACHINES NOW BEING REQUIRED ARE THE VERY FIRST GENERATION EQUIPMENT OUT OF THE LAB, AND HAVE BEEN DEEMED BY FAA AS THE "BEST AVAILABLE", AND THEY ARE THE ONLY MACHINE APPROVED BY FAA IN THE NEW RULE.

WHAT'S WRONG WITH IT? IT WEIGHS TEN TONS, AND TAKES UP RAMP SPACE OF ABOUT 19' X 40'. IT'S SLOW, HAS ABOUT A 5% FALSE ALARM RATE AS TESTED (WITH SMALLER AMOUNTS OF EXPLOSIVE BELIEVED TO BE USED BY TERRORISTS, THE ERRORS COULD GO UP TO 15%), AND TOO SMALL AN APERTURE FOR OVERSIZE BAGS! IT REQUIRES SPECIAL TRAINING, SPECIAL NUCLEAR LICENSES (NO OTHER COUNTRIES HAVE YET APPROVED IT, AND SEVERAL ARE DEVELOPING ALTERNATIVES). IT WILL COST A GREAT DEAL TO OPERATE AND SUPPORT...INCLUDING SIGNIFICANT COSTS TO MODIFY ACCESS CONTROL PROCEDURES TO ACCOMMODATE THE INCREASE IN RAMP ACTIVITY REQUIRED BY THE SCREENING OF 100% OF INTERNATIONAL BAGGAGE. AND, IT WILL CREATE DELAYS AND/OR EARLY

CHECK-IN REQUIREMENTS OF 3 HOURS OR MORE FOR INTERNATIONAL FLIGHTS.

DOES IT WORK? YES. DOES IT HAVE PROBLEMS? YES.

CAN THE RULE BE FIXED? DEFINITELY.

ONCE AGAIN, THE POINT IS NOT TO DENY THE NEED FOR ENHANCED SECURITY; THE TNA MACHINES CAN HELP A GREAT DEAL, BUT ONLY AS PART OF A BROADER SYSTEMS APPROACH TO SECURITY.

THE FAA IS EXPECTING A SPECIAL REPORT FROM THE NATIONAL ACADEMY OF SCIENCES WHICH LOOKED AT EXPLOSIVES DETECTION TECHNOLOGY IN DEPTH. THE REPORT WILL, AMONG OTHER THINGS, RECOMMEND PRECISELY WHAT WE HAVE ADVOCATED IN OUR COMMENTS TO THE FAA'S RULEMAKING PROCESS (FULL TEXT ATTACHED): A COMBINATION OF HIGH AND LOW TECH ALTERNATIVES WHICH WILL REDUCE THE NUMBER OF BAGS WHICH TRULY REQUIRE TNA PROCESSING TO A MANAGEABLE NUMBER.

THE FAA HAS IN BOTH CASES ... TNA AND ACCESS CONTROL ... ISOLATED ITS ATTENTION ON THE TECHNOLOGY ITSELF, RATHER THAN THE WAY TECHNOLOGY SHOULD BE IMPLEMENTED INTO AN OVERALL SECURITY SYSTEM AS WE HAVE SUGGESTED, WITH NOT ONLY HIGH AND LOW TECHNOLOGY COMBINATIONS OF ALTERNATIVES, BUT ALSO A FULLER LOOK AT THE HUMAN FACTORS ... SUCH ASPECTS OF SECURITY AS BETTER RECRUITMENT AND TRAINING, HIGHER PAY, AND BETTER INCENTIVES MUST BE EXAMINED.

EVEN WITH THE BEST TECHNOLOGY, THERE MUST STILL BE HUMAN INTERVENTION TO EVALUATE WHAT THE TECHNOLOGY IS TELLING HIM, AND TO MAKE A JUDGEMENT OR RESPONSE ON WHAT MUST BE DONE... DO WE PASS THE BAG, OPEN IT, OR EVACUATE THE TERMINAL? THESE ARE PROCEDURAL ELEMENTS OF SECURITY, NOT TECHNOLOGY. WE MUST INSTITUTE AN INTENSE LEARNING PROCESS TO DEVELOP THOSE PROCEDURES, WITH THE MOST EFFECTIVE AND PROMISING APPROACH BEING A PILOT PROGRAM AT SEVERAL LEAD AIRPORTS.

AOCI AND AAAE HAVE BEEN SEEKING A PILOT PROGRAM FOR SEVERAL YEARS, BUT THE FAA HAS BEEN UNABLE TO FUND IT. THERE IS LANGUAGE IN THE SENATE-PASSED FY90 APPROPRIATIONS COMMITTEE REPORT WHICH WOULD MANDATE AN ACCESS CONTROL PILOT PROGRAM FROM THE FAA. ITS PURPOSE IS SIMPLE, BUT IMPERATIVE: IT WOULD INSTITUTE AN INTENSE ANALYSIS AT FOUR OR FIVE AIRPORTS OF VARYING SIZE AND COMPLEXITY, LOOKING AT THE EFFECTS OF THE ACCESS CONTROL HARDWARE, THE PARALLEL TECHNOLOGIES SUCH AS TNA, THE PROCEDURES, AND THE HUMAN FACTORS WHEN THEY ARE APPLIED IN THE REAL WORLD OF LONG LINES OF PASSENGERS, FLIGHT DELAYS, BAD WEATHER, AND CROWDED TERMINALS.

EQUALLY IMPORTANT, THE PILOT PROGRAM WOULD LOOK AT THE REQUIREMENTS OF THE ACCESS CONTROL AND EXPLOSIVES DETECTION RULES IN A REAL-WORLD CONTEXT ... WHAT PROCEDURES AND EQUIPMENT DO, OR DO NOT WORK, AND WHAT ALTERNATIVES CAN BE LOGICALLY APPLIED. THIS WILL PROVIDE GUIDANCE WHICH AIRPORTS HAVE NOT

RECEIVED FROM FAA AS WE CONTINUE TO MOVE FORWARD IN THE IMPLEMENTATION OF THE RULES.

WE URGENTLY SEEK THE SUPPORT OF THE MEMBERS OF THE HOUSE AND OF THIS COMMITTEE FOR A COMMITTMENT OF FUNDS FOR A PILOT PROGRAM, AS WELL AS FOR LANGUAGE IN THE HOUSE COMMITTEE AND THE CONFERENCE REPORT, AND TO URGE YOUR COLLEAGUES ON HOUSE APPROPRIATIONS TO SUPPORT THE SENATE LANGUAGE IN CONFERENCE. ONLY THROUGH A RATIONAL, SYSTEMATIC DEVELOPMENT OF NEW PROCEDURAL APPROACHES TO THE NEWLY IMPOSED TECHNOLOGY CAN WE FIND AN ACCEPTABLE BALANCE BETWEEN THE HOPED-FOR SECURITY IMPROVEMENTS AND THE OPERATIONAL DELAYS WHICH WILL INEVITABLY RESULT.

I WILL BE HAPPY TO ANSWER ANY QUESTIONS YOU MAY HAVE.

Federal Aviation Administration
Office of the Chief Counsel
Attention: Rules Docket (AGC-10)
800 Independence Ave., S.W.
Washington, D.C. 20591

August 7, 1989

Docket No. 25956, Notice No. 89-18
EXPLOSIVES DETECTION SYSTEMS (EDS)
FOR CHECKED BAGGAGE

Summary and Recommendations

Summary:

Increased capability to detect explosives should be a part of our broad arsenal of measures against terrorist threats, and better baggage surveillance is an important element. However, the Airport Operators Council International and the American Association of Airport Executives are concerned about the implementation of a deeply flawed proposal regarding explosives detection systems. Among our concerns:

- Significant constraints would be imposed on both domestic and international air travel to a degree far out of proportion to the hoped-for gain in security in seeking the two bags per billion handled per year which might contain a real threat;

- There is virtually a total lack of operational criteria on which to base an evaluation of prospective EDS systems and their relationship to other protection techniques;

- The NPRM fails to consider the enormous operational impacts, including extensive delays and large space and weight demands, such as the structural renovations required by the ten-ton units;

- The NPRM fails to consider massive economic impacts, including the half-billion dollar initial cost of the 400 machines called for but not explained by the rule, plus the cost of operators, training, and support;

- The NPRM alludes to several alternative explosive detection technologies, but fails to identify them or to compare their benefits;

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- The NPRM fails to accurately define the threat, its extent or its severity, toward which this proposal is addressed. With an average of five incidents per year, it is unwise to over-react, at enormous cost, to such an amorphous hazard;

- A carrier at one airport has 20 international wide-body jet departures during its 3-hour evening peak. Assuming light loads averaging 200 passengers, and 2 bags per passenger, the new equipment would require the installation of five machines to clear that single carrier's peak-period baggage, and will take just under three hours, without complications;

- Under the EDS NPRM, if a very low false alarm rate of 3% is assumed, the total of annual false alarms approaches 30 million bags -- 82,000 bags every day of the year, requiring an enormous amount of time to resolve;

- The NPRM does not mention or consider the one protection against explosive devices most likely to be effective with relatively simple detection systems, the use of universal tagging of explosives and detonating devices with chemical markers;

- Because the NPRM treats EDS systems in isolation as the sole means of protection, it denies what virtually all experts believe -- that the most effective and practical protection against terrorist acts is a combination of technologies and methods, applied as circumstances warrant.

Recommendations:

1. The rule should not be implemented. A committee of the National Academy of Sciences will shortly issue a report and recommendations to the FAA on the state of the science of explosives detection, with detailed criteria and mixed-technology approaches. It is premature to proceed without serious consideration of these scientific findings and recommendations.

2. We recommend that, following evaluation of the NAS report and a rational analysis of alternative technologies and combinations of methods, a test program be established. The detection alternatives, both high and low tech in rational combinations, should be tested in the high-pressure environment of real-time, constantly varying traffic, in differing climatic, operational and non-standard settings.

3. We recommend stronger U.S.legislative and world efforts to require tagging all manufactured explosives worldwide with chemical markers. This is the one alternative we know which would permit small quantities of explosives to be easily and positively identified by readily available technology.

4. We recommend development of better pre-screening techniques such as passenger interviews, computer profiles, passenger/bag reconciliation, etc., which will result in only a relatively small percentage of bags requiring high-tech investigation, with considerably shorter delays.

5. We recommend that the Federal Aviation Administration continue its excellent program of research and development in both current and evolving technologies, including further testing and development of TNA and similar systems which might be integrated into a comprehensive screening strategy combining both high and low tech procedures.

Because our comments clearly demonstrate the impracticality of the FAA proposal for 100% baggage screening by explosives detection systems, the Airport Operators Council International and the American Association of Airport Executives strongly urge the further development of known alternatives, as well as the active pursuit of new concepts, all of which might be integrated into practical, rational combinations of both high and low tech options to provide the best possible protection.

* * * * *

Docket No. 25956, Notice No. 89-18
EXPLOSIVES DETECTION SYSTEMS (EDS)
FOR CHECKED BAGGAGE

1. Introduction

This proposed rulemaking causes the Airport Operators Council International (AOCI) and the American Association of Airport Executives (AAAE) concern. While we all want protection from terrorist use of explosive devices, the proposal would constrain both domestic and international air travel to a degree far out of proportion to the hoped-for gain in security.

Increased capability to detect explosives should be a part of our broad arsenal of measures against terrorist threats, and better baggage surveillance is an important element. But this threat must be addressed with a combination of security measures. Total reliance on complex explosives detection systems will introduce a level of delays, inconvenience, and difficulties to passengers that exceeds the enhancement to the security of such an approach. A balance must be considered between costly protective measures and real benefits that they will provide.

2. Basis for the Rule

The rule proposes a three phase approach. The first would screen 100% of international baggage at 40 "high-risk" airports, both domestic and foreign; the second would screen 100% of all checked international baggage at all airports, and the third anticipates screening of all bags on all domestic flights as well.

The current proposal would require early installation of equipment still under development, made by only a single manufacturer -- equipment unproven in an operating airport environment.

The proposed rule identifies this "thermal neutron analysis" (TNA) equipment as only one of several technologies under development, and only as "the most advanced... now available." The NPRM does not identify the others. If these others are systems based on such technologies as vapor detection, gamma ray absorption, active millimeter wave

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inspection, and low-Z imaging, all of which are being tested by FAA, surely the NPRM should indicate so and compare their relative strengths. The NPRM also is silent on such alternative approaches to security as human factors research, new techniques for profiling high-risk situations, or more aggressive personal interviews, among others.

3. The Threat

In requiring the purchase and installation in Phase Two of (but not providing financial assistance for) four hundred units of this untried technology at a cost of up to a half billion dollars for equipment alone, the rule provides no data, specifications, or operational criteria on which evaluate the rule.

In its commentary on TNA, the FAA makes several assumptions --but does not substantiate them-- that the Explosives Detection Systems (EDS) (a) works well, (b) works better than other alternatives, (c) is truly necessary, and (d) responds to a perceived threat that the FAA only briefly defines, without factual support, as "increased." In the absence of facts, we--and the FAA-- can only speculate.

As to the theory of increased threat, while there have been instances where explosives have been a component of intimidation, extortion or other threats, nowhere has an "increased", or for that matter, stable or decreasing pattern of threat against aviation been demonstrated in the U.S. to our knowledge.

In cataloging the first 40 airports to be equipped (15 domestic, 25 foreign), FAA itself suggests that the threat's locus cannot be easily identified, but that the great bulk of the threat, if any, resides outside U.S. borders.

Available statistics are based on incidents which almost exclusively involve American interests abroad, and include the corporate and diplomatic sphere as well as all modes of transportation. Over the past ten years, the total has grown to about five incidents of explosions per year. While it is not wise to under-react, it is equally unwise to over-react with regard to aviation alone, at enormous cost, to such an amorphous hazard.

The constantly shifting focus of terrorist threat cannot be addressed with massive, immobile, fixed-spot machinery. Of all the weapons used by terrorists, random attack is one of the most effective. Therefore, random screening represents one of the most effective deterrents, because the criminal cannot plan ahead.

Governments worldwide already select high-threat routes or flights to focus resources toward the most likely targets, rather than expending huge amounts of capital to attempt to cover every permutation of possible terrorist plans. Once the EDS baggage clearance process at one locale becomes known, terrorists can be expected to simply move to a more vulnerable target.

4. An Example

A single carrier at one large airport has 20 international wide-body jet departures during its 3-hour evening peak. Assuming relatively light passenger loads averaging 200, and the industry average of 2 bags per passenger, the 10-bags-per-minute throughput rate of the proposed EDS equipment yields a requirement for five machines to clear that single carrier's peak-period baggage, and will take just under three hours. This estimate does not include such common problems as equipment down time, the time required to execute the nine-step process for resolution of possible false alarms which may occur at a rate from 3 to 8 percent, or dealing with oversize or other atypical bags which require hand inspection.

5. Extrapolating the Example

It takes little imagination to extrapolate the example to see the delays and congestion that would result from just the first phase of 100% baggage screening at 40 major airports. With a three hour check-in time for explosives screening alone (we have not factored in added procedures or complications) pre-flight waiting time already approaches the duration of many flights.

Delays will increase throughout the system because the screening is proposed not only on originating bags, but on-line and inter-line connections as well. Connecting bags would be injected into the existing mix of local bags waiting for screening. Connecting schedules then become unmanageably long, rapidly affecting congestion, delays and the availability of aircraft and crews downline. Rush-hour traffic and parking lot demands increase, the need for extended hours for such support personnel as fire, police and maintenance increases, as well as the need to extend vendor services.

The airports with such EDS-induced delays will also be placed at a competitive disadvantage with respect to those without such slowdowns. One major airport already has a minimum interline baggage connection time of two hours, without the addition of EDS delays.

In addition, the manufacturer of the only machine that might meet the FAA requirements indicates it can deliver a maximum of 50 machines in 1990. Simple arithmetic shows the impossibility of meeting the rule's requirements: 100% screening at only three major U.S. airports would require more than the first year's fifty machines. Stated another way, the same rate of production would require eight years to install the 400 machines envisioned in Phase 2.

6. EDS: Size and Weight, and Location

Even if EDS equipment were to become universally and easily available, there is another aspect which many airports are unable to accommodate: the manufactured weight of a single unit is 10 tons. If the unit is located anywhere other than on solid ground, it will likely require substantial structural renovations simply to handle floor-loading requirements at each of several locations at each airport.

Existing terminals and ramps cannot meet the prospective space requirements. The first such machine, to be installed on the airport's ramp, will require in excess of $125,000 for a forty-by-nineteen foot concrete pad and shed. There is simply not enough room available, either inside or outside most terminals, to accommodate such structures.

The best method of handling baggage involves checking bags at the ticket counter, where problems may be resolved at once, while the passenger and bags are still together. If there are several 10-ton machines at any one in-terminal location, each will require reinforced floors and 19' by 40' of space. If the machines are placed anywhere else, the complexity of the check-in process and passenger/ baggage reconciliation is considerably more complex and time consuming, adding significantly to delays.

This single shed would require the rerouting of much ramp activity as well, since each bag must then be transported to, and from, various combinations of the ticket counter, the new EDS shed, the baggage connection areas, and the aircraft. The added handling costs, not to mention ramp traffic, will be considerable for each machine.

7. Readiness of Technology Doubtful

The need for equipment of such ponderous size should be considered in the context of electronic developments of recent years. When one considers that a room-full of early computers now fits inside a pocket, it is reasonable to suggest that technological developments may well diminish the size and weight of first generation equipment to more manageable dimensions... if, indeed, TNA survives field trials as the most effective technology. Surely it must be expected that the high quality R&D being done by FAA and others will yield both high and low tech results less burdensome than the current EDS machines.

8. False Alarms and Oversize Bags

Operationally, there are problems with the machine itself, such as the size of the baggage aperture which does not allow over-size baggage to be checked. This deficiency extends the delays inherent in the manual processing which will also be required to resolve the system's estimated 5% false alarm rate (3% to 8% by some estimates). We have also been led to believe that the 5% rate achieved in the tests is based on an atypically large sample size of explosive material; smaller or thinner samples might yield up to a 10% false alarm rate.

Resolution of that many questionable bags is virtually impossible even under the best of circumstances. The industry estimates it handles a total of approximately a billion bags each year, of which perhaps two will contain a real threat. If we assume a very low false alarm rate of 3%, the total of false alarms approaches 30 million bags -- 82,000 bags every day of the year, which would require an even more time consuming process of problem resolution.

That problem-solving process, which the FAA proposal has not addressed, will add yet another level of delay, and is itself highly labor intensive, and thus very expensive. It involves, among other possibilities, new computer-based profiles, more aggressive personal interviews of passengers, matching of passengers with bags (which must be retrieved from the clearance area), physical searches of people and/or bags, random selection, dog teams, vapor detectors, altitude chambers, and both portable and fixed bomb disposal equipment. Who must supply (and pay for) this equipment and manpower? How much is enough? Who will operate it? Who will train them? Where does a suspect bag go? How does it get there? At what point does an alarm cause airport management to evacuate the area? All are serious questions which must be answered before we resort to questionable high-tech hardware.

9. Costs

A serious question revolves about the costs and the apparent lack of federal funding for nearly a half billion dollars in equipment alone, not including terminal modifications. The terrorist threat appears to be not against a particular American carrier, but against the United States government, which has considerable resources committed to intelligence gathering, defense and law enforcement agencies involved in the deterrence of terrorist activity directed at the US government. We know of only one precedent for the transfer of federal responsibility for the protection of American citizens to the private sector - that which imposed x-ray and magnetometer requirements upon the airlines. Even in that instance the federal government funded the initial costs.

As we have stated on numerous occasions before Congress, most of the cost should be borne not by the carriers, or by the airports, but by the U.S. government, which is the target for the perceived threat and which is imposing requirements on industry for such expensive, unproven apparatus to address a problem the government cannot yet effectively define.

10. Cost/Benefit Studies

We have great difficulty with the NPRM's flawed and unsupported data which fail to support the FAA's highly unrealistic "cost benefit analysis". This is particularly apparent in the speculative nature of the costs attributed to future losses. We are disturbed by reference to analyses made "in the absence of additional preventive measures," with the inference that the proposed EDS approach is the ultimate security solution. It defies logic that other solutions would not also be viable alternatives, at least in combination with other methods and technology.

11. EDS at Non-US Airports

The FAA proposal to require EDS equipment at an unidentified list of foreign airports has raised criticism among AOCI's non-U.S. member airports. Aside from the question of the extension of control by a U.S. regulatory agency at foreign facilities, there is considerable doubt in the industry as to the acceptability of such new nuclear-based technology by foreign governments, some of which have questioned the need for more x-ray equipment.

We have been advised that at least three governments have already indicated they may refuse to accept this equipment. One will require significant modifications, and even then placement could be only in controlled, supervised non-public areas, adding to the operational expense. We question the efficacy of a security system which at the outset can only protect a few of its high risk elements.

12. A Better Approach

The sensitivity of various technologies proposed, and their ability to discriminate among possible threats, will result in unacceptably lengthy delays and increased congestion. With the real threat of an explosive's presence being less than two bags per billion screened, the impossible process of 100% EDS screening must be rethought, and variations of high and low technology combinations tested to minimize the impact of each technique.

A single basket for all our security eggs is an exceptionally weak approach. It is precisely those "additional preventive measures" of more advanced high-tech and low-tech solutions supported by more and better intelligence gathering which are needed. Such low-tech and additional screening procedures as we have outlined will also have the effect of pre-screening the great majority of baggage -- perhaps as much as 90% -- so that the remaining bags which must be exposed to the more cumbersome EDS investigation process, or combinations of other alternatives, can be examined with considerably less delay and congestion.

The equipment proposed by FAA may in time prove to be useful, and we encourage its rational integration into a comprehensive risk abatement process to balance the level of risk against the congestion and delays which would wreak havoc in the air transportation system. We suggest an approach which would combine the strengths of EDS with those of other equipment and procedures, providing a flexible response to the changing face of terrorist threats against aviation.

> This will require a rigorous test program in which the benefits --and drawbacks-- of each technology and procedure are examined and analyzed in various combinations designed to address differing, and constantly changing, levels of threat.
>
> The first part of such a test program can be initiated in conjunction with the placement of the six TNA machines already ordered by FAA. Placement should not go beyond those first sites until the full range of high and low tech alternative combinations has been adequately tested and evaluated for both high and low-risk airport applications, to help assure that we stay on a rational course.

This approach also demands that better intelligence gathering and dissemination at all levels of government, including foreign, be integrated into the risk analysis process to help determine where and when the hazards are highest. Risk analysis was almost totally absent in the NPRM.

13. Tagging of Explosives

A major potential aid, talked about for years, and currently under legislative consideration by Congress, is that of tagging all manufactured explosives with radio isotopes or other chemical markers. This would permit even the smallest quantity of each such compound to be positively identified through simpler, cheaper and more readily available existing equipment.

This process alone, if vigorously pursued in U S. legislative and other world bodies, might be the single most productive way in which to easily and inexpensively identify the overwhelming majority of the world's commercially available explosives and their component substances. In this way, the goal of explosives detection becomes infinitely easier to achieve.

14. Recommendations:

1. The rule should not be implemented. A committee of the National Academy of Sciences will shortly issue a report and recommendations to the FAA on the state of the science of explosives detection, with detailed criteria and mixed-technology approaches. It is premature to proceed without serious consideration of these scientific findings and recommendations.

2. We recommend that, following evaluation of the NAS report and a rational analysis of alternative technologies and combinations of methods, a test program be established. The detection alternatives, both high and low tech in rational combinations, should be tested in the high-pressure environment of real-time, constantly varying traffic, in differing climatic, operational and non-standard settings.

3. We recommend stronger U.S.legislative and world efforts to require tagging all manufactured explosives worldwide with chemical markers. This is the one alternative we know which would permit small quantities of explosives to be easily and positively identified by readily available technology.

4. We recommend development of better pre-screening techniques such as passenger interviews, computer profiles, passenger/bag reconciliation, etc., which will result in only a relatively small percentage of bags requiring high-tech investigation, with considerably shorter delays.

5. We recommend that the Federal Aviation Administration continue its excellent program of research and development in both current and evolving technologies, including further testing and development of TNA and similar systems which might be integrated into a comprehensive screening strategy combining both high and low tech procedures.

Because our comments clearly demonstrate the impracticality of 100% baggage screening by EDS, we strongly urge the further development of known alternatives, as well as the active pursuit of new concepts, all of which might be integrated into practical, rational combinations of both high and low tech options to provide the best possible protection.

AIRPORT OPERATORS COUNCIL INTERNATIONAL

American Association of Airport Executives

Admiral James Busey, Administrator
Federal Aviation Administration
800 Independence Ave SW
Washington, DC 20591

August 10, 1989

Dear Admiral Busey,

The issue of airport security is one of the utmost priority, and one which has unfortunately grown to difficult dimensions on several fronts. The Airport Operators Council International and the American Association of Airport Executives are deeply concerned with respect to three recent actions by FAA.

o First, we note with dismay the Explosives Detection Systems (EDS) rulemaking which seeks deployment by some estimates of as much as $4.5 billion in unproven first generation equipment to address a highly amorphous and ill-defined threat. Worse, the proposal seeks to ultimately institute screening of 100% of airline baggage, which will have the unavoidable effect of causing total gridlock in the world's aviation system. Attachment 1 is a copy of our comments filed in the rulemaking, in the hope that your office will strongly consider the severe implications of this untenable proposal.

o The second topic of immediate concern is the recent accelerated amendment to airport security programs which accommodates the use of FAA Form 8000-39. This is an agency-issued identification credential allowing safety inspectors unescorted access to secure airport areas without regard to the airport's established security programs -- the very same FAA-mandated security program which places upon airports the responsibility, and concurrent liability, to guarantee full control of those areas.

This appears to directly contravene a recent "clarification" issued by FAA stating that airport operators will have no responsibility for, or ability to, control that ID. It is absurd for FAA to require a complex automated access control system at all major airports, and follow immediately with a major exemption for itself. The ambiguity of the situation has caused many airports to advise FAA that they expect not to honor such badges.

Our understanding of FAR 107.11(c), under which individual amendments were promulgated at each airport, is that "a petition to reconsider stays the amendment until the Administrator takes final action on the petition." We have sent to Ray Salazar selected copies from the dozens of such petitions from our member airports, and ask that we be apprised as soon as possible as to the resolution of the numerous complaints.

o We also need to bring to your attention the matter of establishing a reasonable approach to the required access control systems. In brief, there has been a strong consensus in the

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industry as to the need for a lead airport program designed to test various security hardware and procedures in an operating airport environment. This would establish baseline data for airports not yet committed to a particular system to provide information which could help to avoid extensive time and money costs in re-inventing the wheel at each airport.

In several meetings with FAA security personnel it was agreed that the pilot program would be a worthwhile endeavor. There was a commitment by Monte Belger that FAA would commit "whatever resources are necessary" to accomplish such a test program. After several months of delay, we are now told that no money is available, and surprisingly, that the FAA questions the need for such guidance.

Without such a test program, the industry will not only spend uncounted dollars and man-hours in developing fragmented systems which may not meet the anticipated security goals, but that the resulting disarray among airport security systems will likely be detrimental to the overall security of American aviation. .

We believe that virtually every industry group feels an access control pilot program is urgently required to resolve the multitude of outstanding questions.

These issues, considered together, represent a no doubt well-intentioned effort, but one which lacks perspective and practicality. We urge your immediate personal consideration of these issues by:

- o instituting a pilot program for access control systems;
- o halting the explosives detection rulemaking while a more sensible approach is pursued and further research in alternative technologies is completed;
- o terminating the FAA's exemption for its own ID.

Sincerely yours,

Deborah Lunn
Acting Executive Director
Airport Operators Council International

Charles Barclay
Executive Vice President
American Association of
Airport Executives

Attachment: EDS filing

Mrs. COLLINS. Our next witness is Mr. Arad from International Consultants on Targeted Security.

STATEMENT OF ARIK ARAD, INTERNATIONAL CONSULTANTS ON TARGETED SECURITY

Mr. ARAD. Thank you for allowing me to appear before this important forum and present the views of my company. Our company has been involved in airline security for a good number of years and have instituted security programs for major American airlines, such as American Airlines, TWA, Northwest, and some others.

Upon receipt of relevant intelligence information, the FAA sends directives to the airlines. In order to improve this process and not leave room for interpretation of the directives to the individual airlines, the FAA should release specific and technical guidelines, including dates of implementation and periods of validity. In return, the airlines should send a detailed report back to the FAA on exactly how the directive was implemented. This would give the FAA better control over what is happening in the field at a specific time and place.

Also, from what we have observed, both the FAA and the airlines seem to have different standards for domestic and foreign operations. While security has generally been upgraded at foreign airports, the next step should be to upgrade the security for outgoing international flights from the USA, as has been done by American Airlines. The same methods used in foreign airports should be implemented in the United States for outgoing international flights from the United States as has been done by American Airlines. The same methods used in foreign airports should be implemented in the United States for outgoing international flights.

The natural step following this would be to prepare a blueprint for a program to bring domestic flights up to the same level of security, although not necessarily using the same methodology.

The carriers themselves are fully aware of the end for proper international security operations, and are to be commended for the willingness they have shown to invest substantially in order to achieve the desired results. However, we still think that some of the U.S. carriers should invest more in upgrading the quality of security personnel and their training.

In addition to the directives issued by the FAA, our company has been using what we call "the profile method," which we adapted and modified from the El Al security system. I was formerly the El Al director of security at Ben Gurion International Airport in Tel Aviv, and previously the El Al security manager in Canada. Many of our company's executives and employees have also previously been part of El Al security management, and were posted at major European airports.

The ICTS profile method requires each passenger be interviewed, with his bags in front of him, prior to boarding. We found when interviewing a passenger, with proper training and methods, one can very quickly analyze the personality of each individual passenger, and determine the type of security treatment each one should receive. This allows security agents to focus their energies and efforts on dubious and suspect passengers. Since it is impractical to open every bag, all passengers cannot be treated alike.

The method has proven its value in preventing terrorism such as in the Ann Murphy case in London in 1986, where a completely innocent Irish woman did not even know she was carrying a bomb.

The profile method is not limited to being a tool against terrorism, having been of great assistance in the prevention of drug smuggling and the detection of false passports and forged tickets.

Over the past year, on American carriers, our company uncovered 75 false passports in London alone, which were to be used for illegal entry to the United States; 5 kilograms of heroin in Istanbul, Athens, and other locations; a forged ticket, which led to the uncovering of an additional 200 forged tickets. ICTS has also uncovered some incidents of false bottom suitcases; and in Paris, we uncovered a dummy explosive, which we believe was being used to test the system.

In our opinion, the profile method should be instituted for cargo as well, to prevent an increase of use of this avenue for terrorism, or smuggling, once the passenger route has been effectively sealed. It is our opinion that attempts on cargo carriers will be more common as passenger aircraft security is improved.

There are many American agencies which are involved in gathering information regarding threats against civil aviation. In our opinion, a central body should be created under the aegis of the FAA together, sort and disseminate the intelligence information gathered by the many organizations, including the various agencies, airlines, specific stations, et cetera.

This would also minimize conflicting and duplicate information, and the result would probably be that more weight would be lent to the information received. A methodology should be set up whereby the information is quickly disseminated to the relevant parties. Thus, for example, a passenger turned away by one airline due to a false passport would not be allowed to fly on a different U.S. carrier.

It is important to stress that the modern equipment in use today is definitely an asset and a deterrent to terrorism. Without a doubt improved technology in the future will add to the security profile of American and international aviation. However, in our opinion, it would be wrong to rely solely on technology. It is clear that no technology provides complete safety.

The modern terrorists, especially the radical Iranians, Libyans, and others, have become extremely sophisticated and have been known in the past to overcome the most modern equipment in use today. Therefore, the placement of properly trained and motivated security personnel is essential, and technical equipment should be used only as an aid to the human factor.

Furthermore, while large sums have been budgeted by Congress for the development of sophisticated state-of-the-art equipment, we feel that it is even more crucial to allocate funds for the recruiting of higher quality professional security personnel, and for more intensive and professional training programs and periodic testing of the system as a whole.

The last thing I would like to comment on is, I heard yesterday all during the day, comments on how it is impossible to adopt and modify the El Al system and to introduce it to the U.S. carriers. Our company has done it for American Airlines, TWA, Northwest, and some other U.S. carrier, very, very successfully.

Mrs. COLLINS. Mr. Arad, your time has expired.

Mr. ARAD. I am finished.

[The prepared statement of Mr. Arad follows:]

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Testimony by Arik Arad
to
Government Activities and Transportation Subcommittee
of the
Committee on Government Operations
House of Representatives, Congress of the United States

I thank you for the opportunity to appear before this important forum and to present the views of my company, International Consultants on Targeted Security. We are known in the field as "ICTS".

We have been involved in airline security for a good number of years, and have instituted security programs for major American airlines, such as American Airlines, TWA, Northwest Airlines, US Air, Tower Air, and recently, Pan American.

1. Q. An assessment of the Federal Aviation Administration and American airline industry regarding their approach to aviation security.

   A. We have a great deal of respect for the function being performed by the Federal Aviation Administration, and feel that over the past few years they have shown serious regard to airline security. Their directives, guidelines, and auditing of international operations has been professional and effective.

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Upon receipt of relevant intelligence information, the FAA sends directives to the airlines. In order to improve this process, and not to leave room for interpretation of the directives to the individual airlines, the FAA should release specific and technical guidelines, including dates of implementation and periods of validity. In return, the airlines should send a detailed report back to the FAA on exactly how the directive was implemented. This would give the FAA better control over what is happening in the field at a specific time/place.

Also, from what we have observed, both the FAA and the airlines seem to have different standards for domestic and foreign operations. While security has generally been upgraded at foreign airports, thê next step should be to upgrade the security for outgoing international flights from the U.S.A, as has been done by American Airlines. The same methods used in foreign airports should be implemented in the U.S. for outgoing international flights.

The natural step following this would be to prepare a blue-print for a program to bring domestic flights up to the same level of security, although not necessarily using the same methodology.

The carriers themselves are fully aware of the need for proper international security operations, and are to be commended for the willingness they have shown to invest substantially in order to achieve the desired results. However, we still think that some of the U.S. carriers should invest more in upgrading the quality of security personnel and their training.

2. Q. Recommendations regarding upgrading American aviation security, particularly at foreign airports.

A. In addition to the directives issued by the FAA, our company has been using what we call "The Profile Method", which we adapted and modified from the El Al security system. I was formerly the El Al Director of Security at Ben-Gurion International Airport in Tel Aviv, and previously the El Al Security Manager in Canada. Many of our company's executives and employees have also previously been part of El Al security management, and were posted at major European airports.

The ICTS "Profile Method" requires that each passenger be interviewed, with his baggage in front of him, prior to boarding. We have found that when interviewing a passenger, with proper training and methods one can very quickly analyze the personality of each individual passenger, and determine the type of security treatment each one should receive. This allows security agents to focus their energies and efforts on dubious and suspect passengers. Since it is impractical to open every bag, all passengers cannot be treated alike.

Since the threat of terrorism to American aviation, especially at foreign airports, is on the rise, we would like to promote the use of this method as widely as possible, to prevent the recurrence of any tragedy.

This method has proven its value in preventing terrorism, such as in the Ann Murphy case in London in 1985, where a completely innocent Irish woman did not even know that she was carrying a bomb. The profile method is not limited to being a tool against terrorism, having been of great assistance in the prevention of drug smuggling and the detection of false passports and forged tickets. Over the past year, on American carriers, ICTS uncovered:

- Over 75 false passports in London alone, which were to be used for illegal entry into the United States.
- 5 kilograms of heroin - in Istanbul, Athens and other locales.
- A forged ticket, which led to the uncovering of an additional 200 forged tickets.

ICTS has also uncovered some incidents of false-bottom suitcases; and in Paris we uncovered a dummy explosive, which we believe was being used to test the system.

In our opinion, the "Profile Method" should be instituted for cargo as well, to prevent an increase of use of this avenue for terrorism/smuggling once the passenger route has been effectively sealed. It is our opinion that attempts on cargo carriers will be more common as passenger aircraft security is improved.

We also advocate using American security personnel at foreign airports to protect the interests of the American traveller. While it is important that local personnel be involved in the profile questioning, it is equally important that Americans, who have the interest of fellow Americans at heart, be on hand to ensure high security standards. In addition, armed guards dedicated to protecting Americans should be placed in high passenger concentration areas, such as near check-in counters and gate areas, to prevent incidents such as the attacks at Rome and Vienna.

3. Q. **Observations regarding the bombing of Pan Am Flight 103, and your opinion on whether the appropriate remedial steps have been taken.**

A. Since Pan Am has now become our client, we believe that it would be a conflict of interest and improper for us to comment about their present or past security arrangements.

4. Q. Your view on how specific information gathered by American intelligence agencies regarding threats against civil aviation should be handled and disseminated.

A. There are many American agencies which are involved in gathering information regarding threats against civil aviation. In our opinion, a central body should be created under the aegis of the FAA to gather, sort and disseminate the intelligence information gathered by the many organizations, including the various agencies, airlines, specific stations, etc. This would also minimize conflicting and duplicate information, and the result would probably be that more weight would be lent to the information received. A methodology should be set up whereby the information is quickly disseminated to the relevant parties. Thus, for example, a passenger turned away by one airline due to a false passport would not be allowed to fly on a different carrier.

5. Q. An assessment of explosive and bomb detection equipment, including thermal neutron, activation (TNA) x-ray devices and vapor detection. Please comment on the practical uses of this equipment at American and foreign airports.

A. It is important to stress that the modern equipment in use today is definitely an asset and a deterrent to terrorism, and without a doubt improved technology in the future will add to the security profile of American and international aviation. However, in our opinion, it would be wrong to rely solely on technology. It is clear that no technology provides complete safety. The modern terrorists, especially the radical Iranians, Libyans, and others have become extremely sophisticated and have been known in the past to overcome the most modern equipment in use today. Therefore, the placement of properly trained and motivated security personnel is essential, and technical equipment should be used only as an aid to the human factor.

Furthermore, while large sums have been budgeted by Congress for the development of sophisticated state-of-the-art equipment, we feel that is even more crucial to allocate funds for the recruiting of higher quality professional security personnel, and for more intensive and professional training programs and periodic testing of the system as a whole.

Mrs. COLLINS. Mr. Boynton.

STATEMENT OF HOMER BOYNTON, MANAGING SECURITY DIRECTOR, AMERICAN AIRLINES

Mr. BOYNTON. I appreciate the opportunity to appear before you to discuss air carrier security programs. There is no issue which is more important to American Airlines than assuring the security of our passengers and employees. To obtain this end, we have made a commitment of resources, training, and inspections. American has accepted the responsibilities for air carrier security.

Worldwide, the airline industry is in the front line in the battle against international terrorism. While the industry is one of the principal targets of international terrorism, it is merely a surrogate or a convenient target. The industry's efforts to thwart and prevent hijackings and the secreting of explosive devices on board aircraft has been difficult and frustrating because of the vulnerability of airports and aircraft to terrorist attack.

In 1988, the International Civil Aviation Organization estimated that worldwide 1.1 billion passengers flew on board 1,100 commercial aircraft on 38,000 to 40,000 flight segments. During this same period, one explosive device caused the awful aviation disaster over Lockerbie, Scotland. If we look at these statistics in their totality, security personnel in the airline industry in 1988 were seeking one explosive device carried by one passenger out of 1.1 billion passengers—a formidable task.

In 1986 we established an antiterrorist security program. The fundamentals of the program are comprehensive security procedures, dedicated personnel, and intensive training, effective equipment, and quality control.

We refer to our antiterrorism program as a risk analysis system. It has been spoken of here on a number of occasions as the El Al system. We don't refer to it as the El Al system. While it was first developed by El Al, it is a basic security concept. It is based upon a risk factor. It not only assesses the risks to passengers, but to all elements of our flight operation, including catering, freight, searching, and guarding of the aircraft.

The risk analysis system concentrates on high risk passengers and recognizes the vast majority of passengers pose no threat to the flight and require a lesser security examination.

I would like to briefly mention TNA, which may be a possible solution for the identification of explosive devices, but has not been tested in an operational environment and therefore, its true value cannot be assessed at this time.

Before the airline industry undertakes the tremendous costs of purchasing TNA machines, there must be an assurance that it will operate satisfactorily and effectively in an airport/airline environment. There are other limiting factors to TNA, such as its size, small tunnel opening, slow-through-put, and concern for environmental factors. Until these concerns have been satisfied, the airline industry should not be required to spend millions of dollars on a machine, which may not accomplish the purpose for which it was designed.

The threat of international terrorism will continue into the foreseeable future. How it affects the airline industry will be determined by political events, government policy, and the mindset of terrorists, which is formulated by their view of the world and how they decide to achieve their objectives.

The ultimate target of terrorists is a government whose policies are opposed to their goals. The airline industry is high profile, susceptible to media attention, vulnerable, convenient, and therefore, an ideal surrogate target for terrorists. Governments must provide a substantially increased involvement in protecting the airline industry.

Thank you, Madam Chairwoman.

[The prepared statement of Mr. Boynton follows:]

AmericanAirlines

STATEMENT OF

HOMER BOYNTON

MANAGING DIRECTOR SECURITY

AMERICAN AIRLINES

BEFORE THE U.S. HOUSE OF REPRESENTATIVES

GOVERNMENT ACTIVITIES & TRANSPORTATION SUBCOMMITTEE

September 25, 1989

Madame Chairwoman, I appreciate the opportunity to appear before you today to discuss with you air carrier security programs. We applaud your continuing interest in this issue. There is no issue which is more important to American Airlines than ensuring the security of our passengers and employees. To obtain this end, you must have commitment, resources, training and inspections. American has accepted these responsibilities.

Worldwide, the airline industry is in the front line in the battle against international terrorism. While the industry is one of the principal targets of international terrorism, it is merely a surrogate or convenient target. The industry's efforts to thwart and prevent hijackings and the secreting of explosive devices on board aircraft has been difficult and frustrating because of the vulnerability of airports and aircraft to terrorist attack.

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In 1988, the International Civil Aviation Organization (ICAO) estimated that worldwide 1.1 billion passengers flew on board 1,100 commercial aircraft on 38,000 - 40,000 flight segments. During this period, one explosive device caused the awful aviation disaster over Lockerbie. If we look at these statistics in their totality, security personnel in the airline industry in 1988 were seeking one explosive device carried by one passenger out of 1.1 billion passengers - a formidable task.

Madame Chairwoman, the question cannot be whether one (even a minute percentage of operations) such disaster can be an acceptable risk. The answer to that question must be "no" -- it is not acceptable. The question to be asked, instead, is whether the current systems and all the parties that participate in the current systems -- every airline, screening personnel, as well as all governments -- are doing those things which will best identify those passengers or bags that might conceivably pose a threat. I'm afraid the answer to that question is "no."

As a result of a number of terrorist incidents, involving both hijacking and explosive devices caused by terrorists in 1985 and in early 1986, Mr. Robert L. Crandall, Chairman of the Board of American Airlines, decided that American would put in place the best security program that could be devised to combat and prevent terrorist attacks against our carrier. In researching the alternatives available, we determined that the best airline security system in the world designed to protect aircraft and passengers from terrorists was the security system developed and operated by the Israeli airline El Al. In May 1986, we engaged the services of a group of private consultants who had formerly worked with El Al and/or the Israeli government and who had participated in the operation of the security system used by El Al. During the summer of 1986, the American Airlines Security Department, in conjunction with the Israeli consultants, developed the procedures, hired personnel and conducted the training for our new security system modeled on the El Al System and which was put into effect at all of our European destination cities and at the U.S. gateways in September 1986. The program is currently operated in all 13 cities that we serve in Europe and the four gateway cities within the United States from which we fly to Europe. At the present time, we have almost 500 American Airlines employees dedicated to this security program, which in Europe comprises 40% of our total airline staff.

We refer to our anti-terrorism program as a risk analysis system, and it not only assesses the risk to passengers but all elements of our flight operation including catering, freight, as well as searching and guarding of the aircraft. The risk analysis system is a basic security concept in that it assesses the risk and develops countermeasures to that risk. In the area of risk analysis for passengers, the system analyzes or assesses the risk to the aircraft of each passenger. This is accomplished through the interview of each passenger and classifying passengers as risk or non-risk. Those that are classified as a risk to the aircraft are given extra scrutiny and are afforded an intensive search of their luggage as well as a body search. The risk analysis system concept permits the normal passenger flow to proceed and only focuses on those passengers deemed to be a threat to the aircraft. Security scrutiny of 1.1 billion passengers annually who are carried aboard commercial aircraft would be cursory at best. In the worst situation it would be disruptive to the entire industry accomplishing in many ways what the terrorists actually seek. The risk analysis system concentrates on high-risk passengers and recognizes that the vast majority of passengers pose no threat to the flight requiring a lesser security examination. It allows our experts to focus their attention on those that might be a threat. It will find more than other systems.

In implementing our risk analysis system at foreign airports, we have received the cooperation of airport authorities, police and other government entities.

As I previously indicated, all of our security personnel are employees of American Airlines and they are hired at entry-level salaries equivalent to other American Airlines employees. Seventy-five percent of our security staff have college backgrounds and a number of the managers of the program have backgrounds in the FBI, DEA, other law enforcement agencies, or were security managers for other airlines. The security agents have backgrounds in education, nursing, business management, law, military, civil aviation and related fields. We are currently providing our security agents with training in ticketing and passenger services and our passenger services agents are receiving training in security. We want the best possible people to do this important work. We do not look for the lowest-wage employees.

Security personnel are also aware that American Airlines provides a career path and that they will not have to remain in security for their entire employment period with American if they desire to advance to other areas of the airline. At the present time, the passenger services supervisors at Manchester, Dusseldorf, Munich, and Paris are former security agents.

The training for all security personnel comprises a two week intensive course and includes the following subjects:

- Passenger interaction
- Passport and ticket analysis
- Weapons and explosive and concealment methods
- History of international terrorist groups
- Current terrorist methods of operations
- Interviewing techniques
- X-ray operation/interpretation
- Catering and freight security techniques

Recurrent training is provided on an annual basis for all security agents who have over two years tenure in the program and there are specialized training courses for security managers and security lead agents. All training is conducted at the American Airlines Learning Center at Dallas/ Ft. Worth, Texas.

American's risk analysis system and hiring and training program are not mandated by federal regulation. FAA regulations do not mention the words "risk analysis" or hiring or promotion practices and only minimally deal with training, yet these are clearly the key ingredients in the development and continuance of a security program demanded by the American public.

At the current time, American Airlines uses E-Scan X-ray equipment manufactured by Astrophysics Corporation in all European cities and at our gateway cities. The E-Scan equipment enables explosives to be more identifiable and accomplishes this by separating the display of organic and inorganic components in the X-ray image. By using the E-Scan, the operator can identify dense organic areas which are displayed in specific colors and may indicate the presence of explosive material. The E-Scan in our view is the best commercially available and proven explosive detection device on the market today.

The TNA technology, while holding promise as a possible solution for the identification of explosive devices, has not been tested in an operational environment and therefore its true value cannot be assessed at this time. The first TNA machine was provided to TWA at JFK Airport only a few weeks ago and the operational test of that machine is in its initial stages. Before the airline industry takes the tremendous costs of purchasing TNA machines, there must be an assurance that it will operate satisfactorily and effectively in an airport/airline environment. There are other serious concerns relating to TNA which have not been fully explored, such as:

- Terminal space limitations due to size and weight of machines

- o Small tunnel opening and slow thru-put speed for luggage

- o Cost of installation and maintenance of machines not factored into FAA costs.

- o High false alarm rate [This is a particularly troublesome issue since it might cause security people to overlook certain items for fear of false alarm.]

- o Response to suspect baggage [Will building have to be evacuated for every false alarm?]

- o Environmental concerns in foreign locations

- o Rule only pertains to U.S. carriers

- o Premature deployment could create a powerful inertia and thereby retard the development of next-generation explosives detection technology.

- o No assurance that foreign governments will permit TNA units to be used at their airports.

Until all of these factors and concerns have been satisfied, we question whether millions of dollars should be spent on a machine which may not accomplish the purpose for which it was designed and may instead be counterproductive. We have also been informed that other explosive detection technology may be available in the very near term. This technology is reported to be more effective than TNA. The FAA should make clear the status of such technology before vast sums are expended on equipment which may be outmoded before we have received delivery.

Prior to the Pan Am 103 incident, dissemination of threat information was furnished to the airlines by the FAA after being analyzed and evaluated by that agency. Subsequent to Pan Am 103, the FAA modified the manner in which intelligence information is furnished to the airlines. Information is now furnished by means of an Information Circular which contains general threat information with no recommended mandatory countermeasures required of the airline industry. Threat information which might include identity of a threat against a specific carrier, a method of attack, or an airport location would be furnished to the airlines via a Security Directive which does require mandatory countermeasures. The new system developed by the FAA should be helpful in establishing different threat levels and will enable a carrier to better assess the information furnished by the FAA. Intelligence information is generally imprecise. It would be nice to know the exact date, time and place of a terrorist attack but that is rarely obtained. Intelligence information for the most part is background information which provides the airline an opportunity of being alert to the continuing problem of international terrorism and the fact that there are groups of individuals in parts of the world who are discussing how to attack an airline or airport.

In implementing government mandated security regulations, it should be the responsibility of the FAA through the U.S. State Department to contact the foreign government as well as airport authorities at foreign locations and inform them of the new requirements before they are effective for implementation by the airline. It is very difficult and awkward for a private corporation to contact a foreign airport or foreign government and attempt to explain new government security requirements. This is a government-to-government matter and the airlines should not be asked to implement procedures until appropriate clearance has been obtained from the host government. The FAA's role in assisting U.S. carriers in attacking the problem in international terrorism should also:

- Require that foreign carriers serving the U.S. to maintain the same level of security mandated of U.S. carriers.

- Provide the airline industry with proven state-of-the art explosive detection equipment paid for by government funding.

- Maintain continuing liaison with appropriate U.S. Embassy officials on civil aviation security matters.

- Work together with the U.S. airline industry in meeting the needs of security requirements with airport and related police and security authorities at foreign cities.

o Assist with training of airline security personnel by providing technical expertise, videotapes, and in-person lectures by security experts.

The threat of international terrorism will continue into the foreseeable future. How it affects the airline industry will be determined by political events, governmental policy, and the mindset of terrorists which is formulated by their view of the world and how they decide to achieve their objectives. The ultimate target of terrorists is a government whose policies are anathema to their goals. The airline industry is high profile, susceptible to media attention, vulnerable, convenient, and therefore an ideal target for terrorists. Governments must provide a substantially increased involvement in protecting the airline industry.

While the government can provide some protection for the airline through the development of security procedures and regulations, and funding of resources, it is up to the airline itself to not only carry out those requirements to the best of its ability, but also to enhance its own security in order to protect its passengers, crews, and aircraft. American Airlines three years ago implemented a comprehensive anti-terrorist security program. We think it is effective and meets the standards which we feel necessary to combat international terrorism.

American Airlines appreciates the opportunity to present these comments and I am prepared to answer your questions.

Mrs. COLLINS. Mr. Miyoshi.

STATEMENT OF DENNIS MIYOSHI, MANAGER, SAFEGUARDS ENGINEERING DEPARTMENT, SANDIA NATIONAL LABORATORIES

Mr. MIYOSHI. Thank you for the opportunity to be here this morning.

I am Dennis Miyoshi, manager of the safeguards engineering department of Sandia National Laboratories. You will note my written testimony is quite short. I took advantage of the time overnight to think about some of the engineering aspects. I will be adding to my written comments with some oral comments.

Let me start by saying Sandia National laboratories is operated for the Department of Energy by AT&T Technologies on a no-fee, no-profit basis. We are one of three nuclear weapons laboratories, and our prime mission is in the weaponization of our nuclear deterrent.

Sandia has been designated the lead laboratory for physical security R&D for the Department of Energy, and has been involved in security systems for over 15 years. Over $500 million of effort has been spent in safeguards-related engineering and field implementation for the DOE, DOD, and other Government agencies since the inception of the safeguards organization at Sandia.

Sandia takes a systems engineering approach to solving security problems. The first step is to define the threat to be addressed, the targets to be protected, and the consequences to be mitigated. If there are multiple threats, targets and consequences, these should be prioritized. Adversary attributes should be carefully assigned. You need to be careful about the objective of this section which is the American aviation security problem. It is not explosives detection.

The threat is to deter or prevent hijacking or sabotage of an airliner resulting in injury or death to the public. I think that is the thing you need to keep in mind. I will come back to that later.

The second step is to perform a detailed analysis of the existing facility to determine the status of the current security system and other features, such as operational constraints, safety aspects, and cost impacts. One needs to consider the target, the features, and characteristics of the target, namely the aircraft.

The third step is to develop security system options that consider the following design principles:

Layered protection—develop security in several nested layers around the asset.

Second, balanced protection—the security system should provide a uniform level of performance at each layer. Overdesign results in a waste of resources, while underdesign provides weak points to attack.

Third, there should be protection in depth. Do not search for the ultimate solution. A single solution, no matter how elegant, will eventually be defeated by your adversary with sufficient time, resources, and ingenuity. A far better strategy is to have many simple, complementary solutions that an adversary must overcome sequentially.

System integration. The security elements of detection assessment, delay, and response should be carefully integrated to maximize the synergism of the system. You should include operational procedures, intelligence procedures, and other factors such as that.

The final step before implementation is to prototype these concepts and test them in an operational environment as a demonstration system. Concepts should be modified as a result of these tests, and retested if possible. Such a structured approach is presently being carried out for the FAA at BWI. Steps 1 and 2 have been completed, and presently various systems concepts are being developed utilizing the security design principles. We hope to begin installing prototype hardware and following new operational procedures in about a year, and having the demonstration underway by mid-1991.

Let me make a few comments in the time remaining. First of all, I mentioned deter or prevent.

Deterrence can have the same effect as prevention. The advantage of deterrence is that you don't have to have a 100 percent assurance.

If I put a sticker on my window saying my home is protected by an alarm system and that deters an adversary or burglar, I have prevented him from entering my home. Likewise, contraband detection have the same kind of effect.

It was mentioned yesterday there were no terrorists uncovered at checkpoints at the airports. That is because a terrorist wants a high probability of success.

He is not going to attack you if he believes he has a chance of failure.

Second, deterrence requires accountability. It requires penalities.

If there are no penalities, you will not have deterrence. Accountability requires audit trails. That is an additional reason for the matching of baggage. Now you have an accountable trail of who has put what on the airplane.

The Margaret Thatcher example that was mentioned is another one of accountability. A terrorist has many chances to attack. If you give him a opportunity to fail, to be accounted for, you have reduced and applies deterrence to that.

Terrorists don't like accountability.

Second, there are analytical tools that can be applied. We believe in logic trees. We believe in trying to identify the different ways a terrorist can actually achieve his goal. Placing various steps in that process, a little bit here and there, adds up to a lot when it comes to defeating a terrorist.

Various system concepts can be considered. Utilize your intelligence. We talked about intelligence yesterday. Intelligence can lead not only to defeating a terrorist, it can lead to such a thing as a contingency plan. If you have an idea something is happening, you can go to a higher state of alert and add additional security features.

Utilize the public.

The public, as you have heard in the last few days of testimony, are becoming aware of the problem. They tend to be more cooperative. Create an environment where the public can help you. If you have a problem at entry-control points with false alarm rates, try to educate the public as to what things not to bring through our entry-control points.

If you have a problem with TNA, picking up things like sausage, educate the public not to bring those through if that is going to cause your bag to be rejected. Utilize the tools, create an environment conducive to your security system.

The problem as I mentioned earlier is not explosive detection. The problem is preventing sabotage. How do you achieve that?

You can go for explosives. You can look for detonators.

The time is up.

If there are further questions, I can address those later.

Mrs. COLLINS. Thank all of you gentlemen for your testimony.

Before going on with this part of the hearing, I would like to take care of one administrative matter we have to address at some time today.

As I said before, and as I said yesterday the details of much of yesterday's testimony requires we go into executive session at some point today.

It is clear certain documents and testimony to be presented to the subcommittee at this hearing will fall under part 191 of title 14, Code of Federal Regulations, which prohibits disclosure of documents, devices and records designed to protect persons in air transportation against acts of criminal violence.

Accordingly, a majority of the subcommittee being present, I move that at the close of the public testimony today, which we hope will be just around 12 noon, the subcommittee recess and reconvene in closed session for all or part of the remainder of the hearing today, and that this include the closing of the hearing on 1 day subsequent for the same purpose if such should be necessary.

Is there discussion on the motion?

Mr. NIELSON. I second it.

Mrs. COLLINS. It has been moved and seconded.

Therefore, it is also required we have a roll call vote. We will begin with Mr. Kleczka.

Mr. KLECZKA. Aye.

Mrs. COLLINS. Mrs. Boxer.

Mr. BOYNTON. Aye.

Mrs. COLLINS. Mr. Nielson.

Mr. NIELSON. Aye.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Aye.

Mrs. COLLINS. I also vote aye.

Inasmuch as a quorum is present and all have voted in the affirmative, the motion carries.

We will now go on with our questioning of Mr. Jackson.

Mr. Jackson, it is my understanding you are a member of a group that is called the American Association of Airport Executives?

Mr. JACKSON. The Airport Operators Council International, yes.

Mrs. COLLINS. You have had an opportunity to observe other airports, and so forth?

Mr. JACKSON. This is true.

Mrs. COLLINS. Do you think the system you are using at BWI could be applicable to other airports?

Mr. JACKSON. Absolutely. Our system is a computer control access system we have had in place for some 15 years. The system has been upgraded one previous time, in 1982.

We are again upgrading the system at this time. The system was—our upgrade design was in place and in action, frankly, before the security control access rule was published last year.

Mrs. COLLINS. Can you describe it somewhat for us here now?

Mr. JACKSON. Yes, ma'am. We have a central computer located in the Maryland State police office within the terminal.

Each of our access points to the air operations side where the aircraft are located, are controlled through a card reader.

The new system will include both the card reader and a pin number device, so each individual when he is issued an identification badge with a magnetic strip attached will also be given a 5 digit pin number.

The combination of the pin number and the card number will open the access point where he or she is, in fact, authorized to open that portal.

We have somewhat over 200 of these portals to include those in our cargo area as well as outside vehicular gates. This system is applicable to other airports, but it should be done in combination with their overall security program.

Unfortunately, some of the airports have been pushed to very rapidly accelerate such a program and we will have a disjointed situation, I am afraid, in a number of airports.

Mrs. COLLINS. The Airport Operators Council International said last month the FAA "seems to be be placing inordinate faith in explosive detection systems and excluding other approaches."

Would you tell me what your feeling is about that statement?

Mr. JACKSON. We do feel that they are putting too much faith in the explosive detection device. We believe that it should be part of an overall program. The device itself has just come out of the laboratory.

It has not been proven, as was mentioned this morning, in an operational environment.

There are many, many problems with that particular machine. It has a small opening, so the large bags that many people carry when they are traveling beyond the borders of the United States will not fit through the opening. It is very slow.

Most people when traveling to foreign countries are going to stay more than overnight. They normally carry two bags or more.

Given these circumstances, with the slow rate of transit through the machine, given that there are false alarms and there are a great number of them, at best, only 10 bags will pass through the TNA machine in 1 minute.

Given that everybody has 2½ bags per person, that is an awful lot of time required to process the passengers on a 350- to 400-person passenger aircraft.

Additionally, we don't know what the requirement is going to be as far as this type of machine is concerned. Where should we locate it?

Should it be located in the terminal so the individual passenger is present when his bag is examined?

We airport operators feel that this would be a good approach. However, this machine weighs 10 tons.

Floor loading is excessive: It could not be placed in most terminals without a great deal of cost to reinforce the flooring.

Additionally, there is a responsibility of who takes care of the bag that alarms? Now it is very easy in a test program knowing that you have nothing in a bag when it alarms, you can go over and jerk open the bag and try to determine why it alarmed.

In a real, live operational situation, when that bag alarms, you don't know whether it has an explosive in it or not. Certainly if it does have an explosive in it, you don't know whether it is booby trapped or not.

If you open the bag, it may detonate. What are you going to do with the bag once it has been detected?

Who is going to furnish the explosive ordinance disposal persons? Who is going to furnish a place for that bag to be taken? How are you going to get it there?

What happens to the passenger who owns the bag?

These are some operational problems that have not yet been solved. These are some of the problems that we would suggest we solve before we go down the trail of having all airlines have all bags going overseas examined by a TNA machine.

Additionally, we don't know what the threat is. I can not recall any time an airplane has been bombed that departed from the United States. Why are we choosing only international flights?

There are a great number of flights that are domestic flights that leave New York or Chicago or Dallas or Chicago or any number of these places that are widebody airplanes that have 350 to 400 passengers. Why not decide that you are going to check all baggage on those large airplanes?

Why are we choosing only the airplanes that go from the United States internationally?

All of our dangers as far as explosives are concerned, to the best of my recollection, are incurred on aircraft that departed from a foreign airport or foreign departure point destined for the United States.

In some cases, they weren't even destined for the United States.

At any rate, we feel a great deal of study needs to be done before we go helter-skelter down a path of requiring everybody to have every bag looked at through a TNA machine.

Mrs. COLLINS. Thank you.

Mr. Arad, you have been a consultant for a number of Americans carriers in security matters. As you know, yesterday there was much discussion about what it would cost to set up the El Al system or something very similar to it for American air carriers.

Would you be at this time able to comment on that for us?

Mr. ARAD. Well, it is difficult to give you specific numbers.

Mrs. COLLINS. We don't want that. We want generalization.

Mr. ARAD. It is cheaper than installing the $1 million machines and more effective.

Mrs. COLLINS. Thank you.

Mr. ARAD. What we have done is instituted exactly the same system in European countries.

Mrs. COLLINS. Mr. Nielson.

Mr. NIELSON. Thank you, Madam Chairwoman.

Mr. Boynton, what is the purpose of the agents who deal with ticketing and related passenger services when so much significance is placed on the expertise of the security agencies?

What role do the ticket agents play in this?

Mr. BOYNTON. The primary function of the security agent, for example, is security. We feel it is also nice to have those people that are ticketing passengers and doing other things with passengers to be familiar with our security procedures.

It gives us double indemnity.

Mr. NIELSON. You mentioned a new risk analysis program having been in effect for 3 years now. What favorable results have you received, if any, at that point?

Mr. BOYNTON. I guess we can say there have been no bombs go off on our planes. It gives us assurance, our crews assurance, and our passengers assurance we have a safe airline.

Mr. NIELSON. Mr. Arad mentioned American has been able to be effective in foreign areas. You have been able to handle a good deal of your problems there, in complying with the laws of the airports from which you serve, in the foreign lands.

Why is it other airlines are not able to do this? Why are other airlines not able to do this? I am asking Mr. Boynton.

Mr. BOYNTON. I am sorry. I thought you said Mr. Arad.

Mr. NIELSON. I quoted him as saying American and others were doing well in foreign airports.

Why do you suppose you are doing well and other airlines are not?

Mr. BOYNTON. I can only speak for American Airlines.

Mr. NIELSON. That is who I am asking you to speak for.

Mr. BOYNTON. We started in 1986. We saw the threat. We decided to put that system in.

We are proud of it. We have also noted that other airlines have followed our lead.

Mr. NIELSON. Mr. Arad, do you want to comment further?

Mr. ARAD. Yes. I think it takes the president of a carrier to make a decision to invest money into proper security. That is what happened with American Airlines.

We were called up in 1986 after they analyzed who is the best consultants, they can implement something. Within 60 days if I am not mistaken, we were on the road to doing it.

Mr. NIELSON. How long would it take you to convert the other airlines to the same system?

Mr. ARAD. More or less the same. They are more or less the same size.

Mr. NIELSON. Why have they not joined you?

Mr. ARAD. Some of them have done it. Some of them felt they didn't want to spend the money or they are not good enough.

Mr. NIELSON. Mr. Miyoshi, how much time would it take for airlines to assume your systems approach?

Why hasn't it been implemented before now?

Mr. MIYOSHI. One thing about the systems approach is it is a very proactive approach. It does take time. There needs to be the front-end work on the threat analysis, that definition. A lot of times, determining a threat is one of the most difficult things to get a facility to do.

After that, you have to move through the analytical stage where you try to take a look at your facilities or targets.

Those all take time, typically of the order of a year. After that point, you want to put together some concepts, some demonstration prototype hardware, operational procedures.

The whole thing does take time. You do pay a price in time to do the job right.

Mr. NIELSON. Mr. Boynton, you say the TNA machines are way too expensive. We shouldn't put that cost on an airlines. If the Federal Government were to assume that cost—and there is that possibility—would you speak to that?

Mr. BOYNTON. There is more than cost, Mr. Congressman. There is space limitations.

For instance, TWA, which has the first machine in New York, has a building they had to put up to house it, 19 feet by 40 feet. They estimate they need 10 machines to do all their checked baggage up there.

If you put that many buildings out on the ramp, you won't have any place to park the planes. It is a facilitation problem in addition to the expense.

Mr. NIELSON. Thank you.

I yield back the balance of my time.

Mrs. COLLINS. Mr. Kleczka.

Mr. KLECZKA. Thank you, Madam Chairwoman.

Let's go back to your profile method, Mr. Arad.

Do you suggest using that in conjunction with something similar to what TWA uses?

Mr. ARAD. It could be. It is a good idea. But the machines should complement the human factor.

You can not ever in my opinion put the machine as the first priority. Human factor should be the first.

The sophistication of terrorism today will always be a step ahead of the new equipment.

Mr. KLECZKA. I think I was a recipient of the profile method on a trip to Israel some years back. Basically, one of the questions which still sticks in my mind is have you left sight of the luggage. That was one of the questions asked.

As I look at your testimony, you indicated here that a woman, an Irish woman did not even know she was carrying a bomb.

How would you detect or how would your method detect that? She came up very innocently.

There was no suspicion of her personally. How did you find out there might be some problem with the luggage?

Mr. ARAD. Unfortunately, I am not going to go into the details of the method of how we suspect passengers. Basically, the idea that we create in our training to our security personnel, we create a number of criteria where if a passenger does not meet those criteria, he is regarded as suspicious.

When we suspect somebody, we check him very, very seriously.

Mr. KLECZKA. I have to assume—another question that pops in my mind, did anyone give you a package to take along?

So it is possible through that questioning someone said yes, I met a stranger who asked me to take this package to whomever? That would be the key?

Mr. ARAD. Absolutely. That is what we call the profile method; trying to profile the passenger and decide what type of Federal security this passenger requires.

Mr. KLECZKA. This method is used by some American airlines which have contracted for you for international flights only?

Mr. ARAD. Right.

Mr. KLECZKA. No domestic use at this point?

Mr. ARAD. Only one carrier does from the domestic States to Europe. The other ones are doing from Europe to the States.

Mr. KLECZKA. I have to assume that people who work with the method are very highly trained personnel. As I look to the previous hearings, Madam Chair, what we have in this country doing security is just a lot of minimum wage employees, no benefits, high turnover.

It would seem that we are going to have to reverse that whole trend. If we are going to start using this for international and domestic flights, we need these people who are, again, highly trained.

Mr. ARAD. You cannot expect taking somebody from the street and ask them to question passengers and determine what type of security they will require or analyze their personalities. What we do is we have a certain standard of people. We recruit them. We give them 2 weeks of training, which is very intensive, long training, with a lot of psychology, a lot of——

Mr. KLECZKA. All in 2 weeks?

Mr. ARAD. All in 2 weeks. Well, you may laugh, but it helps and it works.

Mr. KLECZKA. What type of expenses are associated with training for these employees?

Mr. ARAD. One employee, $8, $9 an hour, 8 hours a day. In some American carriers that we have dealt with, we recommended the security people not only deal with security; after 2 years they can be rotated to ticket agents as done by American Airlines.

If you regard security personnel as the lowest level of people, that is what you are going to get. If you are going to treat security personnel as others, you get better quality.

Mr. KLECZKA. Let me—I have probably one question left.

Mr. Jackson, knowing what you do about the profile method and knowing BWI does have international flights, why hasn't the airport looked into that, or is that a carrier by carrier basis?

Mr. JACKSON. It is a carrier responsibility. The air carrier is responsible for the security of the aircraft itself as far as the passengers are concerned. They are the ones that operate the security screening points. They do the baggage match up. They own the airplanes. It is their responsibility.

We have proposed on a number of occasions that the FAA support a lead airport program, and we could institute a number of these things on a trial basis from an airport and airline perspective and give them an opportunity to be tested.

We are doing that to some extent through the Sandia Corp. at BWI. We feel there are a number of things the lead airport would accomplish with the TNA, with any other program that would come down. We could put it in an operational environment and test it and see if it does work.

If it doesn't work, we can discard it. If it does work, we can let the rest of the industry know about it and they can incorporate it as they see fit into their program.

Mr. KLECZKA. Thank you, Madam Chair.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Thank you, Madam Chairwoman.

Mr. Boynton, I would like to pursue with you, if I might, what would be the cost of deploying TNA machines in the way that presently you deploy X-ray machines and magnetometers.

In your testimony you remarked that presently your security system is focused on your four U.S. gateways to Europe and in all the European cities that you serve.

If you were to focus in addition on the rest of your system, how many additional gates would we be talking about?

Mr. BOYNTON. I can't give you an exact figure, Mr. Congressman. We, with our four cities in the United States, and we are opening up another one very shortly in Europe, you are talking about 19 cities. You are talking about a couple of million passengers a year. One of the problems, of course, is our flights in Frankfurt, for example, or Paris.

We have four flights leaving the same time so you don't have the opportunity of staggering. You buy one machine and it will take care of every flight. You have got four flights leaving at the same time so you will need at least four machines at 600 bags an hour; $750,000 a machine ~~if~~ bought in bulk, and then all the other added expense.

Mr. COX. I recognize that you might not have this figure right at the forefront of your mind right now, but how many gates in your whole system would you need to protect?

Mr. BOYNTON. Well, we have about 60 screening points in the United States, if you are talking about the United States. In Europe with the number—we have 119 flights a week. In Paris, another example, we need four gates at one time.

Frankfurt, we fly three flights a day. Dusseldorf and the other cities, we have one flight a day. Brussels, we have two. Zurich, we have two. You are talking about 40 gates.

Mr. COX. One-hundred fifty in the United States and 40 in Europe, so 190. If it were the case that you had an x-ray machine deployed along with the TNA machine—those are about $150,000 a copy—figure $1 million, for a total of $190 million to protect the system?

Mr. BOYNTON. Whatever big figure you want to arrive at, Mr. Congressman, that would be about it. It is big numbers.

Mr. COX. OK. Mr. Miyoshi, you mentioned that, and I think that Mr. Arad would agree, no matter how elegant our system, terrorists are going to attempt, and presumably be successful if they are gold, staying one step ahead of that technology.

Does it make sense to spend, let's say, $190 million on a single airline to deploy a single technology everywhere?

Mr. MIYOSHI. I don't believe so. I think, again, that question has to be taken in context. How does it fit in with the overall security plan? If it fits in with the overall security plan and the use of the

$190 million greatly improves the protection of your security system, then the answer might be, yes.

Mr. Cox. I think we can be very specific here and talk about real cases. It is not hypothetical. The numbers we are using are the figures for TNA machines.

Mr. MIYOSHI. The numbers are correct as far as the dollars that it takes to provide that machine, but how it fits into the overall security plan is not. That is the part that is missing. That is the part that Mr. Jackson has pointed out needs to be looked at, how well does it work.

What is the overall security plan and how does it fit in? If it does fit in, maybe that number is OK. My opinion is very likely it is not.

Mr. Cox. If instead of saturating the market for explosion detection devices with a single technology, we were more carefully to deploy on a limited basis a new technology, would that give other companies greater incentive to develop new technologies?

Mr. MIYOSHI. I am sure that is true.

Mr. Cox. Is it possible ultimately that we can have a number of different technologies in operation simultaneously throughout the civil aviation system?

Mr. MIYOSHI. I am sure that is true also.

Mr. Cox. Would it even be possible to follow an approach similar to the mobile MX system, as it were, and confuse terrorists about which devices were in operation at any given time?

Mr. MIYOSHI. That is part of deterrence. Deterrence is an operation. That is certainly possible. What you are talking about are many different ways of solving a problem. The way we like to look at it from a systems engineering perspective is to develop a whole series of a spectrum of options and pick the one that fits into your overall plan.

Mr. Cox. Thank you.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Thank you, Madam Chair.

Mr. Boynton, I just wanted to congratulate American Airlines for doing something that this committee felt was the right way to go yesterday because it really was pretty much across the board that experts seem to agree that the El Al type system is the most effective.

You have seen that yourself before Government said it, before the FAA said it. You went ahead in 1986, it seems, and did it. So I am very pleased with that. I wanted to ask you what percentage of your budget do you spend on security?

Do you have that number for us?

Mr. BOYNTON. International, $10.5 million.

Mrs. BOXER. $10.5 million. Do you know what percentage of your international budget that would be?

Mr. BOYNTON. Well, no. Our total revenues international run between about 7 and 8 percent. If things go well in the last quarter, I guess we will be at $9 billion revenue.

This year, of course with $9 billion revenue, we may have $8.5 billion worth of expenses.

Mrs. BOXER. Thank you for answering that. Yesterday we had a tough time getting Pan Am, remember, Madam Chair, to tell us what percentage they spent. Their security guy didn't seem to know.

You list on page 9 a number of things that you think the Government ought to do in the body of FAA. Some of these are very important. One of them is to provide the airline industry with proven state-of-the-art explosion detection equipment paid for by Government funding.

It is pretty clear here that you see the function of the Government to help protect the flying public by paying for this type of equipment. I want to say that I agree with you. I also wondered if you knew what the status of our airport trust fund was, how much is in that?

Mr. BOYNTON. No, ma'am, I don't. I heard $5, $6 billion.

Mrs. BOXER. That is correct. We have about $6 billion sitting in an airport trust fund masking this Government deficit. When Mr. Cox asked his question about what would it cost, the numbers are staggering when you look at it in that context.

When you look at it in terms of what is sitting in an airport trust fund that is supposed to be spent on this, I think it is close to criminal that we are not doing what we can right now.

Mr. Arad, yesterday the FAA said that the threat is different in Israel and that there is a much smaller volume of passengers in Israel than obviously we have with all our airlines. Therefore, they didn't seem to feel that adoption of the El Al system was the right thing to do for our airlines. I wonder if you could comment on that, the fact that they said the threat is different, which I don't quite understand, because I would think it is the same terrorist that is going to go after them as is going to go after us.

Second, the fact that we have a larger volume would make it impractical to mandate the El Al system.

Mr. ARAD. I think Mr. Salazar referred to the tension inside of Israel. I am not sure he was talking about the Asians. In that case I agree with him that the threat in California is not the same as the threat in Tele Aviv.

Mrs. BOXER. We were talking about international travel.

Mr. ARAD. International travel is no different. American enemies, Israeli enemies are all alike. Like someone tried to get on the El Al aircraft, a different person did on the 103, the same threat exactly. The volume does not make any difference.

We have been working with American Airlines, TWA, Northwest and several others exactly and the same methods. Well, not exactly the same. but we cater to a U.S. carrier, a greater volume. We have only seen less delays on flights.

Those are proven numbers. Less delays on flights, better appreciation of the passengers, et cetera. Everybody is really happy, including the FAA, by the way, in Europe.

We hear from the FAA very good points and remarks on what we are doing there for the U.S. carriers.

Mrs. BOXER. The argument that I hear really coming out, if there is one, seems to be between more high tech and more intelligence reliance versus the kind of hands-on approach that you propose and that American Airlines has.

In other words, in the future are we going to rely more on intelligence information and high technology?

If you bear with me, it might make some sense. The way our hospitals treat the AIDS issue today is they assume every single person in the hospital could have AIDS, and so there is no difference in the way they treat patients, whether it is an elderly 80-year-old woman or a single male of 25.

All the people in the hospital, for example, wear gloves, use masks, et cetera. Then in that way they are trying to achieve 100 percent deterrence. It seems to me that that is the way we ought to go about doing this in our airport security.

It is very difficult. It is a much broader territory to cover. But would you agree that deterrence is a better way to go than relying on intelligence reports because you may not get all the intelligence reports? Intelligence may not be 100 percent effective?

Mr. ARAD. I think it is a combination of all the above. It is intelligence, equipment, et cetera. We place the most importance on the human factor. These security personnel that are determining whether the passenger would get on the plane, will check him or not. This is basically the last element or the last circle of defense that you have regarding——

Mrs. BOXER. So, in other words, the basis, the basic defense is this blanketed type of deterrence and then, yes, use the increased technology and the increased intelligence?

Mr. ARAD. Absolutely.

Mrs. BOXER. Mr. Jackson, you have a statement at the very close of your testimony that alarmed me a little bit. You said our comments clearly demonstrate the impracticality of the FAA proposal for 100 percent baggage screening by explosive detection systems. In other words, you feel there can never be a system or there is not a system that can do a 100 percent check?

Mr. JACKSON. No. We feel the system they have now caused us to go to, the TNA as we now know it, is so slow, has so many drawbacks, that to expect 100 percent of our baggage inspection with that machine is out of the question.

The time you would have to check in at New York Kennedy for a TWA flight would be 5 or 6 hours ahead of flight time. I think that is unacceptable. There are a number of combinations that you could do instead.

You must consider both technology and the human factor.

Mrs. BOXER. You would agree the hands-on method such as El Al and American is now using in combination with technology is a better approach?

Mr. JACKSON. Absolutely.

Mrs. BOXER. Thank you, Madam Chairwoman.

Mrs. COLLINS. Mr. Boynton, when we were sitting here listening to this testimony, a question arose in my mind. That is whether or not you think the FAA's current warning bulletins are adequate?

Mr. BOYNTON. I think they are.

Mrs. COLLINS. Can you tell us the true utility of that information?

Mr. BOYNTON. It all goes together. You need the human factor, you need the technology, and you need the intelligence. You know, the opportunity for obtaining intelligence that is so specific that it will tell us that tomorrow morning, somebody is going to place a bomb on an American Airlines flight out of Frankfurt, it is just not likely to happen.

You know, you can go back on our recent history. Nobody told us somebody was going to drive a truck into the Marine barracks in Lebanon. That type of intelligence is rare. Intelligence does give us trends. It certainly tells us that there are people in parts of the world that certainly are thinking about and holding meetings about attacking airlines.

While that information is not specific, it certainly tells us to keep our vigilance up.

Mrs. COLLINS. Thank you.

Mr. Nielson.

Mr. NIELSON. I just want to make one comment.

Mr. Arad says the enemies of Israel and the United States are the same. I don't think that is true. Iran has always been friendly to Israel. Israel supported Iran in the war. Iran is one of our chief antogonists.

I think the main point is El Al is a small airline controlled entirely by the government. The government has much more say in operation. We have diverse private airlines.

Let me ask a question of Mr. Jackson. If an airport suffers adversely because of inadequate security provided by a carrier at that airport, what influence does the airport have on the carrier to force them to do a better job of security, if for no other reason than just to give the people a more safe feeling about flying through that airport?

Mr. JACKSON. That is a very difficult question, sir. Inasmuch as I have found personally, and I think the airport community has found generally, the airlines are every bit as interested in good security as the airports are. We work hand in hand on this. Each airport has a security committee that meets at least once a month.

We discuss the various problems that we are running into. Even though the air carriers are the ones that control the security screening points, any time an airport security person sees a weakness there, it is brought to the airline's attention. We have found that they have been corrected immediately.

We have not experienced that sort of problem. It is a team effort. We are pulling along with the FAA, we are pulling together to make it the best.

Mr. NIELSON. What do you do with an airline who won't conform to the wishes of the airport and the rest of the airlines? For example, you might have four or five airlines all using a security screening company contracted for by one of those airlines.

Supposing that airline is delinquent and is reflecting badly, not only on that airline, but on the others whom it serves, and also the airport. What do you do?

Mr. JACKSON. Instead of working with the local airline manager, we would go to the airline security operation at the corporate level and let them know that in our opinion, there is a problem that they should look into.

From our executive level to the corporate level, we would receive action.

Mr. NIELSON. Thank you.

Mr. ARAD. Mr. Nielson, can I comment?

Mr. NIELSON. Yes.

Mr. ARAD. Regarding the airline, the size of the airline does not make any difference. A jumbo is a jumbo, the same number of passengers. A gate in Paris is a gate for American Airlines or for El Al, the same type of gate.

Mrs. COLLINS. That is true.

Mr. ARAD. About the Iranians, they are also our enemy, unfortunately.

Mr. NIELSON. I didn't notice that during the recent Iran-Iraq conflict. Thank you, Madam Chairwoman.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. I wanted to ask Mr. Boynton a question about the training and the pay for the people. I am impressed with your point that you have a career path for these people. They are not just stuck at a dead-end job. I think that is very key. What is their entry-level salary, approximately?

Mr. BOYNTON. Their entry level salary, it varies obviously by country and the standards at the airport. But whatever we hire entry-level people for in London, Frankfurt, and Stockholm for doing any other job, ticketing, gate, freight, the security person comes in at that same level.

Mrs. BOXER. Is it higher than the minimum wage?

Mr. BOYNTON. Yes, absolutely. You know, I am trying to put it together in British pounds. I think we pay our manager something like 17,000, 18,000 pounds. I think the security agents are somewhere around 9,000, 10,000.

Really, it doesn't mean much unless you know, we have to get into the standard of living and so forth.

Mrs. BOXER. It is definitely higher than the minimum wage?

Mr. BOYNTON. Yes. We are talking about international now.

Mrs. BOXER. I understand.

Mr. BOYNTON. Yes, ma'am.

Mrs. BOXER. There is a difference. I notice that Mr. Arad has made a point that he thinks that we need to do more security at our own domestic terminals as well. Is that correct, Mr. Arad?

Mr. ARAD. Yes.

Mrs. BOXER. You made a statement on page 2 which says the question cannot be whether one such disaster can be an acceptable risk. The answer to that question must be no. The question to be asked instead is whether the current system and all the parties that participate in the current system, every airline, screening personnel as well as all governments are doing those things which can best, which will best identify those passengers or bags that might conceivably pose a threat.

I am afraid the answer to that question is no. You are laying before this committee your opinion that not everyone is doing all they can do. Without pointing a finger at any other airline, I am not suggesting that you do that, do you believe that, as many of us do here, that at the minute, given what we now know, all the airlines ought to at least do the El Al type system that you have been doing? Is that your opinion?

Mr. BOYNTON. Absolutely.

Mrs. BOXER. Do you believe the FAA should mandate that type of system?

Mr. BOYNTON. Why not? Yes, ma'am.

Mrs. BOXER. I am with you. Thank you.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Thank you, Madam Chairwoman.

Mr. Miyoshi, I wonder if you could talk just briefly about penalties and accountability. I think that that is at least half of what we are about here. Could you expand upon what you think would work?

Mr. MIYOSHI. I am not talking about penalties on the airlines or failure to do security. What I am talking about is making an accountability system and a penalty system, so the adversary does not have unlimited attempts to try to breach a security.

The terrorist only has to be lucky once. Mrs. Thatcher has to be lucky many, many times. The reason that occurs is because of the accountability. There is no traceability.

The adversary is anonymous. If you can possibly have an accountability of some sort, you are going to make it very unattractive for an adversary to try and come and get you, because now he has to be lucky the first time instead of many times.

That is the point I was trying to make there. For example, I am talking about when you talk about bomb threats, you are not only talking about passengers. You are talking about caterers, other people who get on the airline, have access to an airline. You need to make sure you know where those people are coming from.

You need to make sure you know what they are bringing with them, where that stuff is coming from.

Mr. COX. I would like to follow up on a comment made by my colleague from California. I agree with her that the airport trust fund ought not be languishing as an accounting offset to make the deficit appear smaller than it is. My purpose, in my colloquy with Mr. Boynton, in arriving at the $190 million figure is to focus on the fact that we would be talking about billions if we covered all the airlines in that fashion.

I think it is our job to make choices on how to spend this money. What I am hearing, I think from the panel collectively, is if we put all our eggs in the high-tech basket, we are going to get ourselves quickly in trouble.

Instead, we might want to focus on intelligence as well. We might want to focus on training of security employees as well. We might want to focus, as you have pointed out, Mr. Miyoshi, on a series of more simple solutions to confuse terrorists and to trip them up.

Because in the testimony that I received and the studying I have done on this issue in only a short while, I think I have already figured out how to elude a TNA machine.

Thank you very much.

Mrs. COLLINS. The time of the gentleman has expired.

We certainly thank you gentlemen for your testimony this morning and appreciate your—again, as I said earlier—appreciate your coming back today in order to do so.

We now are going to have a panel of Mr. Martin Annis, the president of the American Science and Engineering; Mr. Bozorgmanesh with the Science Application International Corp.; Mr. Anthony Jenkins, Ion Track Instruments; Mr. David Fine, vice president of Technology Thermedics, Inc., and Mr. David deMoulpied of EG&G Astrophysics Research Corp. Come forward, please.

Before we receive testimony from you gentlemen, we are going to see a video presentation, which we will do at this time. For the members, we have invited all the companies to show us on video some of the things they are talking about, so we will have a better idea. Two of the companies did. Thanks to minority counsel, we now have this video he has put together for us so we can avail ourselves of this wonderful opportunity.

[Videotape presentation.]

Mrs. COLLINS. We want to thank Ken Salaets for providing this information and doing a wonderful job of doing it.

Gentlemen, you may begin with your testimony at this time. Why don't we begin with Mr. deMoulpied.

Before we do, all stand, please, and raise your right hand.

[Witnesses sworn.]

STATEMENT OF DAVID deMOULPIED, MANAGER OF BUSINESS DEVELOPMENT, EG&G INSTRUMENTS GROUP, EG&G, INC.

Mr. DEMOULPIED. Thank you for the opportunity to appear before the subcommittee to provide information about the development and use of explosive detection equipment at airports.

EG&G Inc. is a technologically diversified Fortune 500 company of 25,000 employees with sales in 1988 of more than $1.4 billion, providing scientific and technical products and services worldwide. An important part of EG&G's business is involved in operations that support national security with research, field services, and technical products. Included in these operations are development programs for many new applications of technology, including the detection of explosives.

The EG&G astrophysics research division is the world's leading supplier of specialized x-ray instrumentation used primarily for nonintrusive searches of luggage, mail, and other cargo at airport security checkpoints. The company's newest instrument line, the E-scan model, can detect and help identify plastic handguns and explosives and other weapons using a proprietary technology involving dual energy x-ray scanning with color video output.

As the world's leading supplier of airport security equipment, EG&G fully intends to vigorously compete for any requirements for explosive detection equipment. We currently have an intensive program underway to develop an EDS system that is well suited to the practical operational requirements of a major airline. This program to date has been funded entirely by EG&G with no financial assistance from the FAA or any other Government agency. We are exploring several technological options, and the final product design from this program could very well include a combination of TNA plus other technologies. We have not reached the point yet where we have completed the design of this product.

We feel that the FAA has done a good job of developing a very difficult and complex technology such as TNA to the point where it can now be considered in the prototype stage and suitable for extensive field tests. But by no means should this TNA system be considered ready for general field deployment. It is a prototype system. It is much too large, heavy, slow, complex, and expensive to be considered a production unit. It needs field testing and then additional design work before it can be used in an operational airport environment. Even then, it is probable that this generation of explosive detection equipment will not be the ultimate answer to the terrorist threat that we all are hoping for.

The Federal program has been a technology development program which has consumed millions of taxpayers dollars. We think this kind of Government funded program is appropriate to demonstrate the feasibility of a new, unproven technology such as TNA. However, now that the program has reached the prototype stage, the FAA should provide details of the program to qualified vendors, such as EG&G, to allow those vendors to compete in the marketplace to provide a commercially viable explosives detection product. In July, EG&G, as a qualified vendor of aviation security products, formally requested in writing to FAA, to be provided a full disclosure of the TNA program. To date we have received no response to that request.

Our recommendations to the FAA are three:

First, it is imperative that the FAA continue its good work in sponsoring programs that explore the possible development of innovative technological tools to counter terrorism. The TNA program is a good example of this kind of sponsorship. There need to be others.

Second, the FAA should not require the airliners to deploy the TNA equipment in this present form in general operations. The SAIC TNA device is a prototype system which should be field tested at a few carefully selected sites for an extended period of time.

Finally, the FAA should transfer details of the TNA program to qualified commercial vendors, and allow those vendors to participate in the ongoing field tests of the TNA prototype systems. The objective would be to have these vendors compete in the marketplace to supply practical, effective explosives detection equipment.

Thank you.

Mrs. COLLINS. Thank you.

[The prepared statement of Mr. deMoulpied follows:]

STATEMENT FOR THE RECORD

SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION

COMMITTEE ON GOVERNMENT OPERATIONS

UNITED STATES HOUSE OF REPRESENTATIVES

HEARING ON AVIATION SECURITY

DAVID S. deMOULPIED

MANAGER BUSINESS DEVELOPMENT

EG&G INSTRUMENTS GROUP

EG&G INCORPORATED

Madame Chairman:

I am David S. deMoulpied, Manager Business Development, EG&G Instruments Group.

Thank you for the opportunity to appear before this subcommittee to provide information about the development and use of explosive detection equipment at airports.

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We feel that the FAA has done a good job of developing a very difficult and complex technology such as TNA to the point where it can now be considered in the prototype stage and suitable for extensive field tests. But by no means should this TNA system be considered ready for general field deployment. It is a prototype ~~and nothing more~~. It is much too large, heavy, slow, complex and expensive to be considered a production unit. It needs field testing and then additional design work before it can be used in an operational airport environment. Even then, it is probable that this generation of explosive detection equipment will not be the "ultimate" answer to the terrorist threat that we all are hoping for.

The Federal program has been a technology development program which has consumed millions of taxpayers' dollars. We think this kind of government funded program is appropriate to demonstrate the feasibility of a new, unproven technology such as TNA. However, now that the program has reached the prototype stage, the FAA should provide details of the program to qualified vendors, such as EG&G, to allow those vendors to compete in the marketplace to provide a commercially viable explosives detection product. In July, EG&G, as a qualified vendor of aviation security products, formally requested, in writing to the FAA, to be provided a full disclosure of the TNA program. To date we have received no response.

Our recommendations to the FAA are three:

First, it is imperative that the FAA continue its good work in sponsoring programs that explore the possible development of innovative technological tools to counter terrorism. The TNA program is a good example of this kind of sponsorship - there need to be others.

Second, the FAA should not require the airlines to deploy the TNA equipment in its present form in general operations. The SAIC TNA device is a prototype system which should be field tested at a few, carefully selected sites for an extended period of time, perhaps as long as a year.

Finally, the FAA should transfer details of the TNA program to qualified commercial vendors, and allow those vendors to participate in the ongoing field tests of the TNA prototype systems. The objective would be to have these vendors compete in the marketplace to supply practical, effective explosives detection equipment.

Thank you.

BIOGRAPHY

David S. deMoulpied Home: Chelmsford, MA
Born: Portsmouth, N.H.; Reared: Durham, N.H.
Married, three children

Current position:

Manager of Business Development, EG&G Instruments Group, responsible for long range strategic planning, new market assessment, and acquisitions for diversified group of technical instrument companies. Recently has spent majority of time working directly with EG&G's newly acquired Astrophysics Research, helping develop a strategic plan for Astrophysics, and working with the EG&G task force developing a strategy for advanced security products, including explosive detection systems.

Work History:

Most recently, 6 years at EG&G working on strategic issues affecting diversified group of highly technical companies involved in the manufacture of instruments used in the fields of nuclear, optical, and chemical research; X-ray materials analysis; and X-ray security.

6 years with Technical Marketing Associates, a consulting firm specializing in strategic planning and market research for technical industrial products businesses.

2 years with ISI, Inc., a start-up company involved in the manufacture and distribution of photo security systems and access control systems.

2 years as Assistant City Manager for Economic Development, Lowell, MA.

Military:

Served 4 1/2 years, U.S. Army Communications Test Officer, Arctic Test Center; Headquarters Company Commander, 3d Brigade, 82d Airborne Division, Vietnam; Captain, Artillery.

Education:

Graduated from -

Harvard Business School, Boston, MA, MBA, 1974
U.S. Military Academy, West Point, N.Y., B.S., General Engineering, 1965
Phillips Exeter academy, Exeter, N.H., 1960

Mrs. COLLINS. Dr. Fine.

STATEMENT OF DAVID FINE, Ph.D., VICE PRESIDENT, THERMEDICS, INC.

Dr. FINE. My name is David Fine, and I am a vice president of Thermedics, Inc., with responsibility for the technical team working on the development of new explosive detection detectors for explosives and narcotics. On behalf of Thermedics, I appreciate your invitation to submit this testimony.

In the early 1980's Thermedics developed the world's first instrument for use in identifying, after the event, the type of explosive which had been used in a terrorist bombing. Five years ago, both the Department of State and the Federal Aviation Administration recognized the urgent need to develop an explosives vapor detector which could find all explosives, including plastic.

It has not been an easy task, since in order to achieve this goal, an increase in sensitivity of over one thousandfold would be needed. The advance planning and foresight on the part of the Department of State and FAA has paid off. The new equipment has the sensitivity to detect the plastic explosives, which had previously proven so difficult to detect.

The first of the new explosive vapor detectors, called EGIS, is a portable system which was developed for the State Department for the detection of explosives in vehicles and packages. The first production units, which sell for $125,000, have already been shipped. By December 1989, these units will be leaving the production floor at the rate of 10 per month.

In addition to the United States, units will be delivered this year to France, West Germany, United Kingdom, Holland, Spain, Israel, and Japan. EGIS is the only vapor detector which has been shown to be capable of detecting both of the two plastic explosives, including PETN and RDX.

The FAA effort at Thermedics has focused on the detection of explosives on airline passengers. This project, called SecurScan, although still in the development stage, detects explosives on passengers as they step inside a small booth. It has proven successful with the first prototype hardware having been evaluated in a limited field trial at Logan Airport in October 1988. Development of SecurScan is proceeding to increase the performance even further so as to be able to increase the useful range of operational scenarios.

There are two key messages that I want to deliver today. First, the placing of so much emphasis on checked luggage may only be setting the stage for the next disaster. In the aftermath of the Lockerbie tragedy, government efforts in the United States and abroad have focused on screening checked luggage, since this was how the bomb was placed on board Pan Am Flight 103.

However, it must be remembered that in four of the last five targets since 1986, the bombs were directed at the cabin area. This illustrates that in addition to checked luggages, there is an urgent need to screen carry-on luggage, and airline passengers, for concealed explosives.

The target of the terrorists is most often the aircraft, not checked luggage. Millions of dollars in increased airport security will buy little additional protection against another bombing if the new equipment addresses only checked luggage. The terrorists have already demonstrated that they have the ability and know-how for placing plastic explosives in the cabin of passenger aircraft. To prevent the terrorists from simply stepping around and bypassing the new security equipment, a systems approach is needed which includes screening not only checked luggage, but also carry-on luggage, and airline passengers.

Carry-on luggage may be amenable to a screening technique which combines x ray with EGIS, an approach which I will describe for checked luggage. The ability to screen airline passengers will be available as soon as FAA's walk-in passenger portal, is completed.

The second point which I want to make today is that it is wishful thinking to believe that a particular detection technique can detect all explosives under all conditions. Each technology, including thermal neutron analysis, x ray, and advanced vapor detectors, such as EGIS, when used by well trained security guards, should be part of a systems approach which can contribute to the overall safety net.

Each technology has unique strengths. X ray is undoubtedly the ideal technology for finding hand grenades and electronics, but does poorly at finding plastic explosives hidden inside a working radio.

TNA, as has been reported in the press recently, is excellent at finding the larger plastic bombs, but has difficulty with the smaller ones. Many of these holes in the security net can be filled with an advanced vapor detector which has the capability of detecting even trace amounts of plastic explosives.

It is my professional opinion that if each technology is not pushed to its limit, then the combination of the three could be more cost effective than a single TNA unit. Each technology should contribute only what it does best, instead of being pushed into areas that can be done far more easily and cheaply by another technology.

Mrs. COLLINS. The time of the gentleman has expired.

[The prepared statement of Dr. Fine follows:]

Statement Of
DAVID H. FINE
VICE PRESIDENT OF THERMEDICS, INC.
Before The
SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION
Of The
HOUSE GOVERNMENT OPERATIONS
September 26, 1989

My name is David H. Fine and I am a Vice President of Thermedics Inc. I have a PhD degree in explosion chemistry from the University of Leeds in England. I am the leader of the 60-man technical team at Thermedics working on the development of new vapor detectors for explosive and narcotics.

On behalf of Thermedics, I appreciate your invitation to submit testimony to the Subcommittee on Government Activities and Transportation.

In the early 1980's, Thermedics developed the world's first instrument for use in identifying, after the event, the type of explosive which had been used in a terrorist bombing. This forensic equipment is now in routine use with the Federal Bureau of Investigation, the Bureau of Alcohol, Tobacco and Firearms, the Canadian Mounted Police, and their British, French, Italian and German counterparts for the analysis of post blast explosion debris. Five years ago, both the Department of State and the Federal Aviation Administration recognized the urgent need to develop an explosives vapor detector which could find all explosives, including plastic. It was not an easy task, since in order to achieve this goal, an increase in sensitivity of over one thousand fold (1000) would be needed. Work was initiated in 1984, and Thermedics has since received approximately $5 million from the FAA and $7 million from the Department of State for the development of the new generation of advanced explosive vapor detectors. The advance planning and foresight on the part of Department of State and FAA has paid off. The new equipment has the sensitivity to detect the plastic explosives, which had previously proven so difficult to detect.

The first of the new explosive vapor detectors, called EGIS^R, is a portable system which was developed for the Department of State for the detection of explosives in vehicles and packages. Two units were on display recently in Europe at the Paris Air Show. The first production units, which sell for $125,000, have already been shipped. By December of 1989, these units will be leaving the production floor at the rate of 10 per month, with the production capacity increasing rapidly. In addition to the U.S., units will be delivered this year to France, West Germany, United Kingdom, Holland, Spain, Israel and Japan. EGIS is the only vapor detector which has been shown to be capable of detecting both of the two plastic explosives, including PETN and RDX.

The FAA effort at Thermedics has focused on the detection of explosives on airline passengers. This project, called Securscan, although still in the development stage, detects explosives on passengers as they step inside a small booth. It has proven successful with the first prototype hardware being evaluated in a limited field trial at Logan Airport in October 1988. Development of Securscan is proceeding to increase the performance even further so as to be able to increase the useful range of operational scenarios. In addition, further engineering is needed to increase the throughput from 2 to 10 passengers per minute.

There are two key messages that I want to deliver today. First, the placing of so much emphasis on checked luggage may only be setting the stage for the next disaster. In the aftermath of the Lockerbie tragedy, government efforts in the U.S. and abroad have focused on screening checked luggage, since this was how the bomb was placed on board Pan Am 103. However, it must be remembered that in six (6) of the last fifteen (15) actual or attempted airline bombings since 1982, the bomb was smuggled into the cabin area of the plane. As shown on the enclosed chart from the Washington Post of April 12, 1989, in four (4) of the last five (5) targets since 1986, the bombs were directed at the cabin area. This illustrates that in addition to checked luggage, there is an urgent need to screen carry-on luggage, and airline passengers, for concealed explosives.

The target of the terrorists is the aircraft, not checked luggage. Millions of dollars in increased airport security will buy little additional protection against a another bombing if the new equipment addresses only checked luggage. The terrorists have already demonstrated that they have the ability and know how for placing plastic explosives in the cabin of passenger aircraft. To prevent the terrorists from simply stepping around and bypassing the new security equipment, a systems approach is needed which includes not only checked luggage, but also carry-on luggage and airline passengers. Carry-on luggage may be amenable to a screening technique which combines X-ray with EGIS, an approach which I will describe for checked luggage. The ability to screen airline passengers will be available as soon as FAA's walk in passenger portal, called Securscan, is completed. The emphasis must go beyond finding bombs in checked luggage, to how best to prevent a bomb from getting onto an aircraft.

The second point which I want to make today is that it is wishful thinking to believe that a particular detection technique can detect all explosives under all conditions. Each technology, including thermal neutron analysis (TNA), X-ray and advanced vapor detectors, such as EGIS, when used by well trained security guards, can contribute to the overall safety net. Each technology has unique strengths. X-ray is undoubtedly the ideal technology for finding hand grenades and electronics, but does poorly at finding plastic explosives hidden inside a working radio. TNA, as has been reported in the press recently, is excellent at finding the larger plastic bombs, but has difficulty with the smaller ones. Many of these holes in the security net can be filled with an advanced vapor detector which has the capability of detecting even trace amounts of plastic explosives.

To date, TNA, X-ray and advanced vapor detectors have all been pushed to their technological limits with the goal of single handedly solving the entire bomb detection problem. While there has been talk of how each technology complements the other, three separate machines adds approximately $200,000 to the already high TNA price tag.

It is my professional opinion that if each technology is not pushed to its limit, that the combination of the three would be more cost effective than a single TNA is at present. Each technology should contribute only what it does best, instead of being pushed into areas that can be done far more easily (and cheaply) by another technology. If TNA, X-ray and advanced vapor detectors were combined into a single integrated system, the benefits would be:

- o Far better overall bomb detection capability.
- o Lowest possible false alarm rate.
- o A lower cost system with all three technologies than for TNA alone.
- o Improved operational capability.
- o A really effective bomb detection capability which would be extremely difficult to circumvent.

Some of these ideas are already being put into practice by the FAA, as shown by the use of X-ray to help reduce the false alarms from TNA. Another area of immediate overlap which we have asked the FAA to consider is to combine X-ray with our EGIS advanced vapor detector. In this new approach, the X-ray equipment would be used to locate electronic gear such as lap top computers radios and tape recorders in both checked and carry-on baggage. The passenger would be asked to open the suitcase and/or bag and have the electronic device scanned by the EGIS vapor detector. This approach takes maximum advantage of the unique strengths of the two technologies. X-ray is ideal for locating electronic items inside a closed suitcase; EGIS is very effective in finding plastic explosives inside electronic gear.

Lastly, it is very important that extensive independent testing and evaluation under operational conditions be carried out by the FAA and other security agencies. The testing should not only verify the viability and effectiveness of new approaches, but, if successful, should lead to approval and certification by FAA. This uniform benchmark testing could be conducted on an ongoing basis by an independent testing laboratory so that advanced technology could be regularly evaluated under "real world" conditions to determine its strengths and weaknesses for explosive detection. In this way, we will best understand how an effective and comprehensive detection system can be implemented in domestic and overseas airports.

That concludes my prepared remarks. I would now be willing to answer any questions which members of the subcommittee may have for me.

TARGETS OF AIRCRAFT BOMBERS

DATE	LOCALE	FLIGHT PLAN	BOMB LOCATION	RESULT
8/11/82	Pan Am Boeing 747	Tokyo to Honolulu	Under seat in cabin	1 killed, 15 injured
8/25/82	Pan Am Boeing 747	Europe to Miami to Rio de Janeiro	Suitcase bomb found during cabin cleaning	Did not explode
9/23/83	Gulf Air Boeing 737	Karachi, Pakistan to Abu Dhabi, UAE	Baggage compartment, Abu Nidal suspected	Crashed, 112 killed
12/29/83	Istanbul Airport		Bomb with timing device in bag ticketed on Alitalia flight to Rome, transferring to Pan Am flight to New York	Did not explode
12/83 and 1/84	Athens		Bomb believed to be work of 15 May group found in suitcase of dupe, carried from Athens to Tel Aviv to London to Athens	Did not explode
1/18/84	Air France Boeing 747	Karachi to Dhahran, Saudi Arabia	Cargo hold; Abu Nidal suspected	Landed with major damage; no injuries
6/25/84	West Berlin		Two suitcase bombs seized by police, Abu Ibrahim suspected	Did not explode
2/29/85	Frankfurt Airport		Suitcase with bomb components, including detonator used by Abu Nidal followers, detected by security dog	Did not explode
3/9/85	Royal Jordanian L1011	Karachi to Dubai, UAE	Cargo hold, Abu Nidal suspected	Exploded on ground; no injuries
6/23/85	Air India Boeing 747	Montreal to London	Cargo hold	Crashed in Atlantic; 329 killed
6/23/85	Narita Airport, Tokyo		Bags moved from Canadian Pacific flight to Air India flight, same man bought tickets for both Air India flights	Exploded on ground; no injuries
4/2/86	TWA Boeing 727	Rome to Athens	Cabin area	Landed in Athens; 4 killed, 9 injured
4/17/86	Heathrow Airport, London		El Al security found suitcase bomb carried by passenger, who was duped by Arab boyfriend and about to board flight to Tel Aviv	Did not explode
10/26/86	Thai Airways A300	Bangkok to Manila	Lavatory	Landed in Osaka, 62 injured
11/29/87	Korean Airlines Boeing 707	Baghdad to Seoul	Cabin	Crashed in Andaman Sea near Burma, 115 killed
12/21/88	Pan Am Boeing 747	London to New York	Forward cargo hold	Crashed in Lockerbie, Scotland, 270 killed

SOURCE: Federal Aviation Administration, other security sources

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Mrs. COLLINS. Dr. Annis.

STATEMENT OF MARTIN ANNIS, PRESIDENT, AMERICAN SCIENCE AND ENGINEERING, INC.

Dr. ANNIS. Thank you very much.

I am Dr. Martin Annis, president of American Science and Engineering. It is a high science company, with a 35 year history of involvement with technical breakthroughs. We discovered the first x-ray star, and the first black hole in space. Our company is installing the AS&E x-ray imaging system for the inspection of Soviet missiles to insure compliance with the INF treaty. We have acted as a subcontractor to Bechtel National Corp. in this effort.

Our x-ray inspection systems are in use throughout the world, including Israel, and are used by many U.S. Government agencies. The FAA recently invested tens of millions of dollars in the research and development of equipment such as TNA. My company, on its own, invested millions of dollars in the development of similar equipment.

TNA can detect relatively large amount of nitrogen based explosives. It is essential, however, that all possibilities for development of alternate techniques be open and actively encouraged.

AS&E developed a completely new technique for x-ray imaging called back scatter imaging. Just as TNA uses the fortunate happenstance that nitrogen has a unique gamma ray, our system uses the compton effect which detects materials such as plastic explosives.

It is important to know that TNA does not detect explosives, just nitrogen, which is present in many common materials. It is also true that our system does not detect explosives but detects all low atomic number materials. Hence, the false alarm rate in both systems.

Standard x-ray imaging makes an image out of the x rays that successfully penetrate the bag. Scatter imaging produces an image out of the x rays that bounce off the bag or its content. The scatter image differs from the transmission image in two important ways:

First, the visibility of explosives in the scatter image is dramatically increased.

And second, the image confusion is dramatically decreased.

My first chart shows a radio which could have been the Pan Am Flight 103 bomb. The image on the left is the conventional x-ray image which shows no evidence of a bomb. The back scatter image on the right clearly shows the 12 ounces of actual SEMTEX explosive. This is the only current technology that can detect such a bomb in a confused environment and can fulfill the recently promulgated amendment to the FAA security code change rule 18.

AS&E met the FAA challenge and developed a system called automatic threat detection, which, in my opinion, will meet the FAA requirement for automatic detection of explosives. We were able to develop a technique for computer processing of the x-ray data, which has shown promising results. I won't go through this chart there, but that chart shows a shaded region which contains 98 percent of all normal bags. The dark lines in the chart show the scatter measured with either a 2.3 pound bomb or a 0.7 point simulated bomb, which was added to one of the bags.

Several FAA officials formally expressed their excitement about our ATD system. With the FAA's financial and technical support, we can expedite the final stages of development and testing of this ADT function. We have been led to believe, and do hope such support is forthcoming.

In conclusion, the operation of the equipment is illustrated in my next chart showing the conventional transmission image on the left and a back scatter image of a simulated 1.9 pound bomb hidden behind a radio. Because of image confusion it is nearly impossible to detect in the transmission image. The bomb is clearly seen in the scatter image, and the ATD is triggered automatically, flashing as is shown.

In our previous research the system was able to achieve automatic detection of 2.3 pound bombs 100 percent of the time, five out of five, with a 2 percent false alarm rate. It was able to detect 80 percent, four out of five of the 0.7 pound bombs with a similar false alarm rate.

This exceeds substantially the published performance figures for TNA.

Mrs. COLLINS. Thank you.

[The prepared statement of Dr. Annis follows:]

Congress of the United States
House of Representatives
Committee on Government Operations

September 26, 1989

Statement by Dr. Martin Annis, President
of American Science and Engineering, Inc., to the
Government Activities and Transportation Subcommittee

I am Dr. Martin Annis, President of American Science & Engineering, Inc. of Cambridge, MA. AS&E is a high science company with a thirty-five year history of involvement with technical breakthroughs. We discovered the first X-ray star, the first black hole in space, and have participated in many NASA projects. We supply U.S. Customs, the U.S. Secret Service, and many foreign governments with our advanced X-ray equipment. Our scientists hold 59 patents, and I hold 14 myself. Our company is now installing the AS&E X-ray imaging system for the inspection of Soviet Missiles to ensure compliance with the recently signed INF treaty. We have acted as a subcontractor to Bechtel National Corporation in this effort.

I appreciate this opportunity to share with the Subcommittee my thoughts on what action is necessary to counter the latest terrorists' threat, the use of plastic explosives in and around airplanes. While explosive detection equipment alone will probably never be sufficient to counter terrorists, it is certainly necessary for the safety and convenience of the flying public. As the FAA has recently invested tens of millions of dollars in the research and development of equipment such as TNA, and as my company, on its own, has invested millions of dollars in the development of similar equipment, it is hardly suprising that we agree that equipment must be part of the solution. What that equipment must be able to do, however, remains part of the question.

TNA is reportedly able to detect relatively large amounts of nitrogen based explosives. While this is an interesting scientific development, the public comments to the rulemaking clearly indicate that there are limitations and problems with this technique. It is essential therefore that all possibilities for development of alternative techniques be open and actively encouraged. Notwithstanding the considerable pressure to "do something" immediately, the U.S. should resist an exclusive embrace with TNA.

AS&E has developed a completely new technique for X-ray imaging called backscatter imaging. Recently developed technology has allowed the implementation of a fully automatic Explosives Detection System (EDS).

Standard X-ray imaging makes an image out of the X-rays that successfully penetrate a bag. Scatter imaging, instead, produces an image from the X-rays that scatter (bounce) off of the bag or its contents. Since the basic physical principles involved in creating a conventional X-ray transmission image and a scatter image are very different, it is not surprising that the information in the two images is different. The scatter image differs from the transmission image in two important ways. First, the visibility of the explosives in the scatter image is dramatically increased and second, the image confusion is dramatically decreased.

The images in figure 1 show how the contrast is increased for explosives. The transmission image in figure 1A contains a simulated bomb molded into the side of a suitcase. It is nearly impossible to see the bomb in the conventional X-ray image (which is all that competitive systems generate, including the X-ray system currently used in conjunction with TNA). An operator of an X-ray machine and who had viewed hundreds of similar images that day, almost surely would not see the bomb. Figure 1B shows two scatter images of the same bag taken from either side of the bag. All three of these images are presented to the operator. 274

Figure 1A

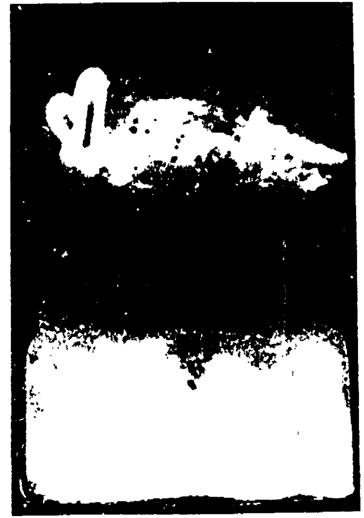

Figure 1B

In the lower image of figure 2B another bomb shows brilliant white. Scatter imaging makes plastic explosives very bright in the image and it also reduces the confusion in the image. Even though it is hard to miss, the FAA has challenged us to make this system fully automatic.

Figure 2A shows a conventional X-ray image of a radio. A real bomb is hidden in the radio. It is nearly impossible to see because there are confusing edges and gray levels in the region of the bomb. There is too much confusion to see the bomb. In figure 2B the scatter image of the same radio clearly shows the explosive which is truly 12 ounces of Semtex. This radio and the amount and type of explosive are believed to be very similar to the bomb which brought down Pan Am 103. A trained operator using our pre-automatic equipment would have detected this bomb.

Scatter imaging can detect the types and amount of explosives that are known to be a problem. We suggest that the recently issued FAA rule be modified to include systems which can clearly image a very small bomb in a confusing environment even though the system may not alarm for the presence of the bomb automatically. Paradoxically, the rule currently allows a system which automatically detects large bombs but does not reliably detect smaller bombs that can destroy an aircraft.

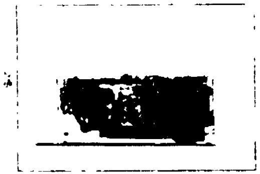

Figure 2A
Transmission X-ray image. Radio with 12 ounces of Semtex explosive.

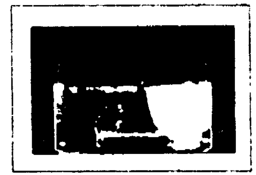

Figure 2B
AS&E Z X-ray backscatter image. Radio with 12 ounces of Semtex explosive.

Nonetheless AS&E has met the FAA challenge and has now developed a system called "Automatic Threat Detection" which in my opinion will meet the FAA requirement for automatic detection of explosives. The system is based on measuring the bulk X-ray scatter characteristics of checked baggage. The basic hypothesis is that normal checked baggage as a group has rather similar scatter characteristics. We obtained bags from a lost baggage agency to test this hypothesis. We were able to develop a technique for computer processing of the X-ray data which has shown very promising preliminary results.

A data base was developed utilizing data from a random sample of bags. The graph in figure 3 shows a summary of these data. The shaded area on this graph represents the region occupied by the scatter characteristics corresponding to 98% of the normal bags. The dark lines in figure 3 show the scatter measured when either a 2.3 pound or a 0.7 pound simulated bomb was added to one of the bags. Note that the scatter measure in these cases falls outside the shaded area. Each of these bags would automatically trigger an alarm for the presence of explosives. The system furnishes an audio alert and flashes the region of the bomb. Several FAA officials have informally expressed their excitement about our ATD System. With the FAA's financial and technical support we can expedite the final stages of development and testing of this ATD function. We have been led to believe and do hope such support is forthcoming.

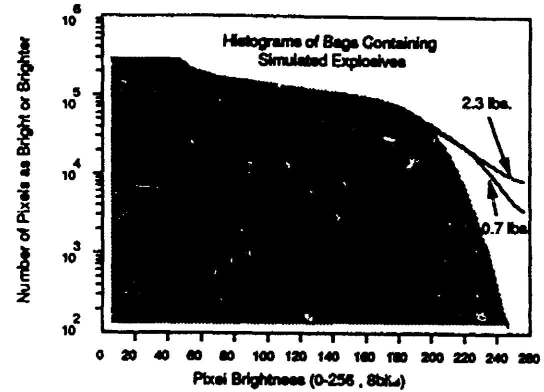
Histograms of Bags Containing
Simulated Explosives
2.3 lbs.
0.7 lbs.
Number of Pixels as Bright or Brighter
Pixel Brightness (0-256 , 8bit)

Figure 3

Operation of the equipment is illustrated in figures 4 & 5. Figures 4A and 4B show the conventional transmission and our proprietary backscatter images of a simulated explosive molded into one side of a suitcase. The bottom image in figure 4B clearly shows the bomb. The Automatic Threat Detection circuit is triggered and the region of the image which is above the scatter threshold flashes as shown in figure 4C (next page).

Figure 4A
Transmission X-ray image.
Carry-on bag with simulated sheet bomb (1/4 inch lucite).

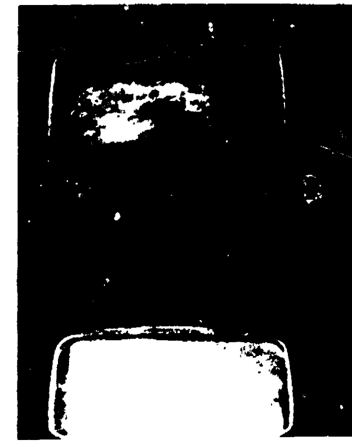

Figure 4B
AS&E ZZ X-ray backscatter images.
Carry-on bag with simulated sheet bomb (1/4 inch lucite). ATD is flashing.

Figure 4C
AS&E ZZ X-ray backscatter images.
Carry-on bag with simulated sheet
bomb (1/4 inch lucite). ATD is flashing.

Figures 5A and 5B show the transmission image and a backscatter image of a simulated 1.9 pound bomb hidden behind a radio and therefore nearly impossible to detect in the transmission image. The bomb is clearly seen in the scatter image and the ATD is triggered automatically flashing as shown in figure 5C (next page).

In our preliminary research, the system was able to achieve automatic detection of 2.3 pound bombs 100% of the time (5 of 5) with a 2% false alarm rate. It was able to detect 80% (4 of 5) of the 0.7 pound bombs with a similar false alarm rate. This exceeds substantially the published performance figures for TNA.

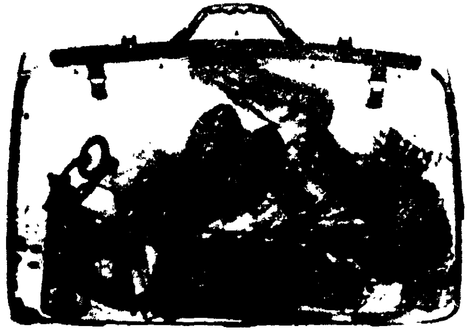

Figure 5A
Transmission X-ray image.
Check-in bag containing a 1.9 lb. simulated plastic explosive.

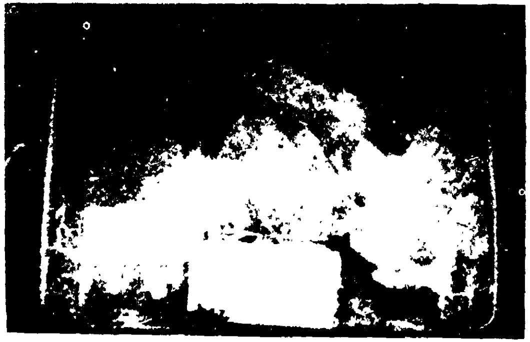

Figure 5B
AS&E ZZ X-ray backscatter images.
The simulated plastic explosive is at the bottom center.
ATD is flashing.

Figure 5C
AS&E ZZ X-ray backscatter images.
The simulated plastic explosive is at the bottom center.
ATD is flashing.

Sheet explosives have proven to be the most difficult to detect for the TNA technologies. Figure 6 shows the action of the ATD circuit on a simulant of a 3/16" thick sheet explosive which was previously shown in figure 1. It is easily detected automatically.

In summary, new X-ray techniques are available which can make plastic explosives obvious in an image and can allow automatic detection of these explosives with a very high detection rate. We will continue to work with the FAA to implement these technologies in an effort to prevent another tragic incident like the bombing of Pan Am #103.

Figure 6A
Transmission X-ray image.
Check-in bag with simulated sheet bomb.

Figure 6B
AS&E ZZ X-ray backscatter images.
Check-in bag with simulated sheet bomb.
ATD is flashing.

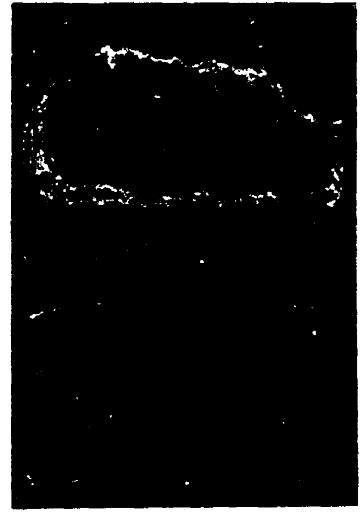

Figure 6C
AS&E ZZ X-ray backscatter images.
Check-in bag with simulated sheet bomb.
ATD is flashing.

Mrs. COLLINS. Mr. Jenkins.

STATEMENT OF ANTHONY JENKINS, PRESIDENT, ION TRACK INSTRUMENTS, INC.

Mr. JENKINS. Madam Chairwoman, thank you for the invitation to speak before you on this very important topic. I am Tony Jenkins. I am a physicist. I have been involved in explosive detection for 20 years. Presently I am president of Ion Track Instruments, the world's leading supplier of explosive detectors. You asked me to describe some of those explosives and how they are being deployed.

Explosives are in three categories: High explosives, deflagrating explosives, and incendiaries. Incendiaries are often dispursed by a small charge. Deflagrating explosives are fast burning explosives and will not explode until you contain them, such as in a pipe bomb. There have been some incidents with incendiaries and deflagrating explosives, but to my knowledge, there have been no crashes resulting from these explosives.

Of greatest concern are the high explosives. High explosives are shock wave detonated. All of these are nitro-based explosives. That is, they have got nitrogen and oxygen in the molecules. Included in this category are dynamite, TNT, and plastic explosives. SEMTEX is a plastic explosive comprised of RDX and PETN, the most popular terrorist explosives today.

Different explosives have different speeds of propagation of the shock waves. The higher the speed the thinner the explosive can be configured. The plastic explosives can be configured into thin sheets as small as one-tenth of an inch, which is invisible to the x rays.

My personal involvement began in the late sixties when the British Government asked me to investigate the detection of vapors from cushions which were floating in the eastern Mediterranean from a crashed jet liner. We found traces of dynamite on those cushions and the bomber in fact died in the crash. Since then, over 70 bomb incidents have occurred. These are well documented by the FAA and especially by Mr. Vincent's testimony yesterday.

This is an average of four bombings per year. More than half of these have been carried-on bombs.

Fifteen or so have been in the cargo or external to the aircraft. Twelve of these have been in checked bags. Five of these have caused fatal crashes.

Only one of these, that is the Pan Am 103, involved a U.S. carrier and could have been detected by the explosive detection system now mandated by the new FAA rule.

I would press the committee to look and press the FAA to look at the total security systems rather than on single aspect—pinning their hopes on one piece of equipment.

Certainly procedures and equipment are available to put into a total security system. Anything less would be like adding the golden padlock on to the front door and leaving the windows open.

Bomb detection is a complicated procedure. You must take account of people, handbags, cargo, supplies, and equipment. I am just going to deal with the equipment available for detection.

All of the avenues for placing bombs have been used, but the FAA mandated measures only require explosive detectors on checked bags and x rays for antihijack purpose on handbags. Handbags, passengers, and supplies remain unchecked for explosives.

We would ask that explosive vapor detectors be deployed to fill some of these gaps. ITI explosive detectors detect minute traces of vapors from explosives used by terrorists and criminals.

SEMTEX is readily detectable by our model 97. Rather than show you a film of what we can do, I have here a model 97.

This is in daily use by the U.S. Army, Navy, Department of Energy, Nuclear Power Stations, and Maryland State police at BWI Airport.

Only last week, we were asked to deliver equipment to the Embassy in Bogota to cover the drug wars down in Colombia.

This detector will detect explosive vapors in less than 2 seconds. It is very simple to use. It takes maybe 15 minutes to train an operator on its use.

It weighs about 30 pounds, and it costs $15,000.

In recent tests at Logan Airport, we had less than a 1 percent alarm rate on the trials.

Mrs. Collins. The time of the gentleman has expired.

[The prepared statement of Mr. Jenkins follows:]

STATEMENT

BEFORE

THE CONGRESS OF THE UNITED STATES HOUSE OF REPRESENTATIVES

GOVERNMENT ACTIVITIES AND TRANSPORTATION SUBCOMMITTEE

COMMITTEE ON GOVERNMENT OPERATIONS

SEPTEMBER 26, 1989

DELIVERED BY:

ANTHONY JENKINS
PRESIDENT

ION TRACK INSTRUMENTS, INC.
109 TERRACE HALL AVENUE
BURLINGTON, MA 01803
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THEME

"TODAY'S SOLUTIONS FOR TODAY'S PROBLEMS"

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Madame Chairwomen and distinguished members of the committee: Thank you for the opportunity to appear before you to discuss how to make airlines more secure from terrorist attacks.

My name is Tony Jenkins, President of Ion Track Instruments, and I have personally been involved in the development and the supply of explosives detectors for almost 20 years. The company that I represent, Ion Track Instruments, Inc., is the World's leading supplier of such detectors.

ITI Explosives Detectors have been commercially available for more than 15 years and our currently available instruments can detect minute traces of vapors from explosives used in terrorist and criminal bombings. Semtex for example is the explosive of choice of the international terrorist. In every instance, and there have been several, that we have had a chance to examine captured samples of Semtex (including Semtex used in actual terrorist bombs), we have found it to be detectable with our instruments.

The U.S. Army, the U.S. Navy, the U.S. Department of Energy, and the U.S. Nuclear Power Industry all use ITI explosives detectors.

Bomb protection in the airline industry is a complicated problem. Anti-terrorist security measures must take account of the hundreds of people, pieces of luggage, cargo, and supplies converging on an aircraft from multiple directions. Each of these conduits have been used in the past to smuggle actual bombs aboard aircraft. It is essential that all of these people and items be subject to security measures. Anything less is the equivalent of locking the doors and leaving all the windows open.

The vulnerability of the system to bombs carried on board is a matter of record, KAL flight 858 was brought down by a bomb in carry on baggage and TWA flight 840 was seriously damaged by the same method. In Sri Lanka a bomb concealed in supplies blew a DC10 in half just before take off. The X-ray machines and Metal detectors in place today were designed to protect against hijackers who use guns and knives. The threat has changed to terrorists who use bombs. Systems are needed at all checkpoints to specifically counter this threat. It should be noted that a truly effective system is one that combines people, policies, procedures, training and equipment. In other words a totally integrated system.

The recent FAA rule is a good first step. Unfortunately, it is only a partial solution as it only covers checked bags. It mandates a very expensive technology that has not undergone full operational testing. This technology cannot be safely used to search carry-on bags or people. We are concerned that its cost will leave very little available to block the other conduits. Just blocking the checked bag channel with such expensive instrumentation is like placing a gold plated padlock on the door I referenced earlier. We ask that all the channels be closed today with existing equipment capable of detecting terrorist explosives. We do not feel the public interest is best served by rushing into full deployment. We recommend a phased approach. This would allow for feedback and changes where necessary and an examination of alternative approaches.

This portable explosives detector:

weighs less than 30 lbs

costs a modest $15,000

detects in less than 2 seconds

and is simple to use

Its detection capabilities are well documented and there is general agreement on those capabilities. In tests conducted at Logan Airport in Boston, this instrument was used to search approximately 1000 carry on and checked bags without adding any delay and with less than a 1% false alarm rate. The tests are summarized in Section 7 of your briefing books.

ITI's walk-through detector processes more than 50,000 people per day. Its effectiveness has been graphically demonstrated at the Houses of Parliament in London. Prior to its installation, there was an average of two bombing per year one of which resulted in the death of a member of Parliament. Since it was installed in 1979 there has not been a single bombing.

We need to change the emphasis in the latest FAA rule to block all conduits for a bomb to an aircraft. One can expect improvements to come with experience and further research but that should not delay deployment of equipment available today.

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STATEMENT

U.S. HOUSE OF REPRESENTATIVES, COMMITTEE ON
PUBLIC WORKS AND TRANSPORTATION, AVIATION SUBCOMMITTEE

TUESDAY, MARCH 21, 1989

DELIVERED BY

JOHN G. PADERSON
SALES AND MARKETING MANAGER

ION TRACK INSTRUMENTS INC.
617-272-7233

THEME

"TODAY'S SOLUTIONS FOR TODAY'S PROBLEMS"

Mr. Chairman, and Members of the Subcommittee: Thank you very much for the opportunity to appear before you to discuss what we can and should do today to make the travelling public more secure from bomb attack. Let me begin by introducing myself and my associate. I am John Paderson, Sales and Marketing Manager for ION TRACK INSTRUMENTS INC. During the past 15 years, I have been involved in the development and application of security systems to protect against a variety of threats, including bombings. Joining me today is Mr. Anthony Jenkins, who was one of the first scientists to develop a practical explosives detector and is a leading authority in the field. He is also, I am pleased to say, our Group Technical Director. It should be noted that Mr. Jenkins developed his first explosive detector almost 20 years ago at the request of the British Government in response to the Northern Ireland situation. Explosives detection is not a new science but has been a commercial industry for the past almost 20 years. ITI Explosives Detectors, in wide use today, could be helpful in detecting approximately 99% of the domestic high explosive threat and approximately 84% of the perceived international threat including SEMTEX. ITI Explosives Detectors daily search tens of thousands of people and packages in the U. S. alone.

The U. S. Nuclear Power Industry is required by Federal Law to search every person entering each facility for concealed explosives. 80% of those plants use ITI Walk Thru and Portable Explosives Detectors. Our own Federal Government, including the

U. S. Navy, the U.S. Army, and the U. S. Department of Energy, are using ITI Explosives Detectors because they perceive the threat to their organizations to be acute. The airline industry today finds itself in the same situation. In the past, the threat was hijackers. Their weapons were knives and guns. Now the new threat is terrorists and criminals and their preferred weapon is the improved explosive device. Bombs are easy to make, easy to conceal and once placed, afford the bomber a high degree of safety and security. The tragic losses of Pan Am Flight 103, Korean Air Flight 858, and Air India Flight 182, to other bomb attacks and the fact that there were 1,831 high explosive bombings in the U. S. between 1976 and 1985, underscores the urgency of the situation.

The x-ray machines and metal detectors currently in use were deployed to counter the hijacking threat. The threat has changed and the effectiveness of the system in meeting this new threat can be greatly improved by the use of commercially available explosives detectors. Looking for a bomb in baggage without an explosives detector is like looking for a gun or knife in that same baggage without an x-ray machine.

Commercially available explosives detectors such as this ITI Portable Instrument (Model 97), and this ITI Walk Thru instrument (Model 85), can significantly enhance the capabilities of what is currently in place. The ITI Portable Instrument (Model 97) was recently tested in cooperation with the FAA at Boston in Logan Airport. The results show that it can be integrated into the existing system without the addition of any delay and with less than a 1 (one) % false alarm rate. It weighs less than 39 lbs., costs 1/3rd the price of an x-ray machine, is simple to use, and detects explosives in less than 2 seconds. The detection capabilities of this instrument is well documented in tests conducted in 1987 at Baltimore Washington International Airport and at the FBI Academy in 1988.

The ITI Walk Thru Detector (Model 85) is widely used in the U. S. Nuclear Power Industry and protects the Houses of Parliament in London. It can process one person every 6 (six) seconds.

The decision facing the U. S. today is a policy, not a technical decision. The threat is so acute and the consequences so dreadful that we should enhance the capabilities of the current system now by the addition of commercially available instruments such as we have shown you here today.

Deployment of these or any similar instruments does not eliminate the need to continue R & D efforts to find an even better solution. In fact anything that can be done to accelerate new technologies should be done. But at the same time, the research into better solutions should not delay deployment of currently available instruments. Tomorrow's technology is important but our focus must be on what we can do today to enhance the system.

We strongly support the recommendation of the Air Transport Association that a special appropriation be made from the

Aviation Trust Fund for the acquisition of explosives detectors. The ATA's estimated $17,100,000 cost for vapor detectors is sufficient to deploy more than 1400 ITI Portable Explosive Detectors and could equip all U. S. carriers at high-threat airports abroad and at home.

We also recommend that R & D funding be expanded to speed up the progress. ION TRACK INSTRUMENTS INC., as an FAA Research Contractor, has new technology in the laboratory that shows every promise of detecting an even higher percentage of the threat.

In summary, the threat to the Air Transport Industry has changed from hijackings to bombings. Equipment is commercially available which has and will deter the terrorist bomber. What is needed today is:

a.) A policy decision to use today's tools,

b.) funds to make that possible, and

c.) increase funding for research.

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EXPLOSIVE DETECTION BACKGROUND

ITI is the world's leading supplier of explosive detection instruments. ITI is the leading supplier of such systems to the U.S. Nuclear Power Industry and the U.S. Government. ITI's installed base of more than 400 walk through explosive detectors currently protects a majority of the U.S. Nuclear Power Plants from terrorist attack. The need to protect such high risk facilities was recognized by the Nuclear Regulatory Commission which mandated through 10CFR 73.55 that each plant screen individuals entering the protected area for explosives and firearms. ITI and it's affiliate U.K. companies also protect the Houses of Parliament, and several airports worldwide.

ITI introduced the world's first successful walk through explosive detector (Model 75), in 1978, after five years of research and development. ITI's current generation of equipment (Model 85) is capable of screening one person every six (6) seconds, in a non-intrusive manner, for explosives and firearms. ITI has also successfully completed a variety of special applications development programs under contract from the United States Government agencies, including the Department of Transportation.

Terrorist incidents are on the rise and many facilities that were once considered low risk for such attacks are now searching for equipment and systems to protect themselves. to date, facilities located in the U.S. have escaped relatively unscathed. The future doesn't hold the same promise.

ITI, through its extensive experience in explosive detection, is uniquely positioned to help organizations defend themselves from such deadly threats.

ITI's product line includes walk through and hand held systems, that use proven technology, to detect a wide variety of high explosives including those commonly used by terrorists.

ITI's line of products using this technology show a high degree of sensitivity. While no system can guarantee immunity under all circumstances, each of ITI's products when properly used, can enhance security significantly in such applications as:

* Personnel Screening
* Building Search
* Package Screening
* Luggage Screening

ITI, under the sponsorship of the FAA, is pursuing an on-going research effort to develop advanced detectors which will apply a new technological approach to vapor detection. This approach builds on the extensive body of knowledge developed by ITI through its years of practical experience in the U.S. and abroad. While there are many promising technologies currently being researched by others for use in explosive detection, many of these technologies represent attempts to apply techniques originally intended for other purposes and have yet to be proved in practical day to day use.

ITI's other sophisticated security products include a complete line of weapons detectors. ITI also supplies high speed leak detection and quality control instrumentation for Industrial applications.

Ion Track Instruments, Inc., of Burlington, Massachusetts is a wholly owned subsidiary of Meggitt Holdings PLC of Wimborne, Dorset, England. Meggitt Holdings PLC is a rapidly expanding product oriented group of companies engaged in the manufacture and supply of advanced engineering products for a variety of specialty applications. Specific areas of their expertise are in Aerospace and Defense, Industrial controls and Instrumentation, Energy Engineering, Electronics and Engineering Distribution.

**HISTORY OF ITI GROUP INVOLVEMENT
IN EXPLOSIVE VAPOR DETECTION**

1. 1969 Designed and built the world's most sensitive tracer gas leak detector.

2. 1970 Modified the leak detector to detect dynamite explosives.

3. 1971 Successfully introduced the world's first continuous sniffing dynamite detector in active service. Apprehended the first terrorists by detecting dynamite on suspect hands in Northern Ireland.

4. 1972 Successfully completed research to improve selectivity of dynamite detector for the UK Government.

5. 1973 Introduced the first hand held bomb detectors in the USA for EOD applications.

6. 1975 Designed portable forensic analysis for explosives.

7. 1976 Made the world's first automatic combined x-ray and explosives sniffer for airline bags.

8. 1976 Made the world's first continuous sniffing TNT detector.

9. 1977 Successfully completed a research project for the FAA to produce a baggage pumping and detection system for explosives.

10. 1978 Introduced the ITI Model 75, the world's first automatic walk through explosives detector. Began installation in US Nuclear Power Stations.

11. 1979 Installed Model 75's into the Houses of Parliament in the UK. Bombings on average were 2 per year for the preceding 10 years. Since installation, no bomb incidents have occurred.

12. 1979 The sister company of ITI was awarded the prestigious Queens Award for Technology for the work in designing the Model 75.

13. 1980-81 Successfully completed development project in conjunction with the FAA to improve sensitivity of the walk through detector. Demonstrated detection of dynamite and commercial TNT at tests in SANDIA labs from explosives placed below one layer of clothing on the body.

ITI Ion Track Instruments, Inc.

14. 1983 Introduced the ITI Model 85 Walk-Thru portable detector.

15. 1985 Designed and produced ITI Model 97.

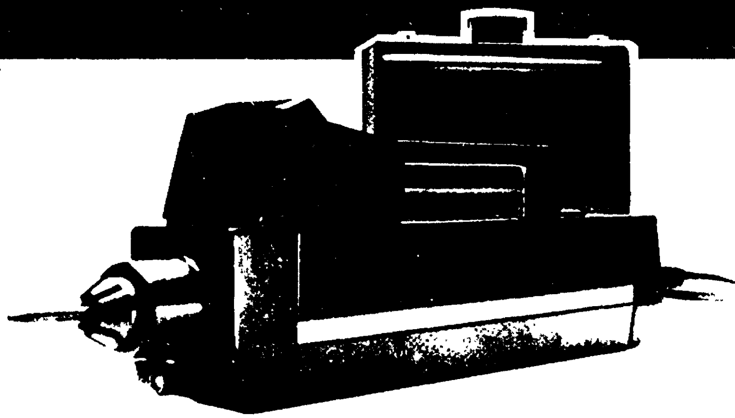
16. 1987 Carried out research for the FAA to improve detection of explosives.

17. 1988 Supplied Model 97's to US Army.

18. 1989 Further research work for FAA has resulted in detection of pure RDX, PETN and HMX, in the ITI laboratory.

Explosives Detection Equipment

MODEL 97



Description

The ITI Model 97 is a fourth generation handheld explosives detector designed to be used by security personnel to search people, vehicles, places, and parcels for concealed explosives The Model 97 detects the vapor produced by a wide variety of commercial and military explosives and provides both an audible and visual indication of alarm

The Model 97 contains a unique real time detection system that can rapidly discriminate between the vapors from an explosive and those produced by a similar non-explosive material The results are instantaneous as there is no tedious sample collection or slow analysis process in the system Once an explosive has been detected by the unit, it is automatically purged clean and is ready to continue within a few seconds

The Model 97 is lightweight and simple to use It is contained in an unobtrusive attache style case and can be quickly made ready for use Its simplicity of operation makes user training quick and painless.

Features

- Detects a wide variety of military and commercial explosives
- Detects instantaneously
- Minimizes false alarms
- Lightweight
- Easy to use
- Ready in just minutes
- Clears in seconds

iTi Security

Operation

The Model 97's operation is based on twin electron capture detectors (ECD's). Suspect vapor is drawn into the instrument through a membrane which isolates it from ambient air. The vapor is then mixed with Argon, an inert carrier gas, and fed down two columns. One of the columns is coated with a special material which selectively retards the progress of molecules from high explosives. Each of these columns terminate in an ECD.

When the vapor/carrier gas mixture enters the ECD it is bombarded by beta particles from a sealed radioactive source (similar to the amount of radioactivity present in ionization smoke detectors). The beta particles dislodge electrons from the carrier gas molecules which supports the ECD's standing current. If molecules from high explosives are present they absorb these free electrons and thus change the standing current and trigger an alarm.

The timing sequence of the signals from the twin ECD's discriminates between vapors from explosives and those produced by similar non explosive substances.

Applications

The Model 97 because of its instantaneous response and rugged construction is ideal for continuous screening applications. It can be used, for example, to check suspect luggage, packages, storage lockers, automobiles, buildings, and people, etc. Model 97 applications include **Airlines, Nuclear Power Plants, Military Bases, Police Departments, and Sensitive Government Facilities.** The Model 97 is an ideal tool to enhance security at any high risk facility.

Contents

Instrument Case	*Accessories Case*
Handheld Instrument	Spare gas bottle
Battery	Spare battery pack
Argon Bottle	Instrument Charger and cord
Regulator	Power supply cord
Headphones	Spare membranes
	Test sample

Options

Item	*Description*	*Part #*
Transfer valve	Used to fill 4 ft³ bottles from large supply tank	220-027
Replacement membranes	For Model 97 Nozzle	220-121

Specifications

1	Sensitivity	1 part explosive vapor in 10¹¹ parts air.
2	Explosives Detected	Wide variety of military and commercial explosives. Detection matrix available to qualified buyers upon request
3	Response Time	2 seconds or less
4	Selectivity	Can rapidly discriminate vapor from explosives and that produced by other materials. Shows excellent immunity to alarms caused by halogenated solvents
5	Detection System	Unique twin ECD gas chromatography system. Long life Ni^{63} beta source
6	Alarm Indicators	Visual and audio alarms. Each operates independently. Headphone jack
7	Other Indicators	Nozzle temperature O K Detector temperature O K Low battery Low standing current Bar graph of signal output
8	Controls	Pump on/off Audio on/off for integral loudspeaker Reset Standing Current check
9	Power Supply	1 12 volt rechargeable battery, 6 hour duty cycle or 2 External 12 volt battery supply for continuous operation or 3 In conjunction with battery charger on AC supply of 240 V ± 30V, 50-60 Hz 120 V ± 15V, 50-60 Hz
10.	Ready for use	15 minutes or less
11	Portable Endurance	Battery-6 hours Argon-12 hours
12	Carrier Gas Gas bottle	99 998% pure Argon 4 ft³

Description	Dimensions		
	Length	Width	Height
Instrument and Case	20" (500mm)	14 8" (370mm)	6 4" (160mm)
Packed for Shipping	22 4" (560mm)	20 4" (510mm)	8 8" (220mm)
Accessories Case	20" (500mm)	14 8" (370mm)	6 4" (160mm)
Packed for Shipping	22 4" (560mm)	20 4" (510mm)	8 8" (220mm)

Description	Weight
Instrument and Case	29 7 lbs (13 5 kg)
Packed for Shipping	35 64 lbs (16 2 kg)
Accessories Case	26 84 lbs (12 2 kg)
Packed for Shipping	32 34 lbs (14 7 kg)

iTi Security

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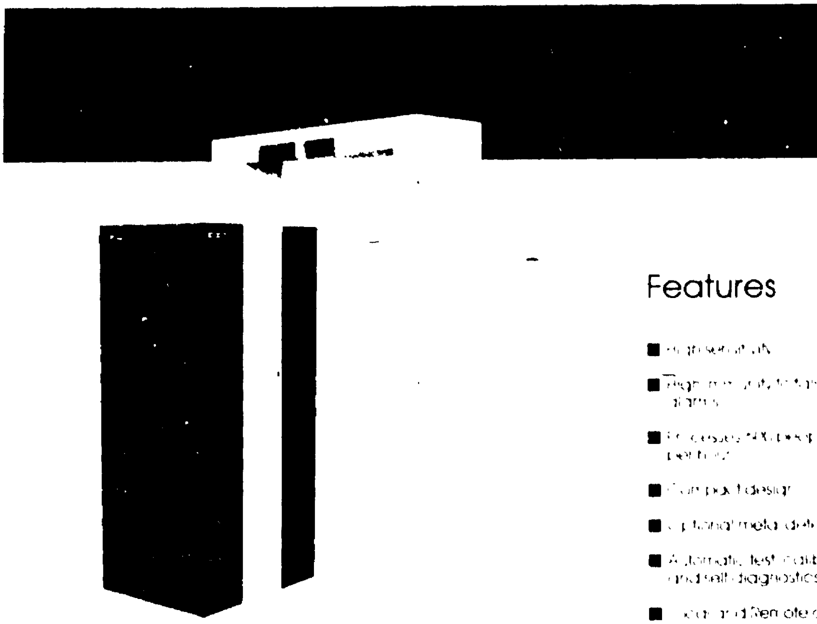
*The manufacturer reserves the right to change the specifications without notice

Explosives Detection Equipment

ENTRY SCAN MARK II



Features

- [illegible]
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- [illegible]
- Compact design
- Optional metal detector
- Automatic test calibration and self diagnostics
- Local and Remote audio and visual alarms and controls

Description

The Entry Scan Mark II represents the state of the art in explosives detection It rapidly searches personnel for concealed explosives by quickly analyzing air samples collected from individuals as they enter the instrument's airstream The rapidity and non intrusive nature of the search assures acceptance It is ideally suited for high risk access control to **Nuclear Power Plants, Government Facilities** and **Defense Contractors.** The Entry Scan Mark II can also be integrated with an optional metal detector to protect against weapons as well as explosives

The instrument's patented detection process provides high sensitivity to explosives coupled with a high degree of immunity to false alarms

The Entry Scan Mark II provides three processing modes to fit any application. In its normal mode it can process up to 600 people per hour which makes it ideal for high traffic entry points.

The instrument is attractively packaged to complement any decor and compactly designed to fit into areas where space is limited

ITI Security

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Operation

The Entry Scan Mark II automatically signals each person to enter the portal by means of a green "enter" light. While in the portal, an air sample is collected from around the person being searched by means of a gentle air curtain. This air sample is continuously analyzed in the detection system for the presence of molecules from explosives. The detection mechanism selectively traps vapor of interest from the sample and selectively desorbs it into an argon carrier gas stream which carries it into a high sensitivity Electron Capture Detector (ECD). Any molecules from explosives present in the carrier gas mixture will absorb electrons in the ECD and trigger an audible and visual alarm. An additional interface permits alarms to be routed to an alternate location or to a computer for logging purposes.

At the completion of the detection cycle the Entry Scan signals the person being searched to exit by means of a green light and an audible chime. If the individual should leave the instrument before the cycle is completed, an audible and visual alert signal will be generated. When no personnel are being processed for an extended period of time, the system automatically switches to Standby Mode which conserves argon gas and increases operational life. When the first person to be processed approaches the Entry Scan, the system automatically returns to the normal operating mode.

The Entry Scan presents simplified controls and indicators to enable easy operation and monitoring of the system. In addition, it contains self diagnostics and indicators to facilitate service. A test and calibration option is available which automatically tests the Entry Scan at the push of a button and maintains the circuitry at optimum sensitivity.

Applications

- Airports
- Nuclear Power Plants
- Corporate Headquarters
- Computer Centers
- SNM Processing Plants
- Precious Metal Refineries
- LNG Storage Facilities
- Petroleum Refineries
- Drug Manufacturing
- Public Utilities
- Construction Sites
- Government Facilities
- Manufacturing Plants
- Oil & Gasoline Storage
- Military Check Points

Options

Item	*Description*	*Part #*
Metal Detector	Customized Walk-thru metal detector for integration into the system	MD-85
Test and Calibration System	Automatically injects a vapor standard at the push of a button and adjusts the instrument to optimal sensitivity	CT
Low Pressure Alarm	Initiates an alarm condition when argon gas supply is low	220-046
Gas Regulator	Maximum inlet 2500 psi, Delivery range 4-60 psi, Standard inlet connection 510	220-022

Specifications

MAIN CONSOLE

Processing Rate	Adjustable as required A. Walk Thru B. Fast (6 seconds/ 600 people/hr.) C. High Sensitivity (11 seconds/327 people/hr.)
Sensitivity	One part per trillion for nitrated base explosives
Alarms	Audible and visual alarms for Explosives Non Valid Test and End of Test Audible Alarm for Access Doors

OPERATIONAL CONTROLS AND INDICATORS

Controls	Standby on/off switch with indicator Main Supply on/off switch with indicator Power Supply on/off switch with indicator System Test Push Button Mode Switch with indicators for each mode A. Walk Thru Processing Rate B. Six Seconds Processing Rate C. Eleven Seconds Processing Rate Alarm Reset Push Button Display Function Switch for: A. 24 volt Power Supply B. 12 volt Power Supply C. 15 volt Power Supply D. 15 volt Power Supply E. Detector Status

Controls Cont.	F. Heater One Temperature G. Heater Two Temperature H. Alarm Level I. Signal Reading during Processing Argon Flow Control Valve Alarm Level Control Tamper Switches (Access Doors 2/unit)
Indicators	Pump Fault, Low Argon Pressure, System Fault, Not Ready, Ready, Wait, Enter, Heater One, Heater Two, Detector, Foil Sync., Power Supply Fault
Personnel Control Indicators	Enter, Wait, Exit
Displays/Meters	Elapsed Time Meter Argon Flow Meter Digital Display (utilized with function switch)
Electrical Supply	110 Volts 60 Hz Supply Outlets available in Instrument for Service/Maintenance requirements (Special Order/Option 240 Volts 50 Hz)

Dimensions	Height	Width	Depth
Main Console:	69.5 (176.5 cm)	24 in. (61 cm)	30.5 in (77.5 cm)
Portal:	84 in. (213.3 cm)	4 in (10 cm)	17.75 in. (45 cm)
Portal with Metal Detector:	84 in. (213.3 cm)	4 in. (10 cm)	32.75 in. (83.2 cm)

Opening between console and portal: 31.5 in. (80cm)

Argon Supply Required	Internal replaceable argon cylinder (99.998% Pure Argon Required)
Argon Consumption	Normal Operation: 1 cu. ft/hour (approx.) Standby Operation: 1/10 cu. ft./hour (approx.)
Detector Response	1.5 seconds
Detector	10 Millicurie Ni63 Heated *Sealed* Detector
Environmental	Normal ambient condition ranges for temperature and humidity are recommended however the instrument will tolerate geographic extremes.
Remote Alarm Interface	Provided
Construction	Single vertical column of structural steel welded frame with baked enamel texture steel panels.

REMOTABLE POWER/CONTROL MODULE

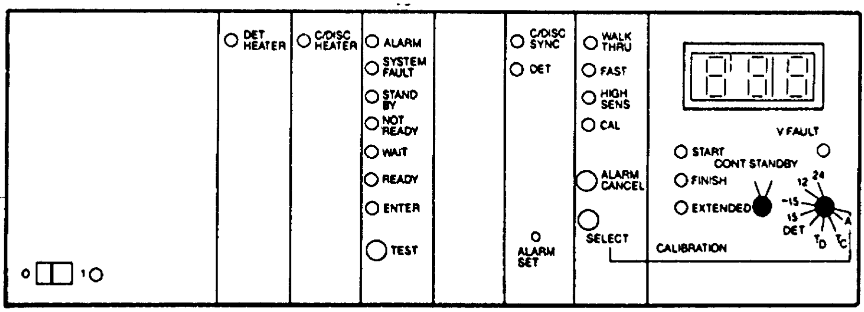
Controls	Supply on/off switch w/indicator Standby on/off switch w/indicator Audible Alarm on/off switch Alarm Reset
Indicators	Alarm, Not Ready, Ready, Low Argon Pressure, System Fault
Cable	100 feet w/connectors
Construction	19 inch rack configuration console which can accommodate up to two Control Modules with handles and adjustable legs

Dimensions	Height	Width	Depth
	5.24 in. (13.3 cm)	8 in. (20.3 cm)	6.8 in. (17.3 cm)

Optional	Up to four MK II's can be integrated into one 19 inch rack configuration console
Shipping Weights	Total weight: 631 lbs (287 kg) Total weight with metal Detector: 720 lbs. (324 kg)

Shipping Dimensions	Height:	Width:	Depth:
Console:	76 in. (193.0 cm)	32 in. (80cm)	36 in. (91.4 cm)
Portal:	88 in. (224 cm)	8 in. (20 cm)	22 in. (56 cm)
Portal with Metal Detector:	90 in. (228.6 cm)	24 in. (61.0 cm)	10 in. (25.4 cm)

OPERATIONAL CONTROLS AND INDICATORS



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Facsimile (617) 273-3086

CUSTOMER USER LIST

The following list represents a cross section of approximately 25% of our clients who are currently using the Model 97 and/or the Model 85 Explosives Detection Systems to secure these facilities.

ION TRACK INSTRUMENTS

USERS LIST

MODEL 85 & 97

ALABAMA POWER CO.	AMERICAN AIRWAYS CHARTERS INC.
AMERICAN ELECTRIC POWER CO.	AMERICAN EMBASSY LIMA PERU
AMERITECH SERVICES INC.	ARIZONA PUBLIC SERVICE CO.
ARKANSAS POWER & LIGHT CO.	BABCOCK & WILCOX
BALTIMORE GAS & ELECTRIC CO.	BOSTON EDISON CO.
BOSTON POLICE DEPARTMENT	BROOKHAVEN NATIONAL LABORATORY
CAROLINA PWR & LGT (BRUNSWICK)	CAROLINA PWR & LGT (ROBINSON)
CAROLINA PWR & LGT (HARRIS)	CENTRAL MAINE POWER CO.
CLEVELAND ELECTRIC ILLUMINATI	COMMONWEALTH EDISON
CONSOLIDATED EDISON CO.	CONSUMERS POWER CO.
DAIRYLAND POWER COOP.	DETROIT EDISON CO.
E.I. DUPONT	EXXON NUCLEAR CO., INC.
FLORIDA POWER & LIGHT CO.	GENERAL ELECTRIC
GENERAL ELECTRIC CO.	GEORGIA POWER CO.
GPU NUCLEAR	GPU NUCLEAR CORP.
HOUSTON LIGHTING & POWER CO.	MISSISSIPPI POWER & LIGHT CO.
NEBRASKA PUBLIC POWER DISTRICT	NEW YORK POWER AUTHORITY
NORTHEAST UTILITIES SERVICE CO.	NUCLEAR FUEL SERVICE
OMAHA PUBLIC POWER DISTRICT	PACIFIC GAS & ELECTRIC CO.
PENNSYLVANIA POWER & LIGHT CO.	PHILADELPHIA ELECTRIC CO.
PORTLAND GENERAL ELECTRIC CO.	PUBLIC SERVICE CO. OF N.H.
PUBLIC SERVICE ELECTRIC & GAS	SACRAMENTO MUNICIPAL UTILITY-
SOUTHERN CALIF. EDISON CO.	SYSTEMS ENERGY RESOURCES INC.
TENNESSEE VALLEY AUTHORITY	TEXAS UTILITIES GENERATING

USER'S LIST

MODEL 97 & 85

TOLEDO EDISON COMPANY

UNION ELECTRIC CO.

VERMONT YANKEE NUCLEAR PWR CORP.

VIRGINIA ELECTRIC 7 PWR CO.

WASHINGTON PUBL. POS. SPLY SYS.

WISCONSIN ELEC. POWER CO.

WISCONSIN PUBLIC SERVICE CORP.

WOLF CREEK NUCLEAR OPER CORP.

YANKEE ATOMIC ELECTRIC CO.

ION TRACK INSTRUMENTS'

NON-NUCLEAR USERS LIST

MODEL 85 & 97

US. ARMY	NUCLEAR FUEL SERVICES
US NAVY	LAWRENCE LIVERMORE LABS
NAVAL RESEARCH	TEXACO INTERNATIONAL
SANDIA LABS	FLORIDA SENATE
BALTIMORE WASHINGTON AIRPORT	MASON & HANGER/ JOHNSON SPACE
ARAMCO OIL CO.	A.A.I. CORP
B.P. BRITISH PETROLEUM	
HOUSES OF PARLIAMENT	ROYAL PALACE MIDDLE EAST
MANILA BAY CASINO	EUROPEAN NUCLEAR POWER STATIONS
BANK OF CEYLON	WEST AFRICAN PRESIDENTIAL PALACES
CHASE MANHATTAN BANK	ITALIAN POLICE
EUROPEAN POLITICAL RESOURCES	SINGAPORE AIRPORT
STRATHCLYDE POLICE	PHILLIPINES POLICE
HOUSES OF PARLIAMENT	NIGERIAN AIRPORTS
BRITISH GAS	INDIAN ARMY
LONDON TRANSPORT	MIDDLE EASTERN POLICE FORCES
SRI LANKAN ARMY	ONGC INDIA
EUROPEAN DEPARTMENT STORES	CREDIT SUISSE
PRICE WATERHOUSE	FOREMAN & COMMONWEALTH OFFICES
INDIAN HIGH COMMISSION	MIDDLE EAST AVIATION SAFETY DEPT.
SEOUL AIRPORT POLICE	ANCARNI ENGINEERING COMPANY
MORGAN GRANFELL	RAF BASES
BANK OF CEYLON	BGAMEX

GREEK ARMY

POST OFFICE

SUDAN POLICE

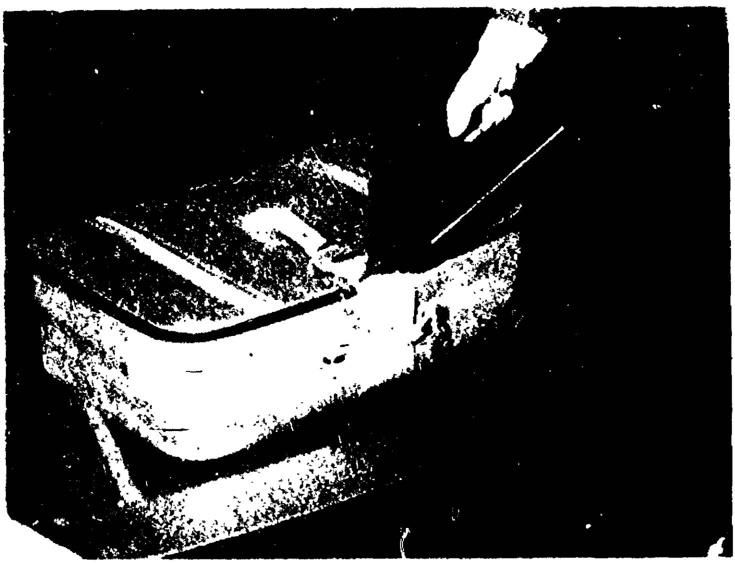
PRESIDENTIAL GUARD INDIA

THE GARDA IRELAND

ION TRACK INSTRUMENTS

OPERATIONAL REPORT

EXPLOSIVE DETECTION FOR AIRLINE USE



Report of Operational test with the Model 97 explosive detector at Logan International Airport, in conjunction with Northwest Airlines and the FAA 15 - 16 February 1989.

Explosive detectors have been in use for many years throughout the world. They have safeguarded people and property from terrorist bombs since the late 1960's

Walk-through archway type detectors screen people at access control points of many large facilities worldwide. Ion Track Instruments' (ITI's) Model 85 is used extenisvely throughout the US Nuclear Power industry as well as in the British Houses of Parliament.

ITI's portable M97 is a handheld detector that allows the operator more flexibility without sacrificing sensitivity. The M97 is standard issue for the US Army EOD worldwide and is used by the US Navy and a variety of high risk Government agencies.

The M97:

- Detects a wide range of military and commercial explosives

- Detects in less than 2 seconds

- Requires no operator interpretation

- Weighs less than 35 pounds

- Clears in seconds

- Can be powered from either 110 or 220 VAC or from internal battery

The portability, flexibility, and ease of use make it an excellent tool for the airline industry.

ITI, in cooperation with FAA, Northwest Airlines and ARA Security Services tested the M97 at Logan International Airport in Boston. Actual airline passengers and baggage were tested to determine how to best use explosive detectors without causing system delays. The results in this report describe how over 1000 bags were searched with a single M97 and no system problems occurred.

This test was to study different search techniques and gather statistics of passenger and baggage volumes, it was not intended to test detection. Tests of the detection capabilities of the M97 have been conducted by the FBI, Maryland State Police, and others. Their results are readily available.

Again, our recent test was an operational field trial to utilize explosive detectors as an additional security measure. Vapor detectors such as the M97 can add significantly to airline security.

How Passengers and Baggage were Tested

The tests were conducted in two phases. Phase one screened checked baggage bound for international destinations. Phase two tested carry-on items on both domestic and overseas flights. Each phase took place on a separate day with average volumes of passengers booked on the flights.

Statistics from each phase were recorded separately and are shown that way in this report. Collectively, these statistics provide valuable information and will help in the design of better airport security systems.

How Checked Baggage for International Flights Examined

In order to test checked bags, we used the portable M97 explosive detector at the ticket counter. Here, an extension table was setup before the x-ray machine already in place at the counter. After passengers received seat assignments at the counter, they placed their bags on the table. The different types of bags, as seen in Figure 1, were scanned with the M97 by the security agent. Next, the bag was passed into the x-ray as normally done with checked baggage. All 170 bags for several international flights were tested with the M97.

The operator was able to spend an average of 20 seconds per bag before a second passenger came to the table from the ticket counter. This buffered effect from the ticket counter allowed the operator to spend a maximum amount of time on each bag without creating a line or delay in the system. As the traffic from the counter fluctuated, the average time per check adjusted accordingly.

The five types of bags required different times to check. Garment bags with many pockets and zippers took a little more time.

Suitcases were gently flexed by the passenger at the table. Air escaped through the suitcase cracks allowing better detection without having to open the case. The security agent also noted whether the passenger was willing to help test their bag as a profile check.

Below are the times on average spent on each type of checked bag without delaying the system. This was not the total time needed to check that type, but the average time taken.

Figure 1

Checked Baggage

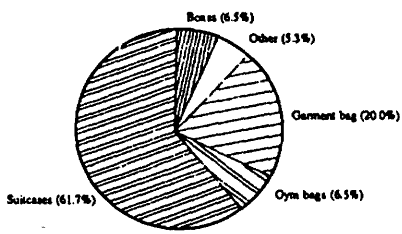
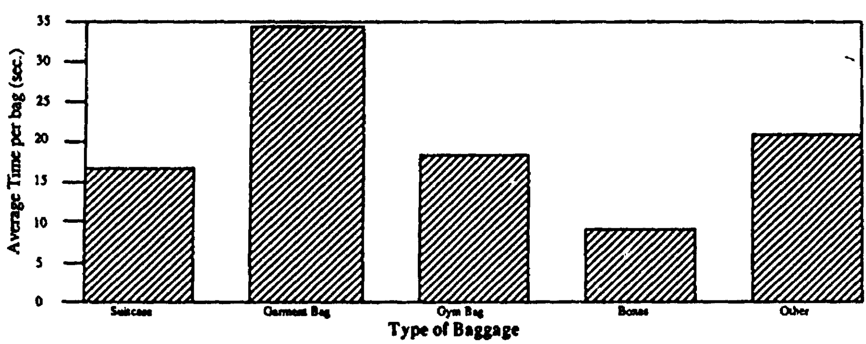


Figure 2

Search Time For Checked



Carry-on Items Checked for Explosive Vapors

As with the checked baggage phase, the carry-on items were tested with M97 before being x-rayed. A function of the test was to integrate explosive detection into the already existing procedure for searching carry-on items.

At the access control point, passengers presented their boarding pass to an agent, then placed their items on a table directly in front of the x-ray machine. Each item was scanned with the M97 then x-rayed.

Positive responses from the M97 were noted but in all cases the final decision to investigate a bag further was made by the x-ray operator.

This test procedure seemed best for this type of access control layout. The agent checking boarding passes was the buffer to reduce any line at the test area. Because of the higher volume of carry-on items, a more rapid search was conducted.

The amount of carry-ons are seen by type in Figure 3 and search times are viewed in Figure 4.

Figure 3

Carry on Bags

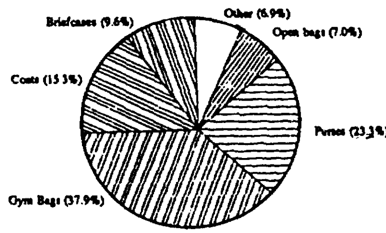
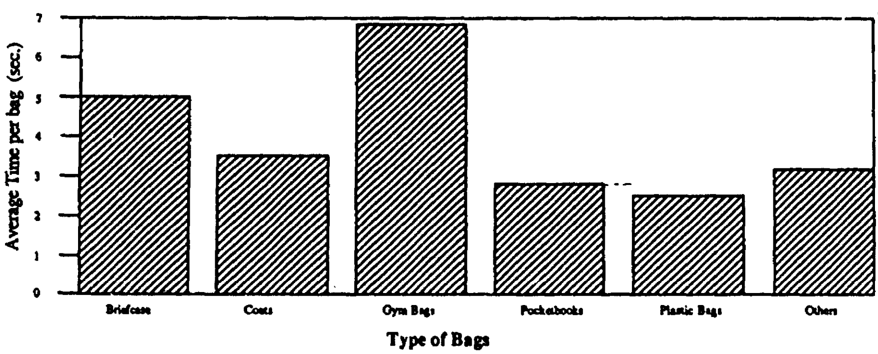


Figure 4

Search Time For Carry-on



FINDINGS

Checked Baggage Responses

A total of 170 bags (100% of bags bound for international flights) were scanned by the M97 at the check station. Responses were as follows:

Clear 75.3%
Positive 2.3%
Retest condition 22.4%

The M97 showed 4 positive responses. In each case, the bag was x-rayed or hand searched by the agent.

One doctor's bag that was searched contained medication (probably nitroglycerin), a valid indication.

The retest lamp lit on the M97 when a masking chemical vapor or halogen was sensed. This could immediately be reset for a second test. In each case, the agent questioned the passenger about the bags contents before a retest and x-ray.

Responses of Carry-on Items

Out of 851 carry-on bags (94% of all bags bound for both domestic and international flights) searched by the M97, three bags caused a positive response. One of these was opened to find a large amount of perfume and deodorants. This represents only a 0.3% false alarm rate. Other responses:

Clear 81.7%
Positive 0.3%
Retest Condition 18.0%

Low False Alarm Rate

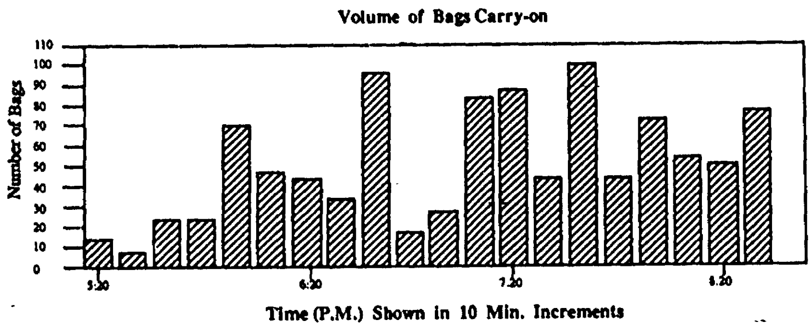
When the data is combined for the total number of bags searched by the M97 the false alarm rate is 0.68% (seven out of over one thousand).

Results of Passenger Page

To avoid having to page passengers to return to their luggagae, we recommend screening at point of origin locations. Should a passenger have to be paged and return to the Baggage Claim Office, an average time of 2-1/2 minutes was recorded.

As seen in Figure 5, the volume of bags through carry-on fluctuated greatly throughout the test. This was due to increased number of bags, flight announcements and changes in departure times.

Figure 5



Passenger and Baggage Flow

Figures 6 and 7 show frequency distribution of passenger and baggage volumes. Figure 6 for instance, shows that between 7:10 p.m. and 7:30 p.m. the traffic increased tremendously. The peak at 7:20 represents a tour group. The group was batch ticketed and released to the test area. The baggage as seen directly below in figure 7 also peaked at that time. These graphs demonstrate that volumes of passengers fluctuate slightly and are prone to surges. Portable equipment such as the M97, was extremely useful whereby additional units could be put on line in seconds to cope with line surges. In our case, a standby unit was ready but not put on line for this quick pulse in traffic.

Figure 6

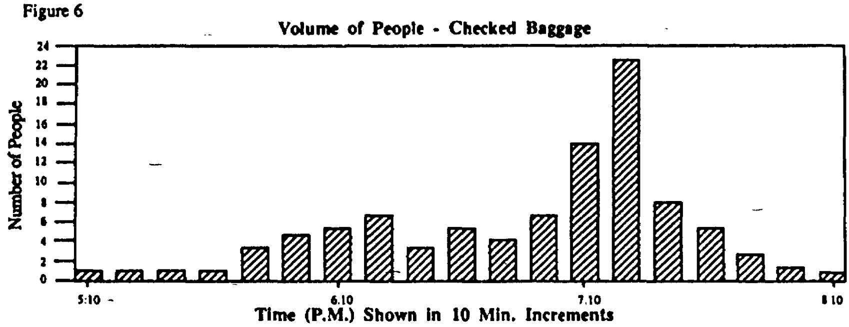
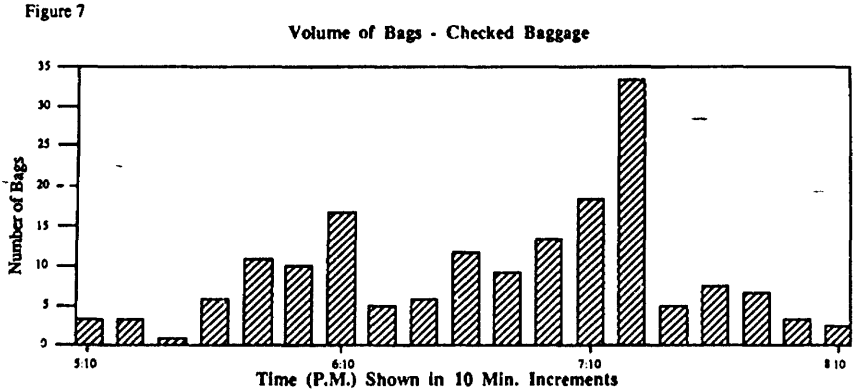


Figure 7



CONCLUSIONS

The Operational Test at Logan demonstrated vapor detection could easily by implemented into an established system.

1. Vapor detectors can be added without adding any delay if a continuous analysis instrument that responds in less than 2 seconds is used.

2. 100% of carry-on and checked bags bound for international flights car be searched without causing any delays.

3. Operator training will take less than 1/2 hour.

4. Additional manpower required is minimal.

5. Use of vapor detectors improves x-ray operator vigilance.

6. False alarms are minimal and can be quickly resolved.

Public Feedback Reflects Praise

Passenger comments reflect overwhelming support for additional security even if it means a slight delay.

"I'm impressed, it's better than it was a year ago".

"I fly for Northwest and I really appreciate this test".

"Why the extra security? Good, the more the better".

"Security should be this tight everywhere in the world".

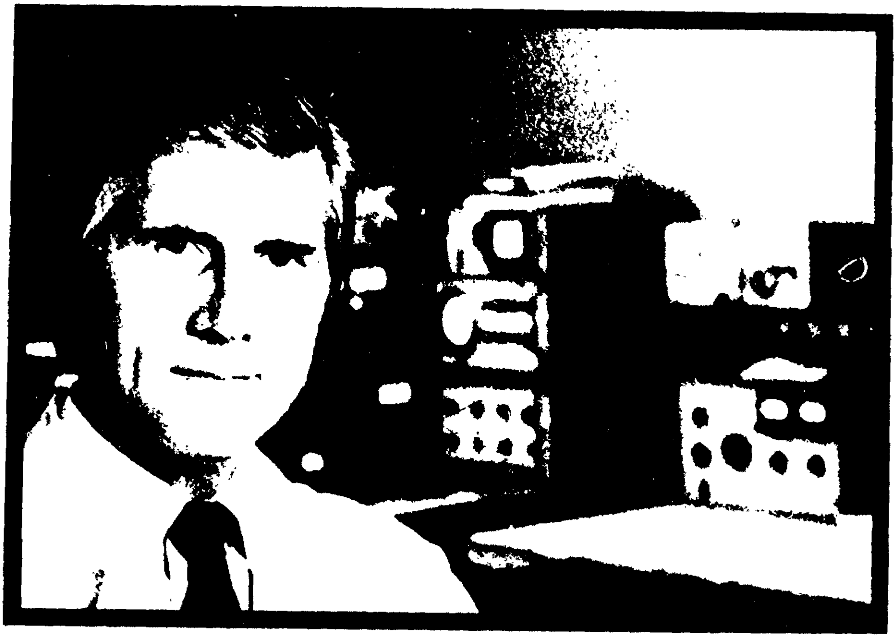
RECOMMENDATIONS

We at ITI feel it is time to move forward and increase airline security. Explosive Detectors should be a component of a good security system that uses the latest equipment with properly trained, competent operators. This test has been an important step in increasing our edge against terrorism.

For additional information regarding this test or others.
Contact:

ITI Security
109 Terrace Hall Avenue
Burlington, MA 01803
TEL. 617-272-7233
FAX. 617-273-3066

SUBSTANCE DETECTION RESEARCH



iTi

DETECTION RESEARCH

Over the past 15 years, ITI has built a reputation as the foremost source for solutions to difficult detection problems. The U.S. and British Governments have turned to ITI routinely for help in detecting concealed explosives. ITI's involvement with government security applications has resulted in the development of the world's first portable explosives detector.

Throughout the company's history, ITI has demonstrated a unique ability to deliver solutions. Scientists and engineers at ITI and affiliated UK Divisions have combined their expertise in electron capture technology, ion mobility spectrometry, thermionic ionization, vapor transport, and image analysis to focus on the detection, isolation and measurement of substances. This unique expertise and its focus on detection has resulted in ITI's preeminence in areas where material detection is a primary concern.

Currently, ITI security provides bomb protection for the U.S. nuclear power industry, the U.S. military, and several other high-risk organizations. Present research is directed toward walk-through and portable explosives detectors fast and sensitive enough for in-line use at airports, as well as toward research in detection techniques that incorporate new technologies.

ITI Industrial has applied its expertise in leak detection to enhance QA/QC activities. Electronics manufacturers, pharmaceutical packaging firms, defense contractors and many other organizations rely on the accuracy and speed of ITI's pressure decay and tracer gas leak detectors to verify and maintain the quality of raw materials and manufactured products.

ITI's image analysis technology is another tool developed to provide detection and identification of difficult materials and conditions. At ITI's Optomax Division, the company's expertise in automation, imaging, and image analysis is being used to provide custom-designed, high-speed, visual inspection and measurement tools for research and industry. New, computer-based products incorporating advanced operating systems are being utilized to meet the increasing demand for cost-effective instruments of exceptional versatility.

EXPLOSIVES DETECTION

No other company can offer greater expertise in the detection of explosives than ITI. ITI's expansive expertise in vapor trapping and transport, electron capture, and ion mobility technology are the basis for a range of products that have earned ITI its position as the primary supplier of bomb detection systems worldwide. In addition, ITI-developed products have become the standard issue for explosive detection by the U.S. Army.

Currently, ITI is developing a fifth generation of bomb detection technology. Additional research undertaken by ITI at the request of the Federal Aviation Administration and other agencies addresses the pressing need for fast and accurate detection of an ever increasing number of explosives used by terrorists and criminals. As part of this on-going effort, ITI belongs to the MIT Industrial Liaison Program and is positioned to draw on a broad spectrum of government and private information resources and subcontractors.

In each research effort undertaken by ITI the company has applied their extensive capabilities to successfully solve complex detection, measurement and analysis problems. The following pages provide more in-depth information on industries and applications where ITI has developed unparalleled expertise. We encourage you to contact ITI concerning your project or application.

CHEMICAL WEAPON DETECTION AND IDENTIFICATION

Chemical agents: nerve gas, blistering agents, choking gases, and substances that attack the blood are among the most frightening weapons in existence. The need to defend against these "invisible" weapons is of international concern. ITI's experience in ion mobility spectrometry and vapor trapping and transport have made the company a logical choice for the research and development of products to detect and identify chemical weapons.

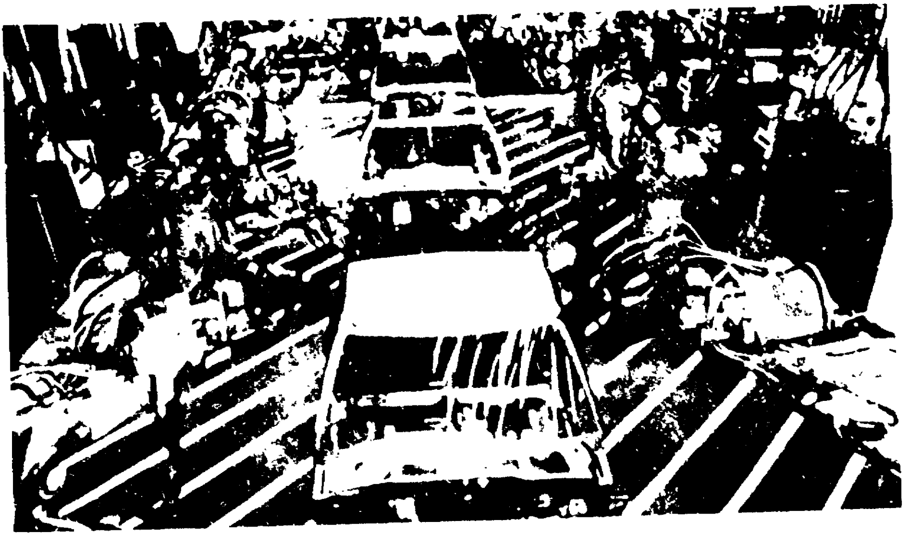
ITI researchers are currently at work developing effective means to:

- identify chemical agents
- test the effectiveness of defensive materials against chemical agents
- provide contamination control for equipment and personnel after exposure to these substances.

DRUG DETECTION AND TRACKING

[illegible]

Vapor detection, thermionic ionization, X-ray, particle scattering, and near field dielectrometry technologies are being refined to detect and identify drugs. III is also developing tools to locate and identify the drug traffickers at the highest levels. Law enforcement authorities can look forward to having tools that will not only detect contraband but more importantly will be able to trace the drugs to their source. This capability will facilitate not only stopping the flow of these substances but also in identifying the kingpins behind this international menace.



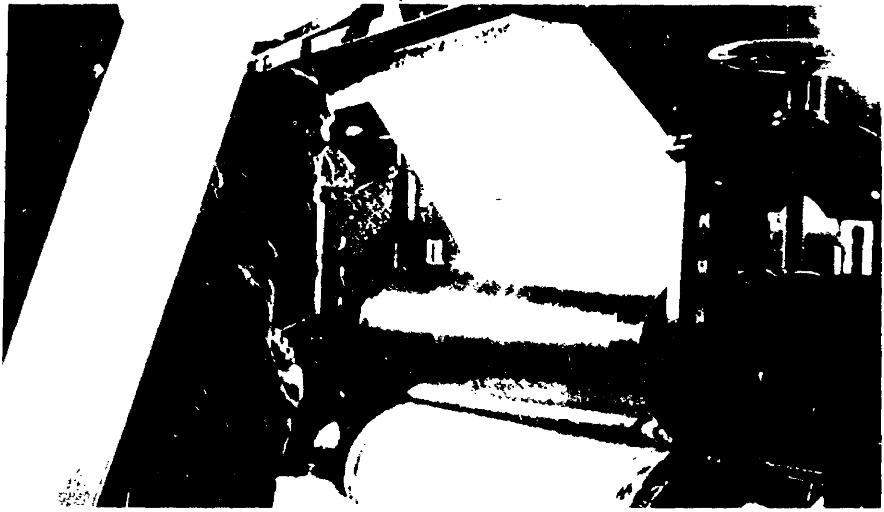
Leak detection

III's expertise in pressure decay and tracer gas leak detection is the best in the world. Utilized to verify the integrity of seals, enclosures, packages, and vessels, III has developed a diverse client base for their custom designed solutions to manufacturing problems involving the detection of leaks.

For production line applications, III engineers have developed systems that incorporate microprocessor technology to provide manufacturers with defect profiles and statistical process control data for real-time process and quality control.

For field applications, III has worked with customers to develop highly sensitive portable leak detectors that combine high reliability with rugged durability.

Applications research in one case produced III's Model 120 Leakgun, which can trace one part SF_6 in 10 parts air. Another breakthrough product allowed a manufacturer to implement non-destructive testing of a delicate product where 100% inspection had been previously impossible due to time and cost constraints.



QUALITY DEFECT DETECTION

ITT's OPTOMAX Division shares the corporation's focus on developing solutions to problems in detection, measurement and analysis by developing solutions based on its image analysis and machine vision capabilities. This technology is based on high speed image capture and analysis of television images. Fast analysis software routines can be readily configured to meet individual applications and provide turnkey automatic inspection and measurement systems. These techniques have been employed to meet the needs of quality testing in the paper and pulp industry by inspecting and evaluating paper samples for the number of contaminants dispersed over a a sheet. Another Optomax application permits "in-line" visual inspection to detect particles in a slurry as it moves through a pipeline. Special illumination techniques and electronic shutters were developed to capture images on a repetitive sampling basis.

Products currently under development at Optomax are directed at automated manufacturing techniques for the factory of the future. These new products provide real-time, in-line process monitoring and extensive statistical process control data via image analysis techniques.

ITT is proud of their experienced and dedicated engineering staff who have achieved an impressive and successful record of solving difficult detection problems.

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Mrs. COLLINS. Mr. Bozorgmanesh.

STATEMENT OF HADI BOZORGMANESH, CORPORATE VICE PRESIDENT, SCIENCE APPLICATIONS INTERNATIONAL CORP.

Mr. BOZORGMANESH. Good morning.

Madam Chairwoman, members of the subcommittee, I am Dr. Hadi Bozorgmanesh and I am a corporate vice president of Science Applications International Corp., an employee-owned company based in California.

I appreciate the opportunity to appear before the subcommittee today to present to you SAIC's efforts in research, development, and deployment of the first generation thermal neutron analysis explosive detection system and to reiterate our commitment and capability to manufacture the quantities of TNA units required to counter the threat to air travelers.

In addition, I would like to take advantage of this hearing to set the record straight on erroneous perceptions regarding the TNA's characteristics and performance.

Madam Chairman, for the past 4 years SAIC has been under contract to the Federal Aviation Administration to develop a practical way to detect explosives in airline luggage and cargo and to build the first generation TNA units for airport operations.

The contract to develop the TNA explosive detector for the FAA was won in open competition and SAIC committed a fast paced but orderly program of research, development, and demonstration which culminated in the successful FAA-run tests for the two prototypes.

As a result of the successful performance of the prototype, the first generation TNA devices are being installed for operational use.

We are pleased to inform you that the construction of these units is underway, and well within the costs.

The initial unit was completed on schedule in June 1989, and successfully passed the FAA acceptance test. It is presently operational at JFK.

The second unit has been shipped to Miami and the remaining units are to be shipped within the next 5 months to Gatwick and other airports.

I can report the latest performance of the TNA at JFK. Since September 21, the performance of the TNA has been 94.5 percent detection probability with 2.4 percent false alarm rate. The emergence of TNA technology as the equipment of choice for detection of explosives has been received by the aviation community with a combination of enthusiastic support, mixed with concerns emanating from misunderstanding and at times unrealistic expectations.

Notwithstanding reports to the contrary, the ability of TNA to detect explosives has been repeatedly verified by impartial evaluators and experts selected by the FAA from other organizations.

This is not to claim that installation of TNA by itself will provide 100-percent secure flights. In fact, no single piece of security equipment or security procedure by itself can provide such a guarantee.

The role that the TNA, or indeed any technology with similar performance, can play is to deter and, with very high probability, detect the placement of explosives in the air carriers and, thereby, make reoccurrence of tragic incidences such as Pan Am 103 highly unlikely.

Another point of clarification to this subcommittee concerns the assumption by some groups that there may be harmful residual radiation associated with the baggage processed through the TNA.

Madam Chairman, I would like to delineate the facts related to this issue for the record and with the hope that once and for all it will be placed in the proper perspective.

A typical human being, as a result of living a normal life in the United States receives about 140 millirems of radiation per year; if living in Leadville, CO, this person receives about 280 millirems per year.

If you are an airline pilot, a flight attendant or a frequent flyer, you receive about 280 millirems per year.

And in an extreme case, such as living in Morro do Ferro, Brazil, you receive up to 20,000 millirems of radiation per year. The most extreme case of residual radiation in a bag passing through the TNA is 0.003 millirem per hour.

I assume my time is up.

[The prepared statement of Mr. Bozorgmanesh follows:]

Science Applications International Corporation

STATEMENT

OF

DR. HADI BOZORGMANESH
CORPORATE VICE PRESIDENT

SCIENCE APPLICATIONS INTERNATIONAL
CORPORATION (SAIC)

CONCERNING

THE

THERMAL NEUTRON ACTIVATION (TNA) EXPLOSIVE DETECTION SYSTEM (EDS)

BEFORE THE

SUBCOMMITTEE ON

GOVERNMENT ACTIVITIES AND TRANSPORTATION

September 26, 1989

SAIC

An Employee-Owned Company

9/19/89

Madam Chairman and members of the Subcommittee. I am Dr. Hadi Bozorgmanesh and I am a Corporate Vice President of Science Applications International Corporation (SAIC), an employee owned company based in California. I appreciate the opportunity to appear before the Subcommittee today to present to you SAIC's efforts in research, development and deployment of the first generation Thermal Neutron Analysis (TNA) Explosive Detection System (EDS) and to reiterate our commitment and capability to manufacture the quantities of TNA units required to counter the threat to air travelers. In addition, I would like to take advantage of this hearing to set the record straight on erroneous perceptions regarding the TNA's characteristics and performance.

First about SAIC and its employees. Employee owned and operated, SAIC is a diversified high-technology company focusing primarily in the areas of national security, energy, environment and health, and high technology products. Founded in 1969 by a small group of research scientists, SAIC has grown into an organization of more than 10,000 people with revenues in excess of $850 million annually. SAIC is truly a unique company -- probably the only company of its size that is so thoroughly owned and controlled by the employees and so dedicated to the national interest.

Madam Chairman, for the past four years SAIC has been under contract to the Federal Aviation Administration to develop a practical way to detect explosives in airline luggage and cargo and to build the first generation TNA units for airport operations. The contract to develop the TNA explosive detector for the FAA was won in open competition and SAIC committed to a fast paced but orderly program of research, development and demonstration which culminated in the successful FAA-run tests of two prototypes at the Los Angeles and San Francisco airports from June 1987 to March 1988. As a result of the successful performance of the prototype, the first generation TNA devices are being installed for operational use.

9/19/89

The science and technology of thermal neutron analysis is neither new nor revolutionary. The application of TNA in a number of industrial and scientific arenas has been practiced for decades. For example, in 1977 SAIC developed the first TNA unit for on-line analysis of the sulfur and BTU content of coal and other minerals. Today, products utilizing TNA are in routine operation in coal and cement processing and other industries. What is exciting, however are the tremendous advances in automated signal processing that have taken place in recent years. The FAA and SAIC have exploited these technology advances in the work that has led to the development of a precise and rapid explosive detection system using the TNA technique.

Indeed the capability of the TNA to detect all types of civilian and military explosives with a high degree of accuracy (averaging 95 percent) and a low false positive rate (averaging 4 percent)was demonstrated in over 40,000 tests performed by the FAA in the Los Angeles and San Francisco airports with actual bags on a real-time basis . It should be emphasized that the system can be operated at close to 100 percent detection probability with a corresponding increase in false positive rate. Another noteworthy conclusion from the FAA test was that this high success rate was attained in finding small quantities of explosives. In addition, in all cases the operationally acceptable rate of 10 bags per minute was maintained. I would also note that the EDS automatically alerts the operator in the event of a possible explosive, removing the problem of operator fatigue associated with other scanning systems.

In June of 1988, based on the successful performance of the two TNA prototypes, the FAA requested SAIC to build and deliver five TNA systems by mid 1990. SAIC had learned much from the experience of the two prototypes and responded to the request with a smaller and more rugged design.

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The tragic destruction of Pan Am Flight 103 reminded us all of the vulnerability of our air carriers to acts of sabotage using the destructive power of plastic explosives. Experts say that our present security equipment was not designed to detect plastic bombs and by-and-large is incapable of its detection with any significant degree of accuracy.

Immediately after this tragedy the FAA Administrator announced the Agency's decision to order an additional TNA unit and expedite the delivery of all six units over six months. SAIC agreed to meet this challenge and build, test and deliver all six units beginning in June of 1989 and ending in January of 1990. (These units are of the smaller and more rugged design referred to earlier).

Madam Chairman, SAIC is pleased to inform this committee that the construction of these units is well under way and on schedule. The initial unit was completed on schedule in June of 1989 and successfully passed the FAA acceptance test. The unit is presently operational at JFK. The second unit has been shipped to Miami and is undergoing operational calibration. The remainder of the units are to be shipped within the next five months to Gatwick and other airports yet to be announced by the FAA.

The emergence of TNA Technology as the "equipment of choice" for detection of explosives has been received by the aviation community with a combination of enthusiastic support mixed with concerns emanating from misunderstandings and, at times, unrealistic expectations.

Notwithstanding reports to the contrary, the ability of TNA to detect explosives has been repeatedly verified by impartial evaluators and experts selected by the FAA from other organizations.

9/19/89

This is not to claim that installation of the TNA by itself will provide 100% secure flights. In fact, no single piece of security equipment or security procedure by itself can provide such a guarantee. The role that the TNA, or indeed any technology with similar performance, can play is to deter and, with very high probability, detect the placement of explosives in the air carriers and thereby make reoccurrence of tragic incidences such as Pan Am 103 highly unlikely.

To those who state that 95% probability of detection is not sufficient, we must reiterate that a higher than 95% detection with the TNA is possible, at the discretion of the airline security supervisor, but one must endure a higher false positive rate. In any event, the TNA detection rate is by far higher than any security equipment in operation, including the X-ray machines and metal detectors used to find weapons on passengers or in their hand -carried luggage..

The criticism of the 4% false positive rate associated with the first generation TNA as being a major operational burden ignores the operational procedures that are used in a selective screening process. The security systems used today for prevention of high-jackings have false positive rates several times higher than the TNA. Yet these equipments rarely have been the source of delay in flights or flow of passengers and bags because of operating procedures employed. SAIC is certain that the operational issues related to resolution of false positives and the flow of bags will be readily resolved through experience gained in the field operations and the input from the experienced and dedicated security professionals employed by the airlines and airports.

Some members of the press have also trivialized the cause of false positives by claims that a "piece of cheese or salami" could trigger the system and cause it to alarm. Madam Chairman, the fact that a suitcase filled with those materials might generate false positives entirely misses the point that the TNA is proven to detect explosives. The TNA will clearly pinpoint the source of alarm and FAA procedures will require thorough examination of its source. Perhaps not too dissimilar is the fact that the change in one's pocket may set off the walk-through metal detector system, but that does not provide a means for concealing weapons.

The TNA technology uses minute amounts of radio isotopes (less than 150 micrograms of 252_{Cf} equivalent to 80 microcuries) as its neutron source. This is about a 100 times lower dosage rate than is produced by a typical X-ray machine currently in use. These sources are doubly encapsulated by stainless steel and have been in routine service in industry and laboratories for decades. As part of the qualification they have been extensively tested for fire and impact. In spite of this record we have heard alarmist predictions ranging from possible nuclear explosions to mischief through sabotage. These concerns are simply based on ignorance of the facts.

In order to duplicate the unlikely event that a terrorist bomb may explode in the TNA system and thereby potentially break the sources encapsulation a simulated TNA was assembled and large quantities of explosives were detonated in it's cavity. The tests on the source showed neither damage to the integrity of the source capsule nor any leakage of radioactive material.

Another point of clarification to this subcommittee concerns the assumption by some groups that there may be harmful residual radiation associated with the baggage processed through the TNA.

Madam Chairman, I would like to delineate the facts related to this issue for the record and with the hope that once and for all it will place it in the proper perspective.

9/19/89

o A typical human being, as a result of living a normal life in the U.S. receives about 140 mrem/yr.; in Leadville, Colorado, residents receive about 280 mrem/yr.; airline pilots, flight attendants and frequent flyers receive about 280 mrem/yr.; and in an extreme case, Morro do Ferro, Brazil, up to 30,000 mrem/yr. The most extreme case of residual radiation of a bag passing through the TNA is 0.003 mrem/hr. (This amount is too small to measure so the number is the result of a calculation.) This is the equivalent of:

- less than one minute of flying,
- spending about one hour in Denver,
- or taking a long ride in a crowded bus.

o A corollary to this notion is the effect of TNA on food and medication. Our average daily dose from consumption of natural potassium in food is 0.054 mrem. A dose from the most extreme scenario of food passing through the TNA is 0.00023 mrem or two hundred times less than our daily consumption of potassium 40 alone or the equivalent of eating a single banana.

Madam Chairman, other technologies may be brought along later that replace TNA. Indeed, SAIC continues to develop other possible technologies as well as improvements to the present TNA. But, the simple fact is--TNA works and it is here now. We should not delay the "good" while waiting for the "perfect.". The safety of air travelers is too important to take that approach.

HB:ajh

Mrs. COLLINS. Perhaps you can expand further on your testimony during the question and answer session which we will begin right now.

I think my first question is that you heard testimony from the previous panel TNA is too heavy, too big, too costly, and that it has a rather large false positive rate.

What is your comment on that Mr. Bozorgmanesh?

Mr. BOZORGMANESH. I can say the following in regard to the size. The TNA unit by itself is 6 feet by 8 feet by 13 feet. That is about 1.4 times larger approximately than the present x-ray units.

Therefore, that issue that it is too large is very difficult to justify. I don't think anybody has complained about tho size of x rays.

Just having it slightly larger than an x ray, I don't think is that horrendous.

Mrs. COLLINS. What about the charge it is too slow? On international flights with 300 or 400 people, you will have to be there 6 hours ahead of time in order to get your baggage checked?

Mr. BOZORGMANESH. That is absolutely false.

The comparison of the speed of TNA with the present x-ray system is very favorable. X rays today do 1 bag every 5 seconds. TNA does 1 bag every 6 seconds.

To say a 1 second difference will create an horrendous slow down of the passenger bags, I think is totally unjustified.

In terms of the weight, indeed it is very heavy. It is 10 tons. That has absolutely no impact in terms of installation.

In the case of Gatwich, it is going, for instance, to be installed in the concourse on the second floor. There was no reinforcement required structurally for the installation.

Mrs. COLLINS. Dr. Annis is trying to answer that question.

Dr. ANNIS. With respect to the comment of the size of the TNA, I would say our x-ray machine, the one I am showing here, is about 10 times smaller not 1.4 times smaller than TNA.

In terms of the through-put, it is two or three times faster, not in the ratio of 6 seconds to 5 seconds.

Mrs. COLLINS. I want to ask TNA, it was also stated that there were—you would have to have perhaps—if there are four flights going out of one carrier's part of the airport, you would have to have four or five of these machines. What is your response to that?

Mr. BOZORGMANESH. I think you are going to need as many machines as are required. If you are going to have four flights leaving at the same time, and they are all jumbo jets, within 1 hour, you are going to process several thousand bags. You probably need several units. There is no question about that.

Mrs. COLLINS. As you know, there have—there has been a great deal of discussion concerning TNA equipment and its effectiveness in detecting explosives. It is my understanding that TNA has a false positive rating of something like maybe 5 or 6 percent; is that accurate?

Mr. BOZORGMANESH. That is correct depending upon the threshold you set for detection. If you want to have 95 percent detection probability, then the false alarm rate could be that high.

On the other hand, at JFK, as I just reported to you, on real bags, after reruns, the detection problem was 95 percent, and the false alarm rate has been 2.4 percent since September 21.

Mrs. COLLINS. It is also my understanding and I have talked to some scientists about this TNA would not have detected a bomb the size of the one used in Pan Am 103. What is your response to that?

Mr. BOZORGMANESH. We are aware of that concern. Over the weekend, a test was performed using quantities of explosive approximately half the size of that which the FAA had thought to be the minimum amount of explosive that would potentially bring down an airplane.

The detection probability of TNA I can report was 71.4 percent with 4.6 percent false alarm for that quantity of explosive.

If you like, one can set the threshold for 95 percent detection probability. In that case, the false alarm rate would go up as high as maybe 10 to 15 percent for one-half the minimum quantity of explosive.

Mrs. COLLINS. Then my question is how good is TNA if TNA has an increasing number of false positives as you try to reach a smaller size bomb?

How effective really is it?

Mr. BOZORGMANESH. I think the question of effectiveness is different than the operational criteria.

Mrs. COLLINS. That is what we are concerned about. The effectiveness. We want to know whether or not it can detect a bomb smaller than the one perhaps that was used in Pan Am 103 or something of the same size?

Mr. BOZORGMANESH. About 3 weeks ago, Madam Chairwoman, I stood at JFK and watched a number of people going through the metal detectors. I found about a 28 percent false alarm rate for people going through the metal detectors and that didn't lead to any delays.

So if you are saying a 4 percent false alarm rate is somehow going to create this huge log jam of passengers and baggage, I don't think that is correct.

Mrs. COLLINS. Mr. Nielson.

Mr. NIELSON. Yes.

I want to disqualify myself a little. I used to work for EG&G in 1967 as a consultant. That has been long enough ago that we didn't dream of the things being manufactured today.

You suggest, Mr. deMoulpied, that the TNA contract and the results therefrom, since they were paid for by the Federal Government, should be shared with other agencies.

Since you also criticize TNA, I am wondering exactly where do you come down?

Would you rather have the saving in money to help your product?

Or would you rather share and produce your own TNA device?

Mr. DEMOULPIED. Your question was would we prefer to have the same amount of money?

Mr. NIELSON. Would you rather have the FAA work with you directly on an alternative system and maybe help your efforts? Or would you simply prefer to have access to the TNA?

Mr. DEMOULPIED. I think this in this particular case, this particular program has been ongoing for a number of years. The moneys spent I have heard are perhaps as high as $20 million. I think the

Federal Government probably has spent enough money on the program to date.

Mr. NIELSON. What I am trying to say, are you saying they put enough money in SAIC and should spread it around to other companies?

Or are you saying the SAIC's R&D results should be made available to other companies to use?

Mr. DEMOULPIED. I don't think at this point the moneys should be further spread around. I think the technology is at the point where it is a good prototype system. That technology, itself, should be provided to qualified vendors to invest their own moneys in further developing the technology to the point where it——

Mr. NIELSON. Let me ask Dr. Fine, Dr. Annis, and Mr. Jenkins the same question. Do you think the research money should be spread around to other companies to supplement what you are doing? Or do you think the TNA technology developed at SAIC should be made available to you?

Dr. FINE. I think it should be spread around to other companies for a variety of reasons.

Mr. NIELSON. In which way? For their own production?

Dr. FINE. For their own production, lowering costs and utilizing the technology which has many strengths so they can combine it with their own technology and make improvements and eventually lead to a more cost-effective system.

Dr. ANNIS. I agree. I think the money should be spread around for some of these other technologies.

Mr. NIELSON. Mr. Jenkins.

Mr. JENKINS. I think, frankly, the major problem is we have a new technology that is totally unproven in an application which involves the public. We should give it time to give a feedback from the field. I have been involved in developments all my life.

I haven't known one new technology going into the field where we got it right the first time. Really, I would say why don't we just allow some time for feedback, but let's implement something right now and hopefully keep investing in the alternative technologies at the same time.

Mr. NIELSON. It was also argued that TNA is still a prototype and only a prototype, and therefore was not a finished product. We ought not to get carried away. Do you agree with that, the three of you? Do you think it is just a prototype only, and therefore we shouldn't get too carried away with production and use of it?

Mr. JENKINS. It is a little more than a prototype, I believe. But we are talking of the application in the field. It only went into JFK this month. We still have not had a chance to answer some of—for example, Mr. Jackson on the previous panel, mentioned several points.

It is one thing talking about a 4 percent false alarm rate on a walk-through gateway where you have the person right there. But what do you do with something that is alarmed and you say this is a bomb? I wouldn't have a employee who would open a bomb.

You just have to take it away or find the owner.

Mr. NIELSON. Dr. Annis, how do you feel about it? Is it a prototype and a prototype only? Or does it go beyond that, as Mr. Jenkins said? In any case, should we be putting a lot of money into it right now?

Dr. ANNIS. We have had experience putting systems of this complexity. I would come down and say it is a prototype and it will be a couple of years before they have worked out the bugs.

Dr. FINE. I don't have a comment on this question.

Mr. NIELSON. Now, Mr. Bozorgmanesh, you have a chance to rebut both of those points. First of all, the money should be spread around and/or you should share your expertise you acquired through your contract with the FAA with the other companies.

The second point, whether in fact your machine is a prototype, or a production model and therefore ought to go ahead.

Mr. BOZORGMANESH. Let me answer the last question first.

We built prototypes which look quite different than the actual first generation machines we put into the field. The present machine certainly is not a prototype when it is compared to the original units. The prototypes were twice as large and much heavier.

In regard to spreading money around, I don't know what specific money we are talking about. I think when we speak about the rulemaking, by no means does it specify SAIC equipment or TNA at all. All the rulemaking is saying, is that the equipment has to meet certain requirements and it just happens that at this point TNA is the only equipment that can meet that requirement.

Mr. NIELSON. Thank you.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Thank you, Madam Chairman.

All of you are in the private sector and developing this equipment, is that correct?

Dr. FINE. Yes.

Mrs. BOXER. I would like you when you answer these questions to try to and step back from your particular interest, if you can for a minute, and just answer the questions so that we can feel very comfortable that you are doing it in terms of what we need to be thinking about.

When I think of technology, the question that always comes to my mind is how quickly are we going to move to improve the particular type of technology. If you take in the recent past television sets, I remember the first television set was huge.

It was heavy. It was very different than what we have today. It is very revolutionary.

Now you can have a TV screen that is this big, the thing is light, et cetera. How fast is this technology moving? That is a very broad question.

Are we looking to see great changes in this technology over the next 5 years, where the machines will be lighter and more effective? Or is this a technology that you think will move slowly. Anyone can answer it who feels he can shed light on the subject.

Yes, sir? Then you, sir.

Dr. ANNIS. I can just give you our experience. This technology, unfortunately, any of these technologies, does not move that fast. For example, in the case of our Z units, this is about 2½ years to go from what I would call prototype to what we are now delivering. We are still going through infant problems.

I would say that you have to look at technologies that are here now if you are talking about the problem of the next 2 years.

Mrs. BOXER. So it is not something that is changing day to day?

Dr. ANNIS. Not at all. Not at all.

Mrs. BOXER. Is there an agreement on this? Yes, sir?

Dr. FINE. No. I would disagree with that.

Before I answer the questions, I need to state that the Department of State security classification guide is in effect on the Thermedics EGIS technology. There are some questions I may have to refer to the closed session.

Mrs. BOXER. OK.

Dr. FINE. Over the last 4 years, the technology in vapor detection has advanced very rapidly with improvements in performance of a factor of a thousand. I do agree in one respect the technology is now frozen, so one can proceed and bring it to the marketplace where it can be used.

But there are already new improvements people have in mind which will take it even further. I would expect the next several years to be a period of very rapidly accelerating developments in size and weight and capability.

Mrs. BOXER. Madam Chairman, this shows you how tough our job is. One of their experts says it is moving really slowly. The other says the next few years will see incredible changes from big to small.

It just shows you—here is a third one. This one is going to come right in the middle between the two.

Mr. BOZORGMANESH. Not quite. I just want to make an analogy that is in my mind, since you have asked us to remove our company hat.

Maybe there is an analogy between the struggle against terrorism and our effort to cure cancer. We are not finding any magic pills. But yet thousands of lives may have been saved by partial solutions as we go along. I think this sort of thing is similar.

Mrs. BOXER. That wasn't my question, but I agree with your comment.

My question was do you think we are going to move quickly toward improvement of these systems or is it a show-moving pace?

Let me move on. Obviously, there is disagreement and some people who aren't sure. In my own mind what I have learned over this last day or so, it has been excellent hearings, is that we cannot afford to rely 100 percent on any system.

In other words, you can't afford to rely 100 percent on intelligence information or 100 percent on technology and that what we need is a basic overall system as the El Al system.

Would any of you disagree with the assertion that despite moving technology, we should still have at our airports to the maximum extent we can, an El Al type of hands on, person to person type of system so that your system is a back up to that?

Mr. JENKINS. Mrs. Boxer, I would like to respond to that.

We have a number of seminars that we run on bomb protection and to say that one particular piece of equipment is a solution is always wrong.

To say that the El Al system is a solution is wrong, because the El Al system in another airline just would not work.

Mrs. BOXER. Why is that?

Mr. JENKINS. You have to have a dedication in the management and in the total security concept. You cannot buy a system. You have to have mainly the dedication and the will to complete the total system. Here we have a mandated solution of little bits and pieces of a system. But yet the total system security is not really a commitment as we see it from the people who should be involved.

We would see, for example, BWI airport has got such a system. It is not the El Al system. But BWI in providing the protection for the airlines, I think perhaps we should look to maybe the airports or certainly the Government being involved with the airports to provide such systems as opposed to relying on airlines to provide this security.

Mrs. BOXER. OK. So what you are saying—you are not contradicting what I said. Because I opened it up by saying that you can't put all your faith in any one particular method, be it the El Al or the intelligence or the technology, but you need a combination, is that what you are saying?

Mr. JENKINS. It has to be customed design and have the will of the people running it to make it work.

Mrs. BOXER. When you talk about will and dedication, which are your words, those are leadership issues. I would respectfully disagree that that can't be done. If you have the will and the dedication in the FAA, as an example, they are the leaders in this area.

I think that that is the strong lesson I am learning. I think Mr. Vincent brought that out yesterday. The will and dedication has to be there in this Congress and in the FAA.

Thank you, Madam Chairman.

Mrs. COLLINS. Mr. Cox.

Mr. COX. Thank you, Madam Chairman.

Mr. Bozorgmanesh, because you sort of got the inside track with your technology, I am going to start with you and make sure that I have clear a few assumptions.

First, is it true that wool contains a greater percentage of nitrogen by weight than dynamite?

Mr. BOZORGMANESH. Not in terms of weight density. That is not correct. TNA doesn't just look at nitrogen. It looks at concentration of nitrogen. That means nitrogen per volume. Therefore, it is not correct just to say that wool has more nitrogen than explosives.

Mr. COX. Well, the question is by weight.

Mr. BOZORGMANESH. By weight, that is correct but it is not relevant to TNA.

Mr. COX. OK. Nylon has as much as some plastique?

Mr. BOZORGMANESH. Again, if you go by weight alone. I think that is a wrong comparison, because the nitrogen in nylon doesn't come in such a high concentration that it could potentially easily trigger the TNA. So theoretically nonetheless, that is correct but again not relevant to TNA.

Mr. COX. You mentioned the deployment of the machine at JFK. How sensitively is the machine presently in operation at JFK set?

Mr. BOZORGMANESH. It is set to detect at the rate of close to 95 percent detection probability. It's performance has been 94.5 percent.

Mr. Cox. To put it in terms of our common denominator, is it set so that it would pick up a 1-pound explosive?

Mr. BOZORGMANESH. I cannot unfortunately talk about the quantity of explosives for obvious reasons, regardless of who else wants to talk about it. What I can say is it is set——

Mr. Cox. Let me say thank you for that sensitivity. We will have other opportunities to ask those questions.

Mr. BOZORGMANESH. It is set to detect quantities of explosives that the FAA previously thought was the minimum threat.

Mr. Cox. All right. Let me ask this question: If I were to wear a vest comprised of thin plastique under my shirt or under my coat, would I be able to board the airplane?

Mr. BOZORGMANESH. Explosives worn by passengers has nothing to do with use of TNA. Therefore, obviously, if you wore such a vest and it was not detected by other means, you probably could board the plane. I don't know what procedures the airlines are employing.

Mr. Cox. If we had your piece of equipment, Mr. Jenkins, in conjunction with the TNA, would you pick me up?

Mr. JENKINS. If you were wearing SEMTEX as a vest, we would pick you up with this machine, yes.

Mr. Cox. Mr. Bozorgmanesh, do you agree with that?

Mr. BOZORGMANESH. I would say that not all explosives can be picked up by sniffers. I think you have to clarify what specific type of explosive you are talking about.

Mr. Cox. Essentially what we are getting at, I suppose, is that your system, Mr. Bozorgmanesh, will not pick up an explosive carried on the person, and your system Mr. Jenkins—is not going to do very well picking up an explosive carried inside baggage. Is that correct?

Mr. JENKINS. Our machine is not going to do well when there is no vapor. There is usually plenty of vapor inside bags. We have developed techniques for extracting the vapor from the bags. We don't usually have a problem on bags, no.

Mr. Cox. So, if that machine were used to check hand luggage, it would be as effective as the TNA machine in picking up plastique?

Mr. JENKINS. Again, we can't say precisely which bomb we detect or whatnot. For SEMTEX plastique, which is the one we are talking about, most terrorists using today, we would detect that bomb unless it were absolutely hermetically sealed in some container.

Mr. Cox. Let me wrap up by asking everyone very briefly on the panel to respond. The TNA machine is based upon nitrogen detection. If we were to focus on resonance absorption systems or fast neutron devices, particularly with the former, we might be able to pick up not only nitrogen, but also carbon and oxygen.

Oxygen, of course, occurs in combination with nitrogen in explosives, so that is a better way to detect hidden explosives.

In the estimation of each member of the panel, how close are we to getting that technology? Mr. Bozorgmanesh, tell me if your company is working on this.

Mr. BOZORGMANESH. I am somewhat familiar with the technology. All I can say is that that it is probably at the minimum, 10 years away, for the following reason: The accelerator itself is not off-the-shelf equipment. One first needs to develop a proton accelerator that is ruggedized.

Then you are talking about going out and deploying the equipment which is going to be much larger than TNA, and maybe two or three times more expensive.

Mr. Cox. Would everybody else respond?

Dr. ANNIS. I would agree with that. That refers to what I said earlier about the time to develop things. I think it is also important to point out that with the exception of the sniffers, where you—if they are not hermetically sealed, which is kind of a big statement, and we have to assume terrorists don't know that, we have already said it in open session many times in the past, none of these techniques actually see explosives. They see carbon, oxygen, nitrogen.

They are also found in ordinary materials. That is a real problem. That is why we have false alarm rates.

Mr. JENKINS. May I address your specific question regarding fast neutron activation? I have first-hand knowledge of the French program, which is being funded by the DGAR, the equivalent of the FAA. We expect to see a device in Orly Airport early next year which will have a combination of fast neutron and thermal neutron.

I would agree the cost of this will be far in excess of thermal neutron alone, and probably be much bigger, too.

Mr. DEMOULPIED. I think that we would agree generally with that as well. Although there may be other technologies that could be combined with TNA or there may be other combinations of technologies that could be developed sooner than the 10-year period.

Mr. Cox. Dr. Fine.

Dr. FINE. I have no knowledge of that particular technology. I would like to sort of weave some of this together. There are three basic technologies for detecting explosives: X ray, which can penetrate a bag and look at the shape and things like that; TNA, which is getting at the nitrogen inside the bag; and there is vapor.

If you have only one of those, it is possible to get around it. If you combine all three of those into one system, either separately or together, you are making it virtually impossible to put a bomb through that technology.

Again, that goes with the next three things: Good intelligence, good training, and competency of the operators. You need all of those to be secure and make sure that the terrorist is facing an impossible obstacle.

Mrs. COLLINS. The time of the gentleman has expired.

Mr. Cox. Thank you.

Mrs. COLLINS. Mr. Owens.

Mr. OWENS. Could we agree that there is no combination of equipment or procedures that can make up or compensate for a lack of this dedication and management and leadership that Mr. Jenkins referred to before? Is there any—do one of you propose that there is a system that can compensate for that?

Mr. BOZORGMANESH. Technologies, Congressman, can only provide tools. Therefore, it is the security professionals that really determine in the final analysis how effective the tools are going to be.

So, I guess the response to your question is that there isn't any single technology now or ever that by itself can, without effective users, be the total answer.

Mr. OWENS. We are back to the proposition that the El Al model should be replicated? We keep coming back to that, panel after panel wants to avoid coming down with that kind of hard statement, that you have to replicate that no matter what.

Mr. BOZORGMANESH. I would like to make a comment about that, if I may, sir. I think you have to define what you mean by the El Al procedure. As a traveler who has used both El Al as well as the U.S. carriers who supposedly follow the same procedures, I see a major difference between what is so-called El Al—as used by El Al and as used by U.S. carriers.

There are only certain elements of the El Al program that are used by U.S. carriers. If you look behind what goes into interrogation when you fly El Al, you will find it is tied to the intelligence community in Israel. It is basically an on-line intelligence operation, and there is absolutely no comparison, in my judgment, between the two systems.

Therefore, we have to really be very careful when we say that we have applied the El Al procedure here and there I think, we need to define it more fully.

Mr. OWENS. There are always limitations when you start applying and making parallels. Can we not draw from that system and use it as a model for developing systems which are more effective than what we have now on U.S. carriers? That is my question. Yes?

Dr. ANNIS. I would agree with what he said. If I may quote David Shakhar, the chief of security of the Israeli Airport Authority, he is currently in charge of implementing this system in Israel.

When he was visiting the Congress some time ago, he mentioned that he uses our x-ray equipment in connection with what you call the El Al system. He represented that it was about 15 percent technology and about 85 percent the rest of it. He also believes—and I don't think I am misquoting him—that for use in the United States, we must stress more technology than the Israelis, because it would be very difficult for us to put in the full-up system as used in Israel in the United States.

I believe that we do have to have a higher percentage of high technology than they do. I think it will ultimately be much cheaper for us.

Dr. FINE. I would like to in some way emphasize that. I think the new technologies, certainly the ones I am familiar with, are tools to be used carefully. It is much like giving soldiers a new battle tank. It can be a very high-tech battle tank, but if they don't use it appropriately, point it in the right direction, it won't hit the target.

The new vapor technology and other technology is related to that.

Mr. OWENS. We are back to the argument of how well-trained are our personnel who implement the security systems, how well-paid they are, how well-trained they are.

Mr. Jenkins, you mentioned the gadget you have there is used by the Army and the Navy, you said?

Mr. JENKINS. That is true, sir.

Mr. OWENS. Can we assume that the bomb detection devices and equipment that have been developed by the military, that we have the benefit of the best that they have developed to date?

Mr. JENKINS. This particular detector is the only one that is accepted for use by the U.S. Army and the U.S. Navy, and has been thoroughly tested in various field trials and is the best available right today.

Mr. OWENS. Can we assume that whatever else they have, that they develop, is being utilized in civilian air safety programs?

Mr. JENKINS. I would like to say the FAA are the lead agency as far as the Government is concerned in the research in this field. Although the Army and Navy have put in considerable funds in this direction, you can take it that the FAA are aware of the latest developments and have funded most of the latest developments.

Mr. OWENS. That doesn't answer my question. Are we aware of the latest developments in the military—maybe that is a question I should ask in closed session—the best they have, is it available for civilian use?

Dr. FINE. I would like to answer that question, but it has to be in closed session [due to classification].

Mr. OWENS. My next question: Is there cooperation as great as could be between governments, you mentioned France a few minutes ago, France and Great Britain and all the others? Maybe even the Soviet Union? Everybody says they are against terrorism and want to combat it. Is there some kind of international effort that we assume we are benefiting from in terms of research which relates to Congresswoman Boxer's question about how fast can this technology move?

Can we assume that it is moving as far as it can move if there were a special effort made, if we considered it to be an objective like putting a man on the Moon? Could we get a faster, better technology—can we get better technology faster? If we assume the safety of airline passengers is as important as putting a man on the Moon, can we have a crash program to get more done faster?

Mr. JENKINS. I think there is a considerable amount of cooperation at the international level. For example, we have the cooperation of Czechoslavakia telling us what is in their SEMTEX explosives. There has been an agreement this year on—an outline agreement—to tag explosives possibly. We will look forward to that in the coming years.

To move on an international basis, it is much slower than a national basis. For example, the new ruling by the FAA is not accepted by the DGAC. I don't think that either France or Germany will accept California 252 in their airports. We would like to have a different method of neutron supply for those countries.

Mr. OWENS. Somebody else.

Mr. BOZORGMANESH. I just came from Europe talking to those governments. Since my first trip there regarding the implementation of TNA, I found there is a tremendous change of attitude. I find the European governments in general much more accepting of the FAA's rule for implementation of explosive detection systems.

Mr. OWENS. Are they doing research? Committing funds to find better ways to deal with the problem?

Mr. BOZORGMANESH. Both the French and the British, have very large R&D efforts underway trying to create their own version of the TNA system, which is very close to what we have in this country.

Mr. OWENS. Thank you.

Thank you, Madam Chairwoman.

Let me say that for a couple of questions that have been asked of this panel, the response was that they could only give the response in executive session. This panel is not listed as being among those who will be in the executive session. Therefore, I ask as a response to those questions, that you send those answers to the subcommittee in writing in a very short period of time.

Thank you, gentlemen, for appearing before us.

Mrs. COLLINS. We now call the next panel. Mr. Frank Conrad, Sandia National Laboratories; Mr. Lee Grodzins, FAA consultant, Massachusetts Institute of Technology; Peter Trower, nuclear physicist, University of Richmond; and Billie Vincent, former Director of Civil Aviation Security, Federal Aviation Administration.

Would you come forward please. Would you gentlemen stand and raise your right hand?

[Witnesses sworn.]

Mrs. COLLINS. Mr. Trower.

STATEMENT OF PETER TROWER, NUCLEAR PHYSICIST, UNIVERSITY OF RICHMOND

Mr. TROWER. It is good to be here. I appreciate being allowed to testify. I am not from the University of Richmond, and as far as being a nuclear physicist——

Mrs. COLLINS. I am sorry——

Mr. TROWER [continuing]. Is concerned, I do that as a hobby. I do mainly highly experimental energy physics.

How did I get involved in detection of explosives? About 3 years ago, my colleague Louis Alvarez asked me to join him to work on a scheme to detect explosives being developed under the rubric of the nitrogen camera. It is an imaging device that uses an accelerator and high energy electrons for the purpose of changing nitrogen 14 into nitrogen 12 and also into boron-12.

The scheme is a technical scheme. We can talk about that later.

My colleague, Louis Alvarez, had some standing in the scientific community, having won a nobel prize in 1968, as well as some standing in the aviation community, having won the Collier's air trophy in 1946 for ground control approach. However, ground control approach was never accepted by the FAA to be used as a device to be installed at airports, despite the fact it was used militarily with some success.

In the process of looking at our technique to see whether it had any potential or not, we submitted a couple of proposals to the FAA, and were denied funding. We then decided that we would fund it on our own and so, some 2½ years and $300,000 later, Louis, who is now deceased, the Royal Institute of Technology in Stockholm, and I are in the process of proving whether the device will work or not.

One of the things that happens when you irradiate nuclei with high energy electrons is, you also get out a lot of neutrons. We find that we get as many neutrons out in an irradiation of a bag. The way we do it, is similar to TNA, and so what I decided to do is to look into seeing how effective those neutrons would be to do the TNA kind of process.

What I discovered was that TNA doesn't work. Now, we have to specify what "not working" means. The FAA has kindly specified that for us when they put out their broad announcement for proposals. They said they had wanted not more than a 2 percent—preferably 1 percent—false alarm rate, greater than 95 percent detection probability, and they wanted to have a through-put of 10 bags per minute. They didn't say anything about cloaking of the device to cause the things to get through by guile.

Realizing in my rough calculation that—and according to the SAIC gentleman here—that those specifications weren't met, I then tried to find out from the FAA, the Department of Transportation, consultants, and contractors to the FAA, whether there had ever been a test. I talked to 14 people, whose names I will be happy to provide the committee, and was informed that there wasn't an acceptance test as a blind test.

What had happened, and I had seen this occur, SAIC people at the United terminal in San Francisco had a bag that they knew had explosives in it. They threw it in the baggage train, and tweaked the detector to see how many times they could find it.

A blind test was finally done. It was done in June of this year by the FAA. I was not present for that. The results of that test will be talked about in executive session, I understand, but I can tell you that the TNA device did not pass that test. It passed it not as badly as I thought it would pass it.

Now, so that I—when I tried to bring this to the attention of the people that were involved in the process of evaluation, I did not want to be put in a position of being in special pleading. So what I did was write Congressman Oberstar a letter forsaking any further interest and involvement with the FAA with respect to any funding, forever. So I am not selling something at this point.

I can say some more things about the way in which acceptance tests are done. I can say some more things in about 2 months about doing some tests myself on neutrons. I have been mainly concentrating on the other things.

But I guess I would like to finish by saying something about the FAA's procedure that they use in order to encourage the scientific establishment in the United States to think about problems that the agency has and want solutions for. My own personal experience was they are enormously discouraging. When you submit a proposal, you will not get written reviews of what your deficiencies are in your proposal. You will be required—at least we were required—to come back and talk to somebody who they wouldn't name that was the expert on this committee, which turned out to be all government employees, who would tell you what was wrong with your proposal. It was very unsatisfactory.

Thank you.

Mrs. COLLINS. You probably will be able to expand on that as we get into the question and answer session.

Thank you.
Mr. Vincent.

STATEMENT OF BILLIE VINCENT, FORMER DIRECTOR OF CIVIL AVIATION SECURITY, FEDERAL AVIATION ADMINISTRATION—Continued

Mr. VINCENT. Thank you, Madam Chairwoman, members of the subcommittee.

Yesterday afternoon, I opened my testimony before this subcommittee with comments about my emotions after listening to the morning's testimony. I said that I was frustrated, perplexed, and distressed with what I had heard. You can now add despair to that, because I despair of the system ever being changed.

During my appearance, one member asked me if I believed there had been a coverup. I responded in an inadequate and rambling fashion, probably because I had not sorted out this possibility in my mind. I have since had a rather sleepless night thinking bout the issues raised yesterday. The emotional input by the families of Pan Am Flight 103 victims was particularly troubling. Yesterday, the Victims of Pan Am Flight 103 called for the resignation of Mr. Raymond Salazar, my successor to the position of FAA Director of the Office of Civil Aviation Security. This was particularly distressing to me because I know the difficulty of his job.

My sleeplessness kept bringing me back to the question of a coverup. I have concluded that there has been, and continues to be, a de facto coverup of the undisguised fact that the U.S. Civil Aviation Security System is neither adequate nor effective in face of today's terrorist attacks.

This is so in the sense that the executive branch of Government comes to these hearings with the intention of assuring all of us that they are doing their job, everything that needs to be done is being done, and that all we have to do is trust them, that is, the experts. They particularly want to reassure the subcommittee members in order to "keep Congress out of the executive's business." They believe that they don't need help, and that the inquiries only distract them doing their everyday business—what Congress wants them to do anyway—protect the taxpayers.

Of course, the FAA representatives deny this. Nonetheless, their testimony suggests otherwise. Mr. Salazar claims that the U.S. Civil Aviation Security System is the preeminent system. Webster's New World Dictionary defines preeminent as: eminent above others; especially in a particular quality; prominent, surpassing. Yet Mr. Salazar acknowledged, after being pressed, that the El Al system was probably the model civil aviation security system in the world.

On another occasion, Mr. Belger, the FAA Associate Administrator for Aviation Standards, said the U.S. Civil Aviation Security System far surpassed any system of any airline in the Middle East, as I recall. I challenge this assertion. First, I know of no study by the FAA or any other organization on which this assertion is based. I personally do not agree with Mr. Belger's claim, and I fly in the Middle East relatively frequently. Moreover, if Mr. Belger wishes to extend this claim to cover Europe, he is even more vulnerable to challenge.

My point in using these two claims is to illustrate the point that this subcommittee is being told that everything is being considered, taken care of, et cetera. At best, this is obfuscating the issues, and at worst, it is a coverup, because these dubious claims distract from reality—the U.S. Civil Aviation Security System will not prevent another Pan Am Flight 103.

Madam Chairwoman, if I may again impose on the subcommittee, I will illustrate my point about inadequacy in the U.S. Civil Aviation Security System. I will need to use the easel for a couple of minutes, if I may.

There are two matters, three, that I would like to use to illustrate my point. As illustrated yesterday, in my statement for the record that is attachment C——

Mrs. COLLINS. Could you speak a little louder, please?

Mr. VINCENT. As I illustrated in my statement for the record, attachment C, the Ann Murphy bomb contained the timer and blasting cap inside a calculator. This bomb did not have a barometric sensor. it was activated before it was given to Ms. Murphy, and she unknowingly tried to carry the bomb on board an El Al aircraft.

As I also illustrated yesterday, three of the more sophisticated bombs—that is attachment A, this one—the under-the-seat-cushion bomb. Attachment B, that is this one, the suitcase bomb, and attachment E, the representation Toshiba bomb—all have barometric sensors. These bombs are not activated until the aircraft climbs above a preset altitude.

The FAA has mandated, in its screening techniques for examining electronic devices, one technique that may detect active bombs. This technique may also detect other active electronic devices. My point is that the most sophisticated bombs—these three—referring to attachments A, B, and E—are inactive when the FAA technique is being used, that is on the ground. They are not active because they do not turn on until they get in the air, and these will go undetected using this detection technique.

The FAA countermeasures for examining electronic devices also contain other techniques, although the most effective one has not been mandated. That technique requires the use of enhanced technology x-ray screening units, as Dr. Annis from AS&E has illustrated and are also made by EG&G Astrophysics now.

Mrs. COLLINS. Are you saying that the TNA will not detect those bombs?

Mr. VINCENT. The TNA may not detect these because of the small amount of explosives. The detection technique that is a part of the process that is now used by the FAA to detect active electronic devices also will not detect these barametric devices. There are other technologies that will, but they have not yet been mandated by the FAA.

[The prepared statement of Mr. Vincent follows:]

OPENING STATEMENT BY
MR. BILLIE H. VINCENT
BEFORE A
SUBCOMMITTEE OF THE
COMMITTEE ON
GOVERNMENT OPERATIONS
HOUSE OF REPRESENTATIVES
SEPTEMBER 26, 1989

Madam Chairwoman and Members of the Subcommittee:

Yesterday afternoon I opened my testimony before this Subcommittee with comments about my emotions after listening to the morning's testimony. I said that I was frustrated, preplexed, and distressed with what I had heard.

During my appearance, one member asked me if I believed that there had been a cover-up. I responded in an inadequate and rambling fashion, probably because I had not sorted this possibility out in my mind.

I have since had a rather sleepless night thinking about the issues raised yesterday. The emotional input by the families of Pan Am 103 victims was particularly troubling. Yesterday, the Victims of Pan Am 103 called for the resignation of Mr. Raymond Salazar, my successor to the position of FAA Director of the Office of Civil Aviation Security. This was particularly distressing to me because I know the difficulty of his job.

My sleeplessness kept bringing me back to the question of a cover-up. I have concluded that there has been, and continues to be, a de facto cover-up of the undisguised fact that the U.S. civil aviation security system is neither adequate nor effective in face of today's terrorist tactics.

This is so in the sense that the Executive Branch of government comes to these hearings with the intention of assuring all of us that they are doing their job, everything that needs to be done is being done, and that all we have to do is "trust them", i.e., the experts. They particularly want to reassure the Subcommittee members in order to keep the Congress out of the "Executive's business". They believe that they don't need the help, and that the inquiries only distract from them doing their everyday business, what the Congress wants them to do, anyway - protect the taxpayers.

Of course, the FAA representatives will deny this. Nonetheless, their testimony suggests otherwise. Mr. Salazar claims that the U.S. civil aviation security system is the pre-eminent system. Webster's New World Dictionary defines pre-eminent as: eminent above others; excelling others, esp. in a particular quality; prominent; surpassing. Yet Mr. Salazar acknowledged, after being pressed, that the El Al system was probably the model civil aviation security system in the world.

On another occasion, Mr. Belger, the FAA Associate Administrator for Aviation Standards, said that the U.S. civil aviation security system far surpassed <u>any</u> system of <u>any airline</u> in the Middle East. I challenge this assertion. First, I know of no study by the FAA or any other organization on which this assertion is based. I personally do not agree with Mr. Belger's claim, and I fly in the Middle East relatively frequently. Moreover, if Mr. Belger wishes to extend this claim to cover Europe, he is even more vulnerable to challenge.

My point in using these two claims is to illustrate the point that this Subcommittee is being told that everything is being considered, taken care of, etc. At best, this is obfuscating the issues, and at worst it is a cover-up, because these dubious claims distract from reality - the current U.S. civil aviation security system will not prevent another Pan Am 103.

Madam Chairwoman, if I may again impose on the Subcommittee, I will illustrate my point about one inadequacy in the U.S. civil aviation security system. I will need to use the easel for a couple of minutes.

As I illustrated yesterday, the Anne Murphy bomb (Attachment C 9/25/89 Statement) contained the timer and blasting cap inside a calculator. This bomb did not have a barometric sensor. It was activated before it was given to Ms Murphy, and she unknowingly tried to carry the bomb onboard an El Al aircraft.

As I also illustrated yesterday, three of the more sophisticated bombs (Attachment A, B, & E 9/25/89 Statement) all have barometric sensors. These bombs are not activated until the aircraft climbs above a preset altitude.

The FAA has mandated, in its screening techniques for examining electronic devices, one technique that may detect active bombs. This technique may also detect other active electronic devices that are not bombs. My point is that the most sophisticated bombs are inactive when the FAA technique is being used and will go undetected using this detection technique.

The FAA countermeasures for examining electronic devices also contain other techniques, although, the most effective one has not been mandated. This technique requires the use of enhanced technology X-ray screening units.

In 1986, a U.S. supplier of X-ray screening units offered a unit with the capability of discriminating between low atomic weight objects and high atomic weight objects. In 1987, a second U.S. supplier of X-ray screening units offered an X-ray unit that for the first time offered excellent imaging capability of organic and inorganic objects. Low atomic weight and organic objects may be explosives.

As a specific example: the sophisticated Improvised Explosive Device in the Toshiba Bombeat 453 radio discovered by the FRG BKA in October 1988 reportedly contained eleven (11) ounces of plastic explosives in addition to an electric blasting cap (initiator) and batteries (electric power source to activate the blasting cap), separate from the batteries powering the radio. It short, it was a fully functioning radio.

If the batteries powering the radio were removed by security personnel, it would still have been a fully functioning bomb. A physical security examination, short of opening the radio, would not have discovered the bombs hidden inside.

An X-ray examination of this Toshiba radio with the standard X-ray might have discovered the bomb hidden inside; however, it is probable that it would have evaded detection. On the other hand, if an enhanced technology X-ray unit had been used in the examination, it is highly unlikely that a well-trained operator would have missed the 11 ounces of Semtex plastic explosive hidden inside the radio.

The operator would have seen an organic or low atomic weight substance in a completely inorganic object, i.e., radio.

This is an example where technology is available, but its use is not mandated by the FAA.

This Subcommittee has set for itself an ambitious undertaking to conclude these hearings in two days. I suggest that two weeks would be necessary just to define the extent of the problem. The Members of this Subcommittee are faced with an impossibility - two days to handle a highly technical and complex subject.

You are about to enter an Executive Session where the FAA representatives will regale you with a myriad of technical security countermeasures. The things that will not be said are where the "holes" are in the system. While the Subcommittee will have the GAO evaluations at their disposal, I doubt if the GAO will be able to identify deficiencies such as the one I illustrated on the screening of electronic devices. I mean no reflection on the competence of the GAO, but they are not civil aviation security experts.

Madam Chairwoman, In closing I would like to submit for the record a petition by the Victims of Pan Am 103 for rulemaking by the FAA to require screening and inspection of checked and carry-on luggage. I would also like to submit for the record my comments to the FAA in support of this petition on August 7, 1989. This petition and my comments address several of the issues relating to the use of technology in the U.S. civil aviation security system.

Thank you for the opportunity to participate in these hearings, and I will now answer any questions you might have.

Billie H. Vincent
12630 Heritage Farm Lane (H) 703-860-8317
Herndon, Virginia 22071 (O) 703-525-2004

Mr. VINCENT. These are enhanced x-ray units. In 1986——

Mrs. COLLINS. Have you completed your illustrations?

Mr. VINCENT. Yes.

Mrs. COLLINS. You have also run out of time.

Mr. OWENS. I ask that he be given an extra few minutes.

Mrs. COLLINS. Is there objection?

Mr. NIELSON. I object.

Mrs. COLLINS. All right.

The Chair hears objection. Therefore, we will go to our next witness, who is Mr. Grodzins?

STATEMENT OF LEE GRODZINS, FAA CONSULTANT, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. GRODZINS. Thank you, Madam Chair.

You asked me in the letter to explain the various types of explosives, give an assessment of their various techniques, recommend what device should be employed.

I tried to do that in a 21-page submission to the committee. Obviously there is not time to do that now. I will talk until I run out of time.

Let me begin by saying that I am a consultant to the FAA, that I, my work is carefully circumscribed so that there is no implication of conflict of interest.

When I either advocate or criticize, obviously I have my own views about which systems I like and which ones I don't.

The FAA has been funding for a number of years an entire orchestra of ways of combating terrorism. And not just one or two systems that have gotten a lot of publicity. Those systems as far as the nuclear methods are concerned consist of at least 12.

I have indicated 12 of them. I would say that six or seven of them deserve very close attention and really deserve our funding. Only a few of them have been adequately funded. In fact, probably only TNA has been adequately funded.

I think the others are slowed down considerably because of the lack of funding.

Permit me, in contrast to previous speakers, to add in my view of 3 years of close experience with Dr. William Wall and his team at the FAA center in Atlantic City, in my view, they are doing exceptional work. I mean under the most difficult circumstances.

They have succeeded in producing the first airport security system that will detect clandestine explosives and they continue to push the envelope of the Nation's technology in order to develop the best security system possible.

They exemplify the finest of public servants and they deserve our thanks.

Explosive materials are unique. That may come as quite a surprise. The fact is there is no other material that we know of that have high densities of nitrogen, high densities of oxygen, low densities of carbon.

When you put those together, I have not found any kind of material that can mimic an explosive. If we can possibly detect inside luggage the carbon, nitrogen and oxygen densities, we will have a unique signature and we can close that port against terrorism.

That doesn't mean terrorists can't find other ways, but at least those portals will be closed. That point is illustrated in the four figures which I am not going to discuss right now.

About TNA, you have heard a great deal about it. I am not going to discuss that here in open session. I have asked for the opportunity to discuss that in executive session. There are other techniques.

One of them being pushed very vigorously by the Israelis as well as by the Los Alamos National Laboratory who have taken the Israelis scheme and running with it, both of them being funded by the FAA that scheme called "resonance absorbent gamma-rays."

It is relatively small, it has a relatively false alarm rate.

Another scheme pushed vigorously by the same thermal neutron company, SAI, wants to investigate the carbon, nitrogen, and oxygen using the fast neutrons. The system of Dr. Trowers also would like to look at nitrogen.

There are other systems using fast neutrons. These have not been supported vigorously enough. It is not the FAA's fault.

It is really the fact that there is just not that much money around.

Let me conclude with what time I have been by simply going through my recommendations and conclusions. TNA has undergone months of field tests. I have taken part in some of them. It is still not fully tested.

I agree with a number of speakers about that. It should be out there in the field. Six or seven units must be placed out there to find out how well they would do. I don't think we will know the answers for many months.

My strongest and most heartfelt recommendations is that the broad deployment of any system, TNA or any of the new systems, including all the x-ray systems—and I have discussed five new ones in that 21-page report—should only be deployed if the system passes double-blind tests based on the threat that the FAA considers relevant now, not what they considered relevant 4 years ago.

These requisite tests should be designed and administered by a neutral group, not the FAA, not the SAIC, not one of the proponents. I suggest the National Academy of Sciences.

Until we have such a neutral group carrying out these tests, we will always have disputes about whether or not these systems are going to work. The resonance absorption of gamma-rays should be capable of detecting small thin nitrogen explosives with excellent probability.

Several groups should be funded with the expectation that initial systems can be ready for airport testing within 2 years. The fast neutron schemes have decided merits over TNA.

They are the only methods proposed to measure the distribution of all major elements that make up all explosives. The attainable spacial resolution has not been determined, but it will almost certainly be better than the present thermal neutron system.

My time is up. I will answer any questions if you have any.

[The prepared statement of Mr. Grodzins follows:]

Testimony of Lee Grodzins
before the
Sub-Committee on Government Activities and Transportation
House Government Operations Committee
Representative Cardiss Collins, Chair

September 26, 1989

Lee Grodzins
Professor of Physics
Massachusetts Institute of Technology
Consultant to the Federal Aviation Administration

The detection of concealed explosives is difficult, but it is by no means impossible. The application of advanced nuclear technologies to this problem during the past few years gives us confidence that secure systems can be developed that will be fast, accurate and cost-effective. These developments, as well as those being made in other disciplines, must be pursued with vigor and over the long-term. We are doing battle with well-trained terrorists whose weapons are sophisticated, and getting more so. If we do not continue to explore new technologies, if we do not carry the best of them to completion and deployment, we will lose the war.

NUCLEAR-BASED METHODS FOR DETECTING EXPLOSIVES

L. Grodzins
Physics Department
Massachusetts Institute of Technology

Introduction

Thank you for inviting me to present my views on the present status and future possibilities for using nuclear methods to detect clandestine explosives.

Much has been made of the Thermal Neutron Analysis system. But it is only one of a dozen distinct schemes. Some of these methods are far enough along in their development to give us confidence that they will be decisive improvements over TNA. I will give an overview of these schemes, concentrating on the most promising. I have three principal aims: First, I hope to provide you with the information you will need for your deliberations. The information is dense and complex. I have described it in some detail in order to convey my second point that war against terrorism on board aircraft is being waged on a broad technical front and that there is every reason to be optimistic that we can win that war. Finally, I want to present my own opinions as to which nuclear and X-ray techniques have the greatest potential for giving us that assured deterrence.

A word about my background. I have been an experimental nuclear physicist for more than 40 years. I have worked directly with many of the nuclear techniques that are proposed for finding chemical explosives. Last year, I took a sabbatical from my directorship of the Relativistic Heavy Ion Group at M.I.T. to devote more time to the FAA work. I am now back to teaching, but the press and the importance of the FAA work has forced me to continue to delegate the Directorship.

I have been consulting for the Federal Aviation Administration for three years on nuclear methods for finding explosives. My principal functions are to review, evaluate and assist programs; to advise on new proposals, and carry out model calculations; and to do experiments to evaluate the scientific questions that arise.

It is not irrelevant to know that I am supported in this work through an FAA contract with the Department of Transportation; a contract administered by M.I.T.'s Center for Transportation Studies. The FAA pays my M.I.T. summer salary and supports students, computerology and some experimental studies. The work is carefully circumscribed so that there will be no implication of conflict of interest when I either advocate or criticize.

Finally, permit me to add that in my long experience with dealing with funding and contract officials from many agencies, I have met none more dedicated, more unbiased, m e aware the importance of their job than Dr. William Wall and his team at the FAA C ter in Al c City. They are doing exceptional work, often under difficult circumstanc hey have succeeded in producing the first airport security system that will detect cla stine explosives. And they continue to push the envelope of the nation's

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technology in order to develop the best security system possible. They exemplify the finest of public servants and they deserve our thanks.

General Remarks on Finding Explosives

Securing an airplane against explosives requires searches of hand bags, hold luggage and people; my involvement is with the first two. Such searches must be reliable, rapid, non-destructive, non-invasive and cost-effective. All the techniques that meet these criteria -- especially reliability -- use ionizing radiations that penetrate a bag and produce an identifying signal when encountering an explosive. All of these techniques are nuclear. Chemical sniffers, X-ray scanners, magnetic resonance, ultra-sonic, infra-red, microwave and other non-nuclear techniques have been considered and have always be found to have major, usually fatal, flaws when applied to luggage. None are contenders at this time as a first line defense against explosives in luggage.

Nuclear radiations, such as neutrons or high energy photons, can easily penetrate the largest suitcase. And the interactions of these penetrating radiations with the elements in the luggage result in signatures that can identify a bomb uniquely.

The Uniqueness of Explosive Material

Explosives that are used by trained terrorists may be found in bulk or sheet, they may be made of moldable plastic or dynamite; they will all have high yield and reliability. Such bombs have physical characteristics which together set them uniquely apart from all non-explosive materials.

All explosive materials have high densities, typically one and a half times that of water; they have relatively high nitrogen and oxygen concentrations and relatively low carbon and hydrogen concentrations. No single characteristic is unique; many common non-explosive materials have similar densities, or nitrogen concentrations. But a much smaller sub-set of materials have the high nitrogen density of explosives, and almost no common materials have both the high nitrogen and oxygen densities that characterize all explosives. If we can reliably measure the distribution of nitrogen densities inside a bag, we will have an assured deterrent against explosives with few false alarms. If we can measure the distributions of the nitrogen, oxygen and carbon inside a bag, we will have that security with almost no false alarms. These points are made in the first 4 figures.

Fig. 1 shows the density of a representative group of explosives and materials commonly found in suitcases. Density measurements, which is what an X-ray scanner determines, do not distinguish explosives from other materials made from carbon, oxygen, hydrogen and nitrogen. X-ray scanners can, however, distinguish clothing from explosives since one cannot pack clothing more dense than about one-fifth of a gram per cubic centimeter; that is, about 15% of the typical bomb density.

Explosives are rich in nitrogen. But Fig. 2 shows that the fraction of the bag that is nitrogen is not a good measure of the presence of an explosive. Fabrics made from silk, wool, nylon or orlon contain high fractions of nitrogen and would not be distinguished unless the amount of nitrogen per unit volume is measured; that is, we must measure the nitrogen density in the bag if we are not to be plagued with many false alarms.

Fig. 3, which gives the nitrogen density of the materials in Figs. 1 and 2, shows that if the distribution of nitrogen density can be measured accurately then only a few materials will mimic the explosive. Unfortunately, these nitrogenous materials, such as melamine, solid nylon and leather, are not too uncommon. False alarms will be observed by any system that only measures nitrogen.

Explosives contain high concentrations of oxygen as well as nitrogen. Innocuous materials do not. The point is illustrated in Fig. 4, which correlates the oxygen density with the nitrogen density for the materials in Figs 1,2 and 3. All of the explosives are contained in the square. All non-explosives are well outside the square.

We emphasize that if one can measure the density of the 3 principal elements of explosives then one will have a truly unambiguous signature. The point is probably best made by considering polyurethane, a dense plastic that has a nitrogen density equal to that of dynamite or black powder and an oxygen density that is 2/3rds that of black powder. But the carbon density of polyurethane is more than a factor of 2 greater than that of black powder, and more than a factor of 4 greater than that of dynamite. A measurement of the C, N, and O densities throughout a bag will unequivocally distinguish explosives from non-explosives.

Surveillance Techniques

1. X-Ray Scanners:

The standard airport X-ray scanners produce projection maps of the density of the surveyed contents. Figure 1 shows that such maps cannot distinguish explosives from many of the common items in baggage. Moreover, these X-ray pictures are scanned by human eyes that may be distracted, misled, bleary or closed. Despite these shortcomings, the ubiquity and modest cost of such scanners is so appealing that the FAA has sponsored a number of programs that seek both to find distinguishing X-ray interaction signatures -- such as shapes together with densities -- and to automate the decision making.

All such programs have been unsuccessful. But the story is far from over. New X-ray scanning concepts, summarized in Table II, should greatly i[illegible]ove the capabilities of older systems.

The improvements are in several directions: more views, including a three-dimensional picture; the ability to distinguish between the light (plastic) and the heavy (metal) components in the bag; and increased sensitivity and accuracy of density measurements.

Prototype systems of the new generation of X-ray machines have been built by their proponents. None, however, have been adequately tested as security systems in realistic environments. <u>But most of the prototypes are reading for testing immediately in airports, either as stand-alone systems or as additions to the TNA system.</u>

Computerized decision making may be possible with these newer concepts, but it has not yet been done. If the tests show any one of the systems can automatically distinguish the shapes and densities of light and heavy materials in a bag, then we will have a very effective second-line defense against terrorism, greatly improving the sensitivity and reliability of any first-line system.

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2. Nuclear Probes:

A dozen, distinct, nuclear-based methods have been proposed. A summary is presented in Table I; a brief description of each is given below Table I. The FAA has supported the research or development of about half of them, some for many years.

The techniques use different radiations to interrogate the luggage, or different radiations to tell that an explosive is present. Seven of the methods measure only nitrogen; each making use of a different property, hopefully unique to nitrogen, to signal the presence of the explosive. Five of the methods seek to measure all the major elements in an explosive, carbon, oxygen and nitrogen, by using fast neutrons for the interrogation.

Two of the methods (TNA and FNA) send the luggage through baths of neutrons; all other methods send the luggage through directed beams of either photons or fast neutrons.

TNA, method 1, is the only one commercially available. All others are in various stages of development, ranging from early proof-of-principle experiments to data taking using arrays of detectors. An example of the last, and the system that is probably closest to commercial production, is Method 5, the Resonance Absorption of Gamma Rays.

Present Status of Resonance Absorption of Gammas: This technique was first proposed several years ago by a group of scientists in one of the laboratories in Israel. It is a very attractive scheme, in part because it uses no neutrons so that no radioactivity is ever created and shielding is easy and cheap, in part because the gamma rays are very penetrating and impossible to thwart, and in part because the signal is unambiguous and unique. The FAA has been funding the development in Israel and a parallel development at Los Alamos Scientific Laboratory.

Both groups have recently demonstrated that the technique is capable of finding small and thin explosives hidden in the complex of full suitcases. The Israeli scientists propose to build a prototype of a commercial system that will detect less than 1 pound of explosive in luggage. The schedule for completing the prototypes will depend entirely on the time it takes to construct the needed accelerator, which must deliver a much higher current than is available from manufacturers today; they estimate about 2 years from the start of funding.

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Table I

Methods of Detecting Explosives

Proposed Nuclear Techniques

Method	Incoming Radiation	Outgoing Radiation	What Measured	Status
1. Thermal Neutron Analysis	Low-Energy Neutrons	Energetic Characteristic γ	N	In Production SAIC
2. Fast Neutron Analysis	High-Energy Neutrons	Energetic Characteristic γ	C, O, N	1st Stage of Development SAIC
3. Pulsed Neutron Beam Analysis	High-Energy Neutrons	Energetic Characteristic γ	C, O, N	1st Stage of Development SAIC
4. Associated Particle Production	High-Energy Neutrons	Energetic Characteristic γ	C, O, N	Years of Development CCC, LASL
5. Resonance Absorption of Gamma	Unique High-Energy γ	Unique High-Energy γ	N	Ready for Prototype SORBO, LASL
6. Pulsed Thermal Neutron Analysis	Low-Energy Neutrons	Energetic Characteristic γ	N	Tested on Nuclear Waste ORNL
7. Pulsed Neutron Beam Backscatter	High-Energy Neutron	High-Energy Neutrons	C, O, N	Research Measurements proposal, PENETRON
8. Pulsed Neutron Beam Absorption	High-Energy Neutron	High-Energy Neutrons	C, O, N	Research Measurements U. of Oregon
9. Nitrogen 13 Production	High-Energy Photons	Annihilation Radiation	N	Research Measurements Proposal, TITAN
10. Nitrogen 13 Production	High-Energy Photons	Neutrons	N	Proposed
11. Nitrogen 12 Production	High-Energy Photons	Annihilation Radiation Continuum Photons	N	Research Measurements Proposal, Alvarez
12. Boron 12 Production	High-Energy Photons	Continuum Photons	N	Research Measurements Proposal, Trower

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Descriptions of the Nuclear Methods

Volume Sources: The following two methods pass the luggage through a swarm of neutrons.

1. Thermal Neutron Analysis

Fig. 5 shows a sketch of the basic components.
Luggage moves through a bath of slow neutrons. The neutrons are captured by the nuclei. Gamma rays, characteristic of the elements, are emitted. The capture in nitrogen results in the highest energy gamma produced by any element. ^{14}N + slow neutron = ^{15}N + 10.8 MeV gamma. The signals from a hodoscope of gamma-ray detectors are tomographically analysed to give the spatial distribution of nitrogen. TNA is intrinsically matched to seeing bulk quantities of nitrogen. Spatial resolution is limited. TNA cannot detect oxygen or carbon.

2. Fast Neutron Analysis

Fig. 6 shows a sketch of the basic components.
Luggage moves through a bath of fast (at least 8 Mev) neutrons. The neutrons, in a continuous or pulsed stream interact with the nuclei of the elements producing gamma rays that are characteristic of the elements.
Example:
^{12}C + 14.4 Mev neutron = ^{12}C + 10 MeV n + 4.4 MeV gamma.
The signals from a hodoscope of gamma-ray detectors are tomographically analysed to give the spatial distribution of the nitrogen, carbon and oxygen. The method is similar to the successful TNA system (#1). It is inherently a detector of bulk materials with limited spatial resolution. It does, however, give the distributions of oxygen and carbon, as well as nitrogen.

Beam Sources: The rest of the methods pass the luggage through pencil or fan beams of neutrons or gamma rays.

3. Pulsed Neutron Beam Analysis

Fig. 7. A focussed, collimated beam of fast neutrons (at least 8 Mev) is swept across the bag. (In practice, vice versa.) The characteristic gamma rays from O, N, and C are sorted according to the position of the neutron beam. The result is a two-dimensional map of the elemental composition of the explosive. If the beam is pulsed with a timing width of one nanosecond or less, then one can obtain a three-dimensional map of the elemental composition of the explosive.
The spatial resolution is given by the effective beam size and can be considerably smaller than that of TNA. Preliminary results are promising.

4. Associated Particle Production

The fast neutrons are obtained from the d,t reaction: ^{2}H + ^{3}H = 3 Mev alpha + 14.4 Mev neutron. The direction and timing of the alpha particle gives the spatial position of the neutron. The distribution of characteristic gamma rays, measured in coincidence with the timed and positioned alpha particles, results in the three-dimensional elemental mapping of the baggage. Spatial resolution should be adequate to see small explosives. This scheme

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has been under development for a number of years. Simple systems have been successfully tested by two groups.

5. Gamma-Ray Resonance.

Fig. 8 shows the basic geometry of the gamma rays passing through the luggage. It is very similar to the familiar X-ray system used to scan luggage in airports; instead of a fan-beam of X-rays passing through the bags, one uses a fan-beam of precisely the right energy gamma rays. Fig 9 shows all the components of the system. A small accelerator is used to create the precise gamma rays. These rays pass through collimating slits, then through the luggage and into the array of detector. Nitrogen in the luggage preferentially absorbs these resonant gamma rays, causing a dip in the signal strength. The method is a very sensitive technique for finding nitrogen. It is capable of spatial resolutions of the order of a cubic inch. It is almost impossible to thwart. It uses no neutrons and makes nothing radioactive. The method may be applicable to oxygen. The method requires a very high current accelerator.

6. Pulsed Thermal Neutrons

This method is very similar to TNA (#1) but the neutron source is pulsed. The method has been implemented at Oak Ridge National Laboratory where it has been used for some years to determine the elemental composition of materials inside nuclear waste containers. ORNL scientists propose to adapt their technology to the surveillance of luggage.

7. Pulsed Beam Backscattering

A pulsed beam of monoenergetic neutrons is scanned across the luggage. The intensity of the energy groups of elastically backscattered neutrons yields the mass distributions inside the bag. The timing of the energy groups gives the depth information. The signals from individual elements can be optimized by choosing the right neutron energy. To effectively search luggage for explosives one should scan sequentially with energies optimized first for nitrogen, then for oxygen, and, if necessary, for carbon. Laboratory tests have been carried out that demonstrate the principle.

8. Pulsed Transmission Beam

A broad energy spectrum of pulsed neutrons is created. The elements in the path of the beam absorb those neutrons whose energies correspond to the characteristic neutron resonances of the elements. The dips in the intensity spectrum of the neutrons that pass through the bag, measured as a function of the position of the beam, yield a projected image of the elemental distribution in the bag. The method, invented by Professor J. Overley of the University of Oregon, was published several years ago. It has not been applied to the airport security problem.

9. Nitrogen 13 Production, 511 kev gamma rays

This method is being proposed to look for Nitrogen by measuring the amount of the 10 minute isotope, ^{13}N, formed when high energy photons are absorbed by ^{14}N. (A neutron is emitted in the reaction ^{14}N + gamma = ^{13}N + n.) The ^{13}N is identified by the annihilation radiation emitted when it decays to carbon.

10. Nitrogen 13 Production, neutrons

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This method also uses high energy photons to transmute nitrogen into ^{13}N. The ^{13}N is identified, however, by the neutron that is emitted in the direct reaction.

11. Nitrogen 12 Production, high energy photons

This method, proposed and patented by Luis Alvarez, uses narrow beams of high energy photons (above about 50 Mev) on Nitrogen, making ^{12}N. ^{12}N decays in only 11 milliseconds, emitting a very high energy positron.

12. Boron 12 Production, high energy photons

When measurements were made of the probability for making ^{12}N (method 11), it was found that the production of ^{12}B exceeded that of ^{12}N. ^{12}B decays in 20 milliseconds, emitting a very high energy electron. The high energy electron (and the high energy positron in method 11) produce high energy photons that can be used as a signal of the ^{14}N. The detection of the bremsstrahlung emitted by the high energy electrons is being proposed as the signature of nitrogen and hence of explosive. An image of the nitrogen density is obtained as the high energy photon beam is scanned over the luggage.

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Table II

X-Ray Techniques

1. Simple X-Ray Scanners
   The standard hand-luggage scanner. An X-ray beam passes through the bag and the absorption of the X-rays at each location is measured. The result is a high-resolution picture of how strongly the contents of the bag absorb the X-rays. The amount of absorption depends primarily on the density of the material along the path of the X-rays. Simple X-ray scanners cannot distinguish a thin sheet of a strong absorber, such as steel, or brass or tin, from a thick slab of a weak absorber, such a an explosive. Moreover, the weak absorber can be masked by placing it in the shadow of a strong absorber, such as a radio.

2. Dual Energy Scanners
   X-ray scanners are being manufactured that produce two views of the X-ray absorption; one view is taken with lower energy X-rays than the other. The higher energy X-rays are more sensitive to the heavier elements, such as steel and copper; the lower energy X-rays are more sensitive to the lighter elements such as aluminum, oxygen and carbon. By comparing the two pictures taken of the same bag, one can get determine whether a heavy or light element was responsible. The technique cannot distinguish between carbon, nitrogen and oxygen. Heavy elements will mask the lighter elements in their shadow.

3. Multi-Energy Scanners
   A prototype of an X-ray scanner has been built in Israel in which the entire spectrum of energies of the absorbed x-rays are measured. In effect, this carries the Dual-Energy Scanner (method #2) to its ultimate effectiveness. It still does not have the ability to distinguish carbon, oxygen and nitrogen, but it easily distinguishes heavy from light materials and its proponents claim that, in the tests they have made, it is 90% effective for searching for explosives in luggage.

4. Back/Side-Scatter Machines
   X-ray systems that simultaneously measure the scattered and absorbed radiations are being marketed. X-rays are preferentially absorbed by heavy materials, they are preferentially scattered from light materials. Measuring the scattered X-rays accentuates the lower atomic number materials. The ratio of forward to backscatter X-rays can give a high-resolution picture of the light versus the heavy elements in the bag, and can do so as a function of depth. The technique is proposed as a inexpensive alternative to the CAT scanners, method #6.

5. X plus Y Scanners
   Two independent views of the absorption in the bag are being obtained by commercial systems that use two x-ray systems at right angles to each other. These "3-dimensional" systems can sometimes uncover lighter objects that are hiding behind heavy ones.

6. CAT Scanners
   Multiple detectors surrounding the luggage give a true 3-dimensional picture of the density distribution in the luggage in one slice, typically 1 cm thick. CAT is, in fact, the only method that yields the true distribution of the densities of the materials in the slice of the examined luggage.

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General Comments on X-ray Systems:

1. X-ray systems cannot distinguish an explosive from any similar sized object with the same general composition. Plastics and bombs of similar densities and shapes look alike to an X-ray machine.

2. No x-ray system is yet automated; the final decisions of every x-ray system must still be made by a human operator. That is not a fundamental limitation, however, though past experience does not make one optimistic that a reliable pattern-recognition program will be constructed soon.

3. X-ray systems normally produce projections of the densities in the luggage, and the complexity of the resulting image increases rapidly with the size of the luggage and the clutter within it. A well-known exception is the CAT scanner. But CAT scanners are notoriously expensive and are not yet fast enough to image more than 1 or 2 slices in a bag in 6 seconds. Method #4, which measures the scattered radiation, may be effective as a "poor mans" alternative to CAT.

Comments on Nuclear Accelerators for Airport Security.

The building blocks of all the nuclear methods for finding explosives are functionally similar: An accelerator to produce the interrogating radiations of gamma rays or neutrons; detectors to measure the signals that will identify the explosive; electronic modules and computer programs to process the signals; a luggage conveyance system; and the necessary housing for all components. The Achilles heel of every one of the nuclear methods is the accelerator needed to produce the nuclear beams.

To be useful at airports, the nuclear accelerators must have the following characteristics:

1. Reliability. The systems will be used routinely by operators who will have minimal technical training, let alone a PhD in Physics. The systems will need to be operated by them for 16 or more hours a day for months on end without a major breakdown, and with only routine maintenance.
   Many nuclear physicists are skeptical. They point out that the only nuclear accelerators that meet our criterion for reliability are those that are manned by crews of technical experts or are run far below rated specifications. Neither option may be available here.

   I am not one of the skeptics. Perhaps it is because I have consulted for so long for the semiconductor industry where small, reliable nuclear accelerators are used in large numbers for making integrated circuits on silicon wafers. These accelerators, as well as those being manufactured for medical purposes, have formidable specifications. The accelerator industry has shown that it can manufacture high-energy, high-current implanter accelerators that meet semiconductor fabrication specifications. I believe that industry can do as well for airport security accelerators.

2. Reasonable cost. Nuclear accelerators are notoriously expensive because they are custom build. The first accelerators for the Airport Security Program will be expensive as well. But most of the accelerators are relatively simple and the costs will decrease substantially with quantity.

3. Small footprint. Real estate at airports is expensive. The size of the accelerators must be kept small.

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4. Minimum Radiation. Every accelerator put in an airport environment must meet strict radiation standards. The workers must not be exposed to any significant radiation. The luggage must not be made radioactive.

5. Operable by very few people at a time; in principle one would only need three people per baggage line per shift; one loader, one machine operator and one floater.

Recommendations and Conclusions

TNA has undergone months of field tests. It is still not fully tested, however. We still do not know if it has the capabilities of meeting the stringent specifications we would now write. The décision to fully deploy TNA should await the outcome of development and testing to determine its ultimate sensitivity to bulk and sheet explosives, while maintaining a low false alarm rate.

The Resonant-Absorption-of-Gamma-Ray method has numerous merits over the TNA system. It should be capable of detecting small, thin nitrogenous explosives with excellent probability. The false alarm rates are expected to be much lower than that for TNA. It cannot be thwarted. It produces no radioactivity. Two groups are ready to begin constructing prototype systems for airports. These groups should be funded with the expectation that initial systems can be ready for airport testing within 2 years.

The Fast Neutron schemes also have merits over TNA. In particular, they are the only methods that have been proposed to measure the distributions of all major elements that make up all explosives. The attainable spatial resolution of these schemes has not been determined, but initial tests of both the Associated Production and the Pulsed Neutron-Gamma methods imply that they could be significantly better than TNA. At least two of the Fast Neutron methods should be supported vigorously with the aim of making an early decision to fund at least one prototype for inspecting airport luggage.

The above methods have been actively supported by the FAA. If more funding had been available, I expect that some of the other methods given in the Table I would have also been supported so as to determine their strengths and weaknesses. It is not too late to do so, and I recommend that the more promising be selected for early support.

X-ray Add-Ons: Two independent searches of a bag will be better than one. A cost-effective approach may be to use one of the Nuclear Scanners followed by one of the X-ray Scanners. I support a strong effort to develop this approach. Deployment of any system should be based on in-depth, double-blind testing under airport conditions.

Accelerator Technology: All of the nuclear methods can be tested with off-the-shelf accelerators, but most of them will ultimately require accelerators of special design to meet the requirements at the airports; a few of the more promising methods depend critically on the development of cost-effective accelerators. Funding should be provided for those industries that will develop these accelerators.

The development and testing of the most promising systems will require a significant increase in funding. I estimate that 15 to 25 million dollars a year will be needed for the next 5 years at least; that is, 2 to 3 times the present level of funding for development.

Lee Grodzins: September, 1989

Density of Explosives and Other Materials

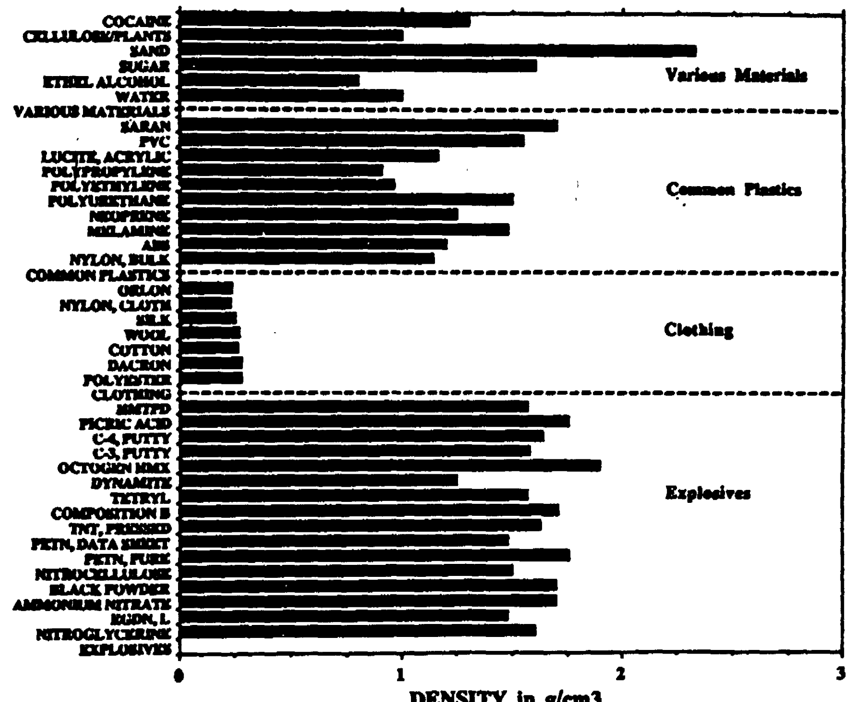


Figure 1

Percentage of Nitrogen in Explosives and Other Materials

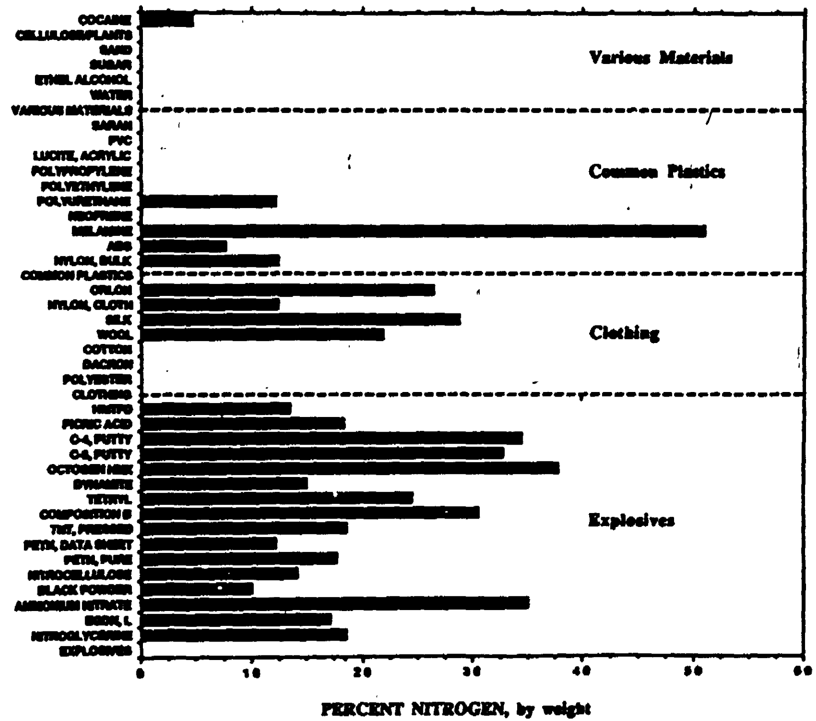


Figure 2

Density of Nitrogen in Explosives and Other Materials

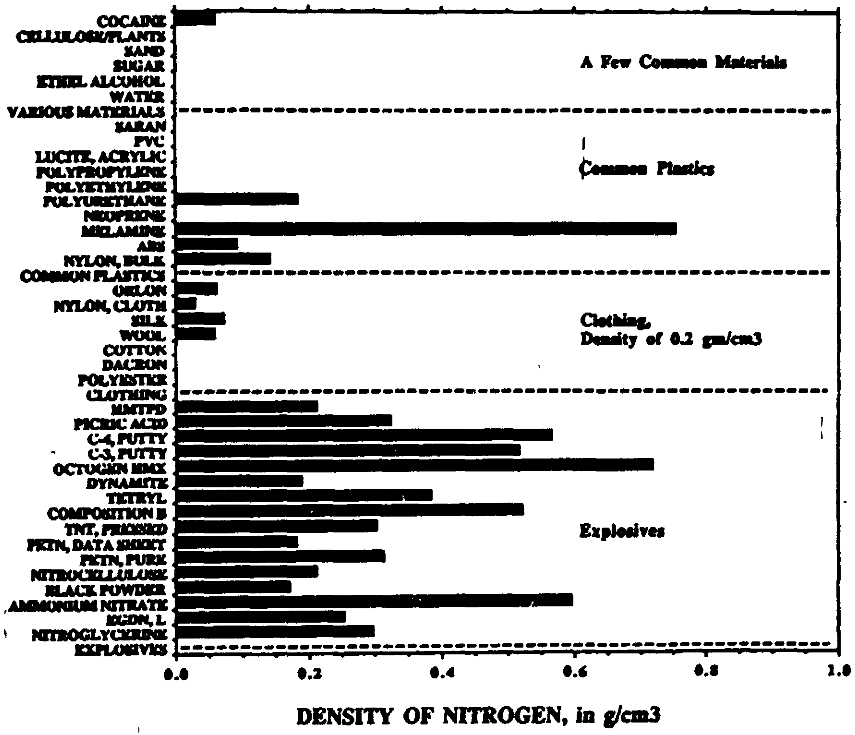


Figure 3

375

Correlation between Oxygen and Nitrogen Densities in Explosives and Other Materials

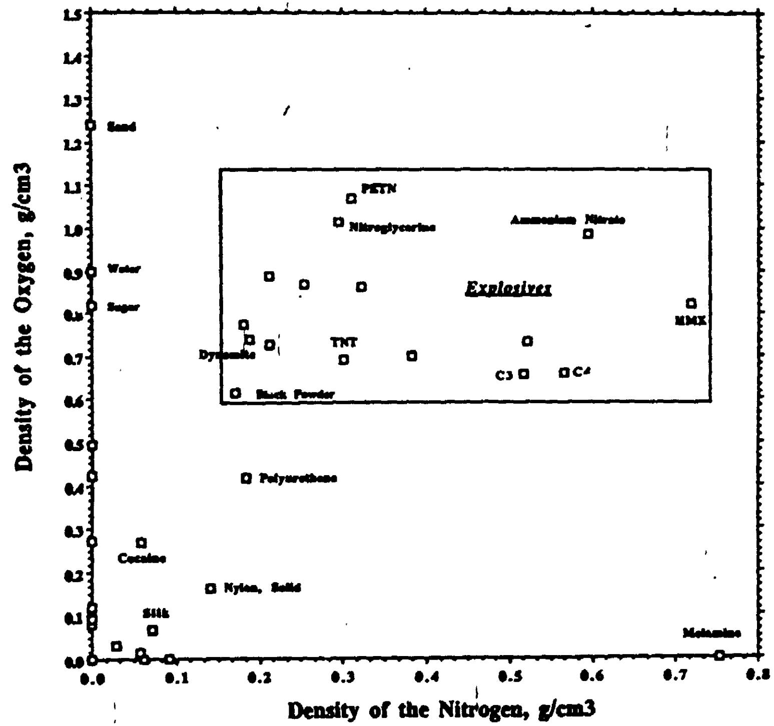
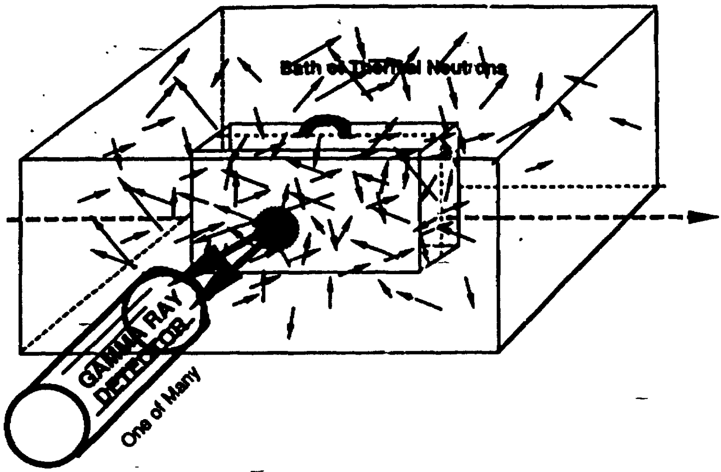


Figure 4



$$n + N^{14} \rightarrow N^{15*}_{(excited)} \rightarrow N^{15} + 10.8\ \text{MeV}\ \gamma$$

Thermal Neutron Activation of Nitrogen

Figure 5

Lee Grodzins

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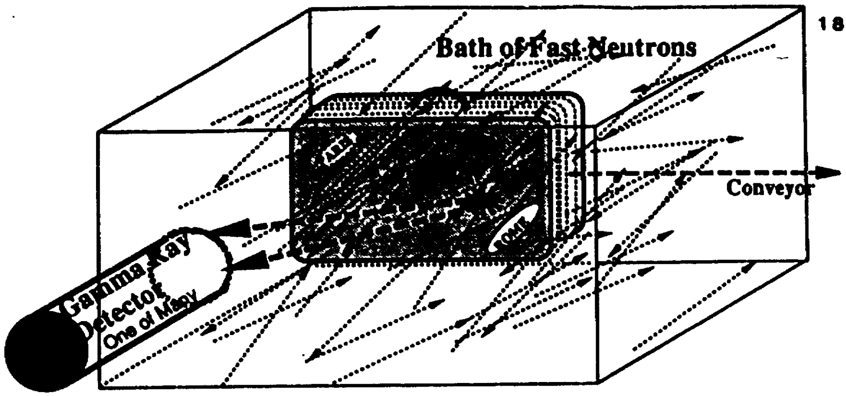


$$14\text{ MeV n} + \mathrm{O}(16) \longrightarrow \mathrm{O}(16)^{*} + 7.9\text{ MeV n}$$
$$\mathrm{O}(16)^{*} \longrightarrow \mathrm{O}(16) + 6.1\text{ MeV } \gamma$$

$$14\text{ MeV n} + \mathrm{C}(12) \longrightarrow \mathrm{C}(12)^{*} + 9.6\text{ MeV n}$$
$$\mathrm{C}(12)^{*} \longrightarrow \mathrm{C}(12) + 4.4\text{ MeV } \gamma$$

$$14\text{ MeV n} + \mathrm{N}(14) \longrightarrow \mathrm{N}(14)^{*} + 8.9\text{ MeV n}$$
$$\mathrm{N}(14)^{*} \longrightarrow \mathrm{N}(14) + 5.1\text{ MeV } \gamma$$

Fast Neutron Activation of Nitrogen, Carbon and Oxygen

Figure 6

L. Grodzins, 5/1989

Fast Neutron Beam Analysis

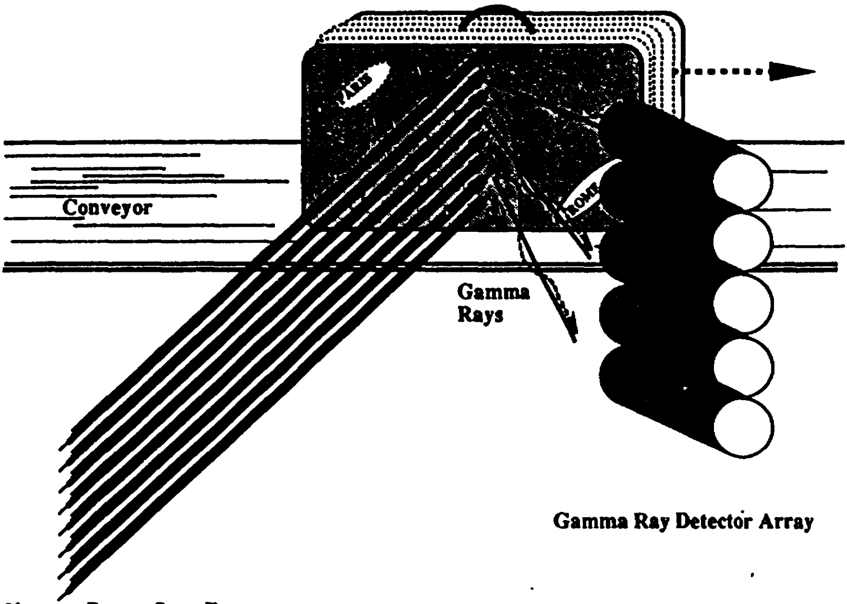
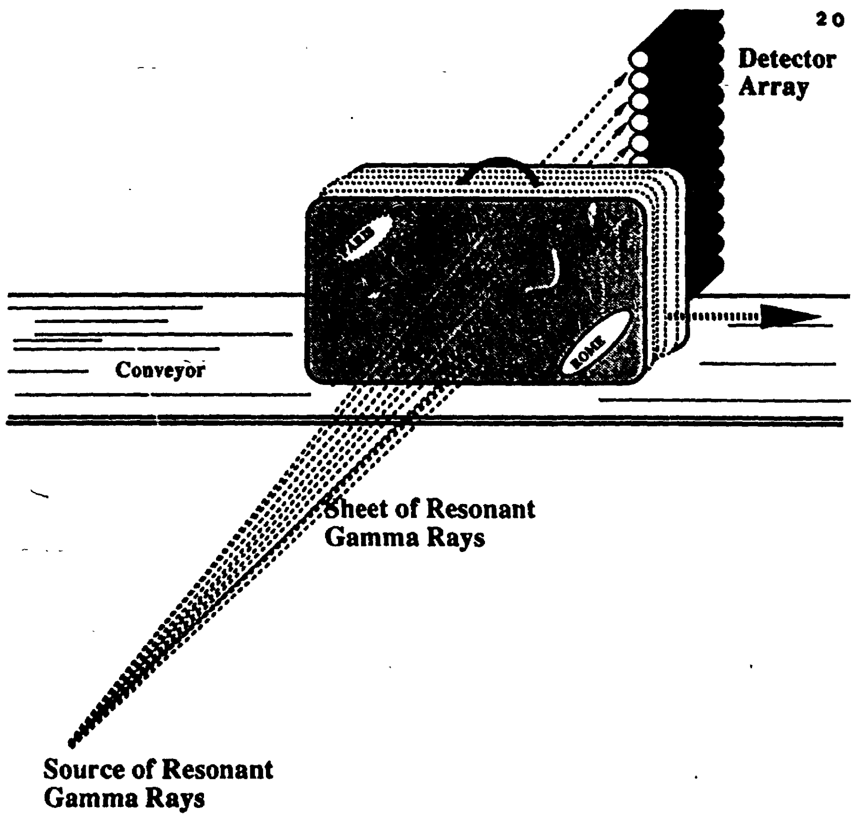


Fig 7



RESONANT ABSORPTION OF GAMMA RAYS

Fig 8

L. Grodzins, Sept. 1989

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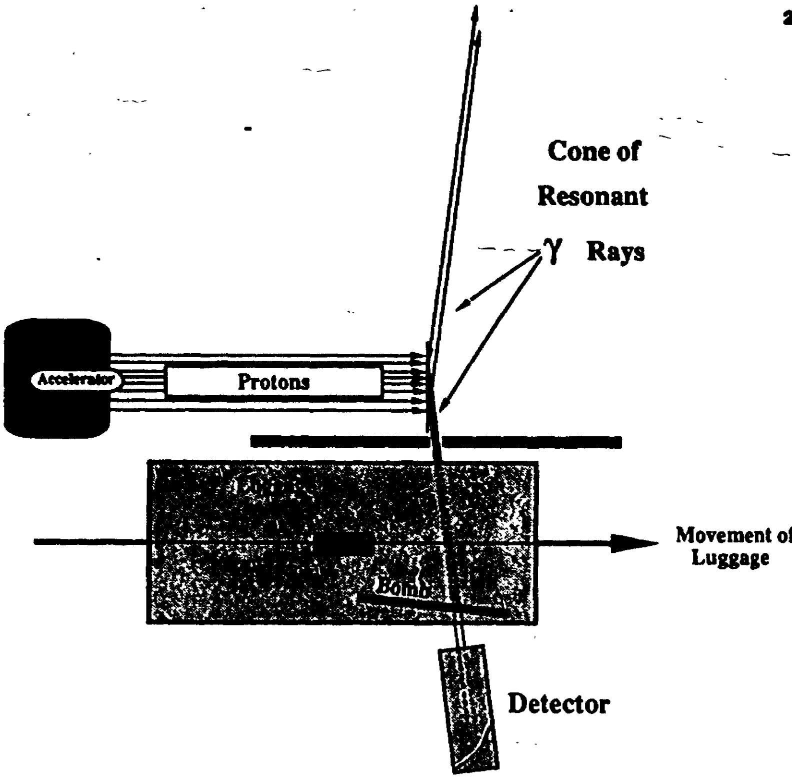

Resonance Absorption of Gamma Rays

Fig 9

Lee Grodzins

Mrs. COLLINS. Mr. Conrad, we have not forgotten about you. However, we have a vote on the floor of the House. Therefore, we are going to recess for 10 minutes.

[Recess taken.]

Mrs. COLLINS. The hearing of the Government Activities and Transportation Subcommittee will reconvene at this time.

Mr. Conrad, I believe it is your turn to testify at this time.

You may begin.

STATEMENT OF FRANK CONRAD, CHEMIST, SYSTEMS ENGINEERING DIVISION, SANDIA NATIONAL LABORATORIES

Mr. CONRAD. Madam Chairman, distinguished subcommittee members, Sandia National Laboratories has been involved in research and development of contraband detection for over 15 years, primarily under the sponsorship of the Department of Energy, Office of Safeguards and Security.

Recently, we have also received additional support from the FAA and FBI and have concentrated on vapor detection of explosives.

The complete field of explosives detection can be separated into two major categories. There is bulk detection, which can be investigated with active probes like x rays, neutrons, et cetera, and vapor detection, which must be investigated with a passive probe such as sniffing the vapors.

Obviously we cannot use most active probes on people.

First, let me summarize the status of bulk detection, in which x ray and TNA are the most highly developed techniques at this time.

The main developments in x ray have been in the computer enhancement of images, for example, a color of orange can indicate the density that might be an explosive. Another unit uses backscattering to give additional information about the organic materials in bags and cases, while still another unit allows a multidimensional view of the articles inside a container.

The use of TNA to determine nitrogen is not new, but the use if TNA to detect explosives in luggage in a public environment such as an airport is quite a departure from what has been acceptable in the near past.

Extensive testing of this device has been carried out in airports and the test results are impressive.

Another possibility for a bulk explosive detector is a low-power microwave detector. Conductance of materials can be measured and the dielectric constant determined even through other materials such as cloth, wallboard, et cetera.

Although we have worked with bulk detection techniques in the past, our present effort is in vapor detection. This field can itself be subdivided into two additional subcategories of hand held and portal.

The hand-held units are used principally for searching boxes and baggage while the portal is used for sampling people. My main task is in portal sampling. Although we have made great strides in vapor detection, in general, and portal sampling specifically, there are still many problems.

The main problem of vapor detection is shown on the chart that was handed out.

Note that the amount of material to be detected is extremely small. In addition, the time allowed to do the detection and analysis is also very short—6 seconds—in an airport application.

Both the hand-held and the portal scenarios have identical requirements, for example, getting the sample—sampling—separating the explosives molecules for air and interfering compounds—preconcentration—and having a detector that is sensitive enough to detect the molecules—detection.

Any investigation starts with the detector. If the detector is not sensitive enough to detect what is collected for analysis, enhancing the other factors will not help. I feel there are currently four detectors to choose from depending on the scenario for use. The four are an electron capture detector with a gas chromatographic separator [GCV-ECD], a mass spec/mass spec [MS/MS], an ion mobility spectrometer [IMS], and a chemiluminescence detector.

The GC-ECD and the IMS detectors are logical choices for hand held real time devices. All four detectors could be used in portal installations.

A simple definition of an explosives preconcentrator is a selective filter that picks explosives molecules from a large air flow and holds them while dumping almost everything else overboard. These trapped molecules are then released into a smaller flow.

Most of the preconcentrators, either in use or being considered for use, have benefited from Sandia's research in preconcentrators.

Sampling is the last but not the least of the areas of research. The flow that is needed in a portal is fast enough to minimize time, slow enough to keep from diluting the vapor and also slow enough not to do other important things such as mussing people's hair.

To summarize, we have succeeded in defining the problems in both vapor and bulk detection. The bottom line of the problem is that there is no instrument being built today that will detect small quantities of all the explosives of interest within an acceptable time for all scenarios.

The TNA is the best we have today for bulk detection but is very large and very expensive. In the area of vapor detection, additional R&D is needed to establish a clear cut preferred technology.

[The prepared statement of Mr. Conrad follows:]

CONGRESSIONAL TESTIMONY

Frank J. Conrad, Chemist
Systems Engineering Division
Sandia National Laboratories

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The complete field of explosives detection can be separated into two major categories. There is bulk detection, which can be investigated with "active" probes like X-rays, neutrons, etc., and vapor detection, which must be investigated with a "passive" probe such as "sniffing" the vapors. Obviously we can not use most active probes on people.

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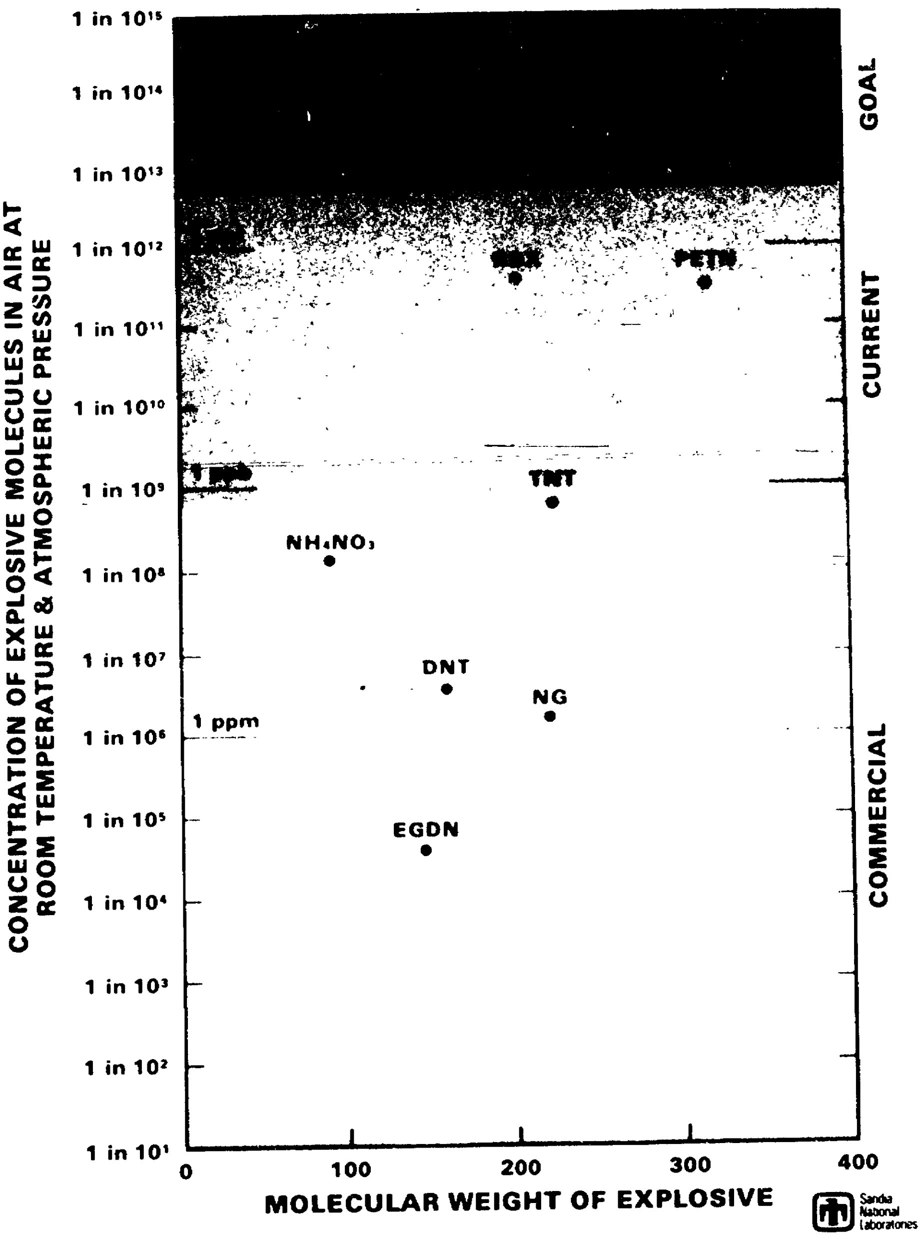
To summarize, we have succeeded in defining the problems in both vapor and bulk detection. The bottom line of the problem is that there is no instrument being built today that will detect small quantities of all the explosives of interest within an acceptable time for all scenarios. The TNA is the best we have today for bulk detection but is very large and very expensive. In the area of vapor detection, additional R&D is needed to establish a clear cut preferred technology.

SANDIA — EXPLOSIVES VAPOR DETECTION



Mrs. COLLINS. Thank you, Mr. Conrad.

Do you feel the FAA's recent rulemaking on explosive detection systems would encourage the industry to focus on TNA-based device at the expense of the other emerging technologies?

Mr. CONRAD. If that is true, it is probably a mistake in that there is a high probably that five nickel solutions beats one one-quarter solution.

Mrs. COLLINS. Mr. Grodzins, are you going to tell us how much of the research and development of nuclear based detection methods is accomplished without the Government financial assistance?

Mr. GRODZINS. Would you repeat the question.

Mrs. COLLINS. Can you tell us how much of the research and development of nuclear based detection methods is accomplished without Government finance.

Mr. GRODZINS. I don't think very much has been. Certainly if you assume that the FAA has indeed put in something of the order of $20 million, then I would guess that Dr. Trower's statement that they have put in $300,000 might be perhaps matched by what some of the non-FAA funded laboratories have put in.

To my knowledge, there is no other outside company that has put in funding for nuclear-based detection of explosives.

Mrs. COLLINS. Thank you.

Mr. Conrad, is it possible that Federal funding and oversight could possibly bread familiarity between the developer and the FAA at the expense of objectivity?

Mr. CONRAD. I am not sure I understand your intent.

Mrs. COLLINS. My intent is to get an answer.

Mr. CONRAD. I apologize.

Mrs. COLLINS. The question is whether or not you think Federal funding and oversight, all being within the FAA, could breed a sort of, a good-boy's, good old boy's network between the FAA and the developer at the expense of objectivity?

Mr. CONRAD. In the cases that I have seen, I would say the answer is no. The FAA has been doing a good job. In fact, I have served on the evaluation committee on most of the evaluating responses to the RFQ's. It seems straightforward on scientific fact as opposed to the good-old-boy routine.

Mr. GRODZINS. My apologies, Madam Chair. I was looking through the list of the nuclear detection systems. There have been companies such as Penatron and Titan that have been developing some nuclear techniques. How much of the money has come from them and how much have come from other parts of the Government is not clear to me.

In a few days I do know that they have carried out studies in such areas as finding bombs that the Army was concerned about. Therefore, they carried out studies under different funding of the Government and then proposed to the FAA to continue these studies.

I guess I would qualify my answer by saying that there are some, there are a few cases where I just don't know where the funding came from.

Mrs. COLLINS. Thank you.

Mr. Vincent, what do you think about my last question, whether or not there could be an arrangement or comfortable level between the developer of certain detection devices and the FAA at the expense of overall objectivity?

Mr. VINCENT. Well, Madam Chairwoman, first let me echo comments made by my colleagues on the left, my left, about the FAA team managing the research and development for the FAA. Dr. Wall and his team is one of the finest examples of a group of professionals that I have ever run across. I think his objectivity is excellent.

However, the suggestion that an independent evaluation group might best serve the interest of all concerned and remove any questions of objectivity has merit. I would be interested to know if the FAA for instance, would echo such a position.

But to answer your question directly, no, I don't think nor have I observed any problem of objectivity up to this point.

Mrs. COLLINS. Dr. Trower, would you think that the competition for limited Government research dollars encourage an exaggerated claim and analysis regarding the effectiveness of an EDS device?

Mr. TROWER. Yes, I do.

Mrs. COLLINS. Mr. Vincent, the question is whether the competition for limited Government research dollars encourages an exaggerated claim and analysis regarding the effectiveness of an EDS device?

Mr. VINCENT. That is always a possibility. I can't say that I know of any specifics. More money certainly is needed in the R&D program. That might resolve that potential problem.

Mrs. COLLINS. Mr. Conrad.

Mr. CONRAD. I know of no case where they have been way out of line. I am sure there must be some of that—exaggeration.

Mrs. COLLINS. Mr. Grodzins.

Mr. GRODZINS. I would say that very definitely the lack of funding has inhibited some of the newer technologies. The FAA has consistently been forced to make hard choices deciding that they had to put sufficient moneys into the few schemes to make sure that they did something and showed whether or not they could in fact proceed.

That meant that they, without any question, had to tell other groups that they could not even get the funding to carry out proofs of principle.

Now, I think there is no doubt in my own mind that if there was more funding available, that funding would have allowed the better schemes to proceed more rapidly. It would have allowed some of the other systems that have very strong proponents to put up or shut up the only way that they can to show whether or not they can do it.

I do think there is a very strong case that can be made.

Mrs. COLLINS. Thank you.

Mr. Owens.

Mr. OWENS. Mr. Grodzins, to pick up on the same line of questioning, can you give me an estimate of what kind of money we are talking about? When we want to solve problems around here, we are able to spend money, when the Congress really wants to solve problems.

We just committed $166 billion to bail out the defunct savings and loan associations. Here is a problem that I think is a very serious one. For example, to be very personal about it, I have counted as many as 10 Congressmen on one shuttle, airline, coming to Washington on a Tuesday morning.

Congressmen vote. Even though we do very good things, it upsets somebody. Then when we deal with a lot of controversial matters, it upsets a lot of people. We are talking about a very serious problem—that probably we have not had more disasters in America because we have fewer terrorists operating in this country.

That is not going to be the case much longer, in my opinion. It is a serious problem. What do we talk about when we say we don't have enough funding? What kind of funding would do the most that can be done with technology?

Some estimates. I am not expecting you to be very specific.

Mr. GRODZINS. The TNA system probably costs the Government over the long period of time that it was being developed at Westinghouse first and then at SAI, probably costs as much as $10 million. That is the number that I have heard. I would guess that none of these systems will cost less than that to develop.

Mr. OWENS. Are you aware of the fact that one defective rocket cost us about $18 million? When they explode these rockets that are defective, that is $18 million.

Mr. GRODZINS. I am well aware of the——

Mr. OWENS. In your scientific objective opinion, is it a bit absurd that we have such a scarcity of funds to invest in this critical matter?

Mr. GRODZINS. It is absurd, exactly right. I couldn't agree with you more. I think if we put in double and triple the amount of money we have been putting in per year and it still doesn't make more than $15 million, $20 million a year into this thing, the pay off will be, will come back many, many, many fold.

This problem of terrorism is not going to go away tomorrow. It is not going to go away in 5 years. There is going to be terrorism as long as there are terrorists and as long as they have—well, we have got to make sure that we have in place every possible technology.

The people who said that the terrorists are not going to stand still are absolutely right.

Mr. OWENS. Does anyone have any idea of how much we put into research and development for this activity since we started searching for some solutions?

Mr. GRODZINS. I don't know. I do know the amount of money that is going into actual development of new technology is—and I mean development from beginning, without putting, excluding the machines that are going into the airports, just on the basis of the moneys for building prototypes, for doing the development is less this year than 3 years ago.

It has gone down. It has not gone up.

Mr. OWENS. Would either one of you care to comment? Yes?

Mr. VINCENT. The figure that I have seen quoted publicly or in print has been $60 million, which seems to me a bit high. I recall more on the order from my personal knowledge and experience with the thermal neutron activation system from 1982 through the time I left Government in 1976, probably somewhere around $13 or

$14 million, I believe it was and a considerable amount since then to develop that system.

That does not include these other smaller or lesser items that money has been spent on over the years. But you don't get there overnight. You have a lot of false starts. You have to explore a lot of technologies to be able to get one that works.

Mr. OWENS. I know. The military is very well aware of that. That is why they spent so much money on research and development. When they really want to seek a solution to the problem, they spend the money necessary for the false starts and the problems that are necessary.

I think the scientific community, as small a group as you may be, focusing on this particular problem, needs to speak more clearly and loudly about, you know, what is not being done to maximize the effort to guarantee the safety of airline passengers. Yes?

Mr. CONRAD. There is one caution I guess I would make. When the Congress gets around to throwing lots of money at something, they expect things to happen very quickly. The thing, the research that would really pay off is being able to spread the base more widely to make sure we didn't miss answering anything, and to cover the other techniques. Certain techniques only develop, you know, at a given rate.

Mr. OWENS. How much would it cost to do it intelligently, Mr. Conrad? To do it intelligently, with prudence and to satisfy the taxpayers, how much would it cost? How much more do we need to invest? You just made a statement about throwing money, which is what I hear from people who really don't want to deal with the problem.

We threw money at the S&L's, you know. It seems to be helping. They threw money before they had any structure set up, before they had any way to work it out. They threw more than $15 or $20 million at one bank. I really have a problem getting that answer from you.

I would like to have a more specific answer.

Mr. CONRAD. My specific answer would be if you doubled or tripled the money, the returns would come by broadening the base as opposed to pay off on any individual thing. So if you take the number X now and multiply it by three, it would be great only because of the spreading of the base.

Mrs. COLLINS. Mr. Trower.

Mr. TROWER. I think there is another problem that happens when you allow a system that is inadequately funded to become anemic. You have to make a choice, as Dr. Grodzins said, at the beginning. Then even if that choice isn't so good, you are committed because you have a history with that choice.

And if the margin looks like it is a bad one, you tend to stick with it because there is nobody else to take to the dance. So I think one of the benefits that you would have out of having adequate funding and the broadening of the base is that you could weed your gardening earlier and more vigorously than you have been able to now.

Mr. OWENS. Mr. Vincent, do you want the last word?

Mr. VINCENT. Congressman Owens, there may be a fairly well thought out and ready answer on that shortly. The National Academy of Sciences has been doing a review on that for the last year. That is a very distinguished group. They have, I think, done an admirable job in getting a very wide viewpoint of the FAA R&D.

I think that report will reveal some of those things, including perhaps the cost of establishing a consistent and long-range program that is needed there.

Mr. OWENS. Thank you, Madam Chairwoman.

Mrs. COLLINS. Mrs. Boxer.

Mrs. BOXER. Mr. Vincent, your position, which is now held by Mr. Salazar, is that a Presidential appointment? Is that a political appointment or is it a civil service position?

Mr. VINCENT. It is a civil service career position. It is not a Presidential appointment or a schedule C, whatever you want to call it.

Mrs. BOXER. Why did you leave that position?

Mr. VINCENT. Essentially, I left the position because for the 4 months previous to, 4 or 5 months previous to April 2, 1986, I had been in a rather serious disagreement with my supervisor about the level and the nature of the security requirements needed in Europe and the Middle East and South Asia.

After April 2, when TWA 840 was bombed, I went in and said, "I have had it. I want out of the position."

Mrs. BOXER. Well, I would like to say, Madam Chairwoman, that for a long time since I have been in Congress, now about 7 years, I have been working to help whistleblowers, particularly at the Pentagon.

People who see problems that are not being addressed, people who are harassed because they come forward with what they see as the truth. To me, these people are the real American patriots.

Now, you left a situation, because you couldn't be a hypocrite and you couldn't go along with the program. To my mind, you joined the great American patriots. Your testimony here today, which unfortunately was not allowed to be extended because Mr. Nielson objected, was really—was really powerful.

What you told us is you couldn't sleep last night, because you were pondering the question I had asked as to whether there had been a coverup in the particular Pan Am bombing. And what you came back today with is that you couldn't sleep and you kept hearing the voices of the people who lost relatives.

The bottom line is you think there is a coverup, not so much of a particular incident, but of a circumstance, which is that our people at the FAA, who you say are decent and good people and care, are spreading the line, however, that we are the best, and that no one is better at airport security, and you don't believe that is the truth.

I just want to tell you that that is very powerful for this committee because when our founders wrote the suggestion, it was written in such a way that there is a check and balance and a balance of powers. We will fill the void.

Our Chair is already—Chair has already done so by this very hearing. As you know, another subcommittee of this committee chaired by a colleague of mine from California, Mr. Lantos, is doing the same thing because Congress is not going to sit back and listen to rhetoric. We want to see action.

When you are talking about the situation as you see it, that we are not the best and we are not doing all we can and we have got

$6 billion sitting in an airport trust fund, it is no wonder you are losing sleep, and probably a lot of us are going to lose sleep until we come forward with a package. I am looking forward to working with my chairman in that regard.

Whatever time I have left I would like to yield to you, Mr. Vincent, because you were cut off where you were just about to say that some of these bombs would not be detected by the machinery. Then you were going to make another point.

Perhaps you have a minute or two to try and complete that. If you don't, maybe I could ask the Chair for an added minute or two for you.

Mr. VINCENT. Well, you are very kind. I am afraid that I am not perhaps what you make me out to be. If I had stayed, I can't say that I would have done any better than Ray Salazar or that I was any more conscientious, or am, than Ray Salazar, because I would doubt that.

The bureaucracy constrains you. It is like, I guess, the budget process. You start, and you say, "I need X number of dollars to do something," and it gets cut four times before it gets to Congress, and you wind up sitting before Congress, and you originally asked for this much larger amount, and then saying to Congress, yes, this is all I need.

And you know the process. You see the people sit before you every day. It is not a comfortable position for any of these people to be in. I have a great deal of empathy for them.

I, by no means, in my testimony would have intended to imply or reflect on them as individuals.

Mrs. BOXER. I don't think you did, Mr. Vincent. You were very clear that you did not. You just went out of your way to say they are good people, but yet, you are telling us what you feel.

Mr. VINCENT. To finish my earlier statement, I deeply appreciate the opportunity to do so, but the FAA's countermeasures for examining the electronic devices also contains other techniques other than the one that I described.

And the most effective one, however, has not been mandated. But as was described by Dr. Annis and also by—I would have liked to have heard a little more clear definition of it by the EG&G Astrophysics on the E-Scan enhanced x rays.

In 1986 and 1987, these organizations or manufacturers respectively came out with these enhanced technology X-rays. As a specific sample, the sophisticated Toshiba boom beat 453 radio discovered by the BKA in October 26, 1986, reportedly contained 11 ounces of plastic explosives in addition to an electric blasting cap and batteries separate from the batteries powering the radio. These were all secreted inside the radio.

In short, it was a fully functioning radio. If the batteries powering the radio were removed by security personnel, it would have still been a fully functioning bomb. A physical examination short of opening the radio would not have discovered the bomb hidden inside.

An x-ray examination of the Toshiba radio with the standard x ray might have discovered the bomb hidden inside. However, it is probable that it would have evaded detection.

On the other hand, if an enhanced technology x-ray unit had been used in the examination, it is highly unlikely that a well-trained operator would have missed the 11 ounces of SEMTEX plastic explosives hidden inside the radio. The operator would have seen an organic or low atomic weight substance in a completely inorganic thing, a radio. It shouldn't have been there.

This is an example where technology is available. Like the gentleman from ITI here on vapor explosive detection noted, you can detect SEMTEX by the impurity in the explosive, not the explosive itself. These technologies haven't been mandated by the FAA.

With that, Congresswoman Boxer, I really appreciate the opportunity to finish that.

Mrs. COLLINS. The time of the gentleman has expired.

Mr. Nielson.

Mrs. BOXER. I know your impatience, Madam Chairwoman. I want to say one thing to you, because I think it is important. One of the things we find about the profile of a whistleblower is their humility and the fact they don't think they are doing anything special. They are just doing what they were taught to do as a good American citizen. That is, tell the truth.

I just want to comment again about Mr. Vincent fitting that profile.

Mrs. COLLINS. Thank you.

Mr. Nielson.

Mr. NIELSON. Thank you, Madam Chairwoman.

Mr. Grodzins, all the manufacturers who testified on the previous panel claimed their machines were able to detect plastics, other types of explosives. Have any of them undergone the same type of testing as TNA?

If so, what were the results?

Mr. GRODZINS. As far as I know, none of those technologies have undergone anything like the testing that TNA has gone through. As I have already testified, I don't think the TNA tests have been adequate.

As far as I am concerned, they remain promising technologies, but untested technologies.

Mr. NIELSON. What are the potential risks from the radiation source used in TNA in the event of a leak or successful terrorist attack?

Mr. GRODZINS. If you mean by a successful terrorist attack blowing up the TNA system, that is a question which I can not really answer. Let me answer it in a slightly different question.

Mr. NIELSON. What are the potential risks from the radiation source in TNA?

Mr. GRODZINS. The Californian system they are using, and the six of them are going to use the Californian 252 systems, can be made quite secure. I do not know whether these are as secure as the ones that are sent up in satellites to power the various devices up there. Those have to be such that if the satellite blows up, you know, you don't have any problem with that.

But I have never seen any report which went through the details, which one has to go through.

Mr. NIELSON. The green party in Germany has taken quite a stand against using anything that uses radiation of any kind, including TNA. Is there any validity to their concern?

How do we overcome their fears and implement it in such a way that it doesn't pose a threat to human health?

Mr. GRODZINS. Let me first talk about TNA and then perhaps the other systems. First, the TNA system, excluding that problem with the Californian source, does not pose a radiation health risk to anybody. The amount of neutrons which you are talking about does not make things radioactive enough to pose any kind of a problem.

I agree with that completely. A good friend of mine is on the—is a health physicist chairing the committee on this. Just by accident, he happens to be a close friend. He is not connected with me other than that. But that has been scrutinized very carefully by outside experts.

They have come to the conclusion that there is no health risk there. One of the reasons that I—not a major reason, but one of the reasons why I am—I like the resonance absorption of gamma rays is it doesn't make anything radioactive. There are no neutrons. It is such that when we do experiments with that, you can walk around the machine, walk in the room without being concerned about it at all.

There is no need for protection of the operator or the technicians. Most machines do have a radiation problem, but no more——

Mr. NIELSON. That may well be true. How do you erase the perception of problems? In eastern Washington, you have to identify 75 tainted apples a year in order to have a problem. Yet, the perception of the problem was sufficient to ruin eastern Washington's market. How do you solve the political problem?

Mr. GRODZINS. That is a problem I really do not know the answer to. The fact, as we know it, the people have very different perceptions. There are some people who will not live within 50 miles of a reactor, even though everything we understand about them indicates there is no radiation that they have to be concerned with.

I don't know the answer to that question.

Mr. NIELSON. Do you want to talk on that? Did you want to say anything about that?

Mr. TROWER. No.

Mr. NIELSON. One last question: If TNA is not yet fully tested, according to your comment, why do you think the FAA moved so quickly toward requirement implementation of the SAIC device? Mr. Conrad can answer that if he would like, or anyone else.

Second, what role has Congress played in this?

Mr. CONRAD. For my part, I think they moved quickly, because it is the only device that reached that point of development in this time period.

Mr. NIELSON. Even though it has not received sufficient testing yet?

Mr. CONRAD. It is at least further developed than everything else we have, which is nothing.

Mr. NIELSON. Do you want to comment, Mr. Vincent?

Mr. VINCENT. Yes, sir. Thank you for the opportunity. I would agree with Dr. Conrad that this has been under development for several years. I personally had the pleasure of being associated with that for 4 years. It is the only thing that works from a technology standpoint.

I guess the only criticism that I would have of the administration was what was apparently, or appeared to be but not necessarily what it was, an obvious public affairs slant that was placed on this when its deployment was announced.

The Government would have had to have deployed this in 1989, regardless. It was ready for deployment for more operational testing.

Mr. NIELSON. Thank you.

Mrs. COLLINS. Mr. Cox.

Mr. COX. I would like to ask whether you agree with testimony received earlier today that it will be about a decade before we can have a TNA machine available for use in airport security, Dr. Grodzins?

Mr. GRODZINS. I would not think we would have to wait that long, Congressman Cox. I think it is really an effort, the time scale depends very much on the amounts of money you put in. In all of these instruments, the bottleneck seems to be the accelerator. The physics we understand of the various components in this machine. The physics we understand, the detectors we understand, we understand the computerology, and how you look at the images.

The biggest single problem is in the accelerator. I think that a proper effort which would pay off in many fields, by the way, not just in this one, in developing the accelerators you would like for the different techniques would allow us to have prototypes even of the fast neutron system within 3 or 4 years; the resonance absorption system, within 2 years, perhaps 3 years, and to begin to think about putting things into airports within 5 years, certainly.

That does not strike me as being an unrealistic timeframe. We are not talking about having to come up with a wholly new idea which we are groping for. We really understand, I think, what it is we are trying to develop.

When you have that much to go along with, of course, money does pay off. Thank you.

Mr. COX. How much money are we talking about?

Mr. GRODZINS. In answer to the question Congressman Owens asked, I did bring up, I had here the FAA resources for security research and development. It reads, in 1987, fiscal year 1987, $13 million. It is down in 1990. It is down to $7 million. That is almost a factor of two. I believe that a sustained effort—and I indicated this in written testimony—a sustained effort in the $15 to $25 million range per year is what is needed.

Mr. COX. You were quoted in the New York Times as saying $10 million. Is that different, the same or——

Mr. GRODZINS. The Times has me quoted as saying $10 million—I had said to the Times that I thought we would need that kind of money in a particular technology. I believe if we are to spread ourselves so that we can, in the end of 3 or 4 years, say, yes, these are the ways that we want to go. These are the best technologies and an independent group said this is the way we want to go——

Mr. Cox. We are just ball-parking this. If we put $10 million into resonance absorption and $10 million into TNA, you would be happy?

Mr. GRODZINS. I would be happy. Unfortunately, I do not get one penny of that.

Mr. Cox. Let me try to dispel what I think are some bugaboos, but they have been nagging nonetheless. Do you have any reason to believe that TNA causes or could cause alteration in the chemical composition of prescription drugs?

Mr. GRODZINS. TNA will not cause any change in the composition of any prescription drug.

Mr. Cox. Second, to what——

Mr. GRODZINS. May I just add, Representative Cox, that is a statement that I made without putting in a single number. I just made it off the top of my head. But I am willing to put my money where my mouth is. I am willing to place a bet on that.

Mr. Cox. People have told me that that is the case. I have not seen anything to back it up, and I am happy to hear you say so.

To what extent can terrorists use boron and cadmium to mask the nitrogen in their explosives?

Mr. GRODZINS. I will give two answers. The first one, of course, is a postponement answer. I would like to talk about that this afternoon.

The second one is that any good system, TNA included, had better be able to counter a countermeasure by the terrorists. It had better be able to find the fact that they have put in the boron or the cadmium. If it is any good at all, it is going to do that.

Mr. Cox. Thank you for your sensitivity. No more questions. Thank you.

Mrs. COLLINS. The time of the gentleman has expired.

We thank you gentlemen for appearing before us.

We are now going on to our next panel, which will be Mr. Ray Salazar, Director of the Office of Civil Aviation Security; Dr. Lyle Malotky, also of that office; and Mr. Bill Wall, Manager for the Aviation Security Branch at the FAA Tech Center.

Would you come forward, please? Would you gentlemen rise, please? You were sworn in yesterday, but I want to make sure—Mr. Belger, would you raise your hand?

[Witnesses sworn.]

Mr. BELGER. I do.

Mr. SALAZAR. I do.

Mr. WALL. I do.

Mr. MALOTKY. I do.

Mrs. COLLINS. Is there anything, Mr. Salazar, Mr. Belger, any of you, that you would like to respond to from the testimony you heard today?

STATEMENT OF MONTE BELGER, ASSOCIATE ADMINISTRATOR FOR AVIATION SECURITY, FEDERAL AVIATION ADMINISTRATION, ACCOMPANIED BY RAY SALAZAR, DIRECTOR; LYLE MALOTKY, PH.D., OFFICE OF CIVIL AVIATION SECURITY; AND BILL WALL, MANAGER, AVIATION SECURITY BRANCH, FAA TECH CENTER

Mr. BELGER. Yes, Madam Chairwoman, if we could, please. Just a few points. I will try to be brief. I think it is important we speak to some of the things we heard today. I think the hearing today—as I said yesterday—is extremely healthy, and has been positive.

I am very encouraged by the fact we have so many manufacturers, so many folks in the research and development area who are interested in trying to develop new explosive detection techniques, trying to refine the TNA system.

I think we must continue to work with them to improve upon the technology that already exists.

There are a couple of things that came up today, and perhaps Mr. Salazar can even expand on these also. We can talk in more specificity in the closed session later today about some of the particular techniques, some of the particular characteristics of what has for the last 2 days been called the El Al system.

I think it is very important to talk about what the FAA system is. The FAA has always, whether we are talking security or safety systems, focused on people, equipment, and procedures. No safety system, no security system can rely on one without the other two. It can't be done.

The FAA, I don't think, has ever said, nor would I ever say, that systems can operate without people and equipment, nor can equipment be the total answer without people and procedures.

We have used profile questions since 1972, 1973, when this security program was set up. We continue to use profile types of questions today to identify higher-risk passengers. You might recall in the early seventies, the hijacker profile, which was extremely simple, basic, but yet it identified well over 98 percent of all folks who hijacked aircraft in the early seventies. We continue to use that type of system.

Yesterday, we talked about checked baggage. The owner of every piece of checked baggage in this country is subjected to a profile for all domestic flights. We don't allow curbside check-in for international flights departing the United States.

The American Airlines system, as I said yesterday, is the risk profile system. I spent a day and a half in Europe with American Airlines. I take my hat off to them. They have done a superb job. I was extremely impressed. They know I was impressed.

When I came to this job a little less than a year ago, one of the things that I focused on was to get smarter about what the U.S. carriers were doing in Europe. That is why I spent a day and a half with them.

We also met for a day with the carriers here in Washington about a month ago. We talked about their risk profile procedures. We also talked about an automated risk profile system that the FAA has established. This does rely on a computerized system.

It looks at the inherent characteristics of passengers who, through the course of history, we know present the higher risk. It looks at itinerary, and some other specifics which I am not going to get into. But the fact of the matter is, there are other alternatives we are looking at.

The reason for the meeting I had with the carriers a month or so ago was to look at the best of both of these systems. This automated system I am talking about, which the FAA intelligence folks worked on for a couple of years, is weighted, can be adjusted very quickly, and can respond to a threat instantaneously.

The challenge that I think the Federal Government and the FAA has today is to look at what we currently mandate, look at the innovative, creative things that the carriers have started doing, particularly in Europe, which are terrific, as you heard from Mr. Boynton. We need to look at also even some newer ideas that we have and merge those together.

I am absolutely committed, my staff is committed, they have heard this from me months ago, that if there is something better, better meaning it gives us a higher level of assurance that we can keep bombs, explosives, weapons and bad folks off of airplanes, I am absolutely committed to mandating that. Cost is not the factor.

One reason that we struggled answering the question yesterday about what does the El Al system cost, is because I haven't even focused on that as part of the equation. What I have focused on is what is better for the traveling public. Cost obviously is a factor, when we get down to making a decision.

But the fundamental question is, what fits best in the U.S. system of air transportation? Not the Israeli system of 19 airplanes and 22 countries that they might serve. What serves the U.S. citizens? What serves the folks who fly on U.S. air carriers best?

The FAA, the Administrator, Secretary Skinner, are absolutely committed to making those decisions quickly. We have done a great deal in the last 6 or 8 months, some of which I talked about yesterday.

We heard about also metal detectors and x-ray machines. We have completed a study which we were directed to do by the Undetectable Firearms Act that was passed last year, which required us to look at metal detectors.

We have studied metal detectors. We were required to look at metal detectors in use in this country, determine which ones meet a standard which was set by the Undetectable Firearms Act. We are in the final process of doing that. We are going to require the carriers to use only state-of-the-art metal detectors that meet the standards for this so-called security exemplar, which is a very, very small handgun. Certain types of metal detectors now in use, will no longer be allowed.

We also have a study underway to improve the standards for x-ray machines. We heard the previous panel talk about some new x-ray machines. We are testing the E-Scan system in a laboratory in Atlantic City now. We are trying to work with AS&E to test their new system.

Those are all things we are doing. We have to continue to do that just as quickly as we can. We heard about costs, for TNA. The rule which will be effective October 5, does not tie us to TNA. One of the objectives, one of the motivators for making the decision to require the use of explosive detection systems was to generate this interest that you have seen today.

The FAA is committed to requiring the use of the best available equipment. The Congress told us in June that we must require the use of explosive detection systems in a very, very accelerated way. We met the challenge of the Congress to do that.

We are not tied to TNA. The best thing that could happen from an equipment standpoint for the aviation security program in this country is to have an alternative to TNA. One of the challenges.

Mrs. COLLINS. Your time has expired.

Mr. Salazar, do you have a statement you want to make at this time?

Mr. SALAZAR. Several things. I almost feel like yielding my time, if that is possible, to Mr. Belger. He was on a terrific roll. I think only to share with you some frustration that many of these topics are difficult to cover in a 5-minute period. I welcome the opportunity in an executive session to be a little less constrained on some of the issues and some of the detail which I think is very important for this subcommittee to know.

In terms of systems approach, we have always advocated systems approaches. I don't know how to say this more clearly. Our project ongoing at Baltimore-Washington Airport right now, using the Sandia Corp. to find better, workable systems to incorporate into aviation security systems speaks directly to a systems approach.

They are looking at everything. It was unfortunate Mr. Jackson didn't have an opportunity to expand upon that, because his airport is being used as a lead airport, for which the AOCI has continued to ask for.

The systems approach is also a little frustrating when we attempt to improve security systems and we get the classic position of being damned if you do and damned if you don't.

The point is that this is the essence to the EDS rule. To be able to start proactive systems and to get them into operation. This is the essence of the automated access rule, to begin a systematic approach of improving critical systems here in the United States.

It is the bottom line of everything that we do. And to correct one last thing, certainly I did say that civil aviation is preeminent in the world, Mrs. Boxer. It, in fact, is. U.S. civil aviation is preeminent. I did not mean to say U.S. civil aviation security.

We are talking about competition in the international and U.S. arena. In order to maintain that preeminence, security has to continue a lead effort. I think you see that in many of the international fora that we deal with in trying to bring the global standards up to U.S. standards.

Mrs. COLLINS. Mr. Wall, do you have a statement?

Mr. WALL. I have no statement.

Mrs. COLLINS. Mr. Malotky.

Mr. MALOTKY. I have no prepared statement. I wish, however to address an issue raised earlier relating to the interactions of the Federal aviation security interests with our allies and with other agencies of the U.S. Government.

Within the United States with the leadership of the Office of Civil Aviation Security there have been established over the previous several years bilateral agreements with the Canadians, the British, and with other governments on a formal basis. These are a vehicle for working level discussions, which are scheduled periodically and held for a couple of days.

For example, we will meet with the Canadians in November at the FAA Technical Center in Atlantic City. We will discuss the technologies that we are exploring. They will discuss theirs. We will address operational issues as well during a free and open exchange.

Within the Federal Government, the FAA makes use of consultants—Sandia National Laboratory being a classic example—and several other laboratories within the Department of Energy. It was mentioned that the evaluators of our proposals are by in large all civil servants. Indeed, that is the case. The FAA, with the bulk explosive detection solicitations had participants from the FAA, from the Department of Energy, from the Department of Defense, and from the National Bureau of Standards. It was an attempt to draw on the resources of the Federal sector and to get a different view, if you will, of our problem.

Likewise, there exists an interagency group within Washington, whose responsibility is the exchange of technical counterterrorism information. Specifically the TSWG, the technical support working group, where the FAA is an active participant. The FAA and TSWG have jointly funded several different technologies that have been explored and are being incorporated, in some cases, into resolving FAA problems.

I wanted the committee to know that we are listening to anyone who has a solution that is out there.

Thank you, Madam Chairwoman.

Mrs. COLLINS. Thank you.

Mr. Salazar, I suppose the very first question that ought to be asked at this time is whether or not you believe there is a coverup?

Mr. SALAZAR. No, indeed not. We have been very forthcoming with this subcommittee. This is not the first congressional hearing we have been before, as you know, Madam Chairwoman. We have been before a number of subcommittees, and answered very tough questions. There was a complete review of civil aviation security conducted by the Department of Transportation. That review also endorsed these practices and procedures that we have been involved in.

There is a Presidential commission that has been appointed and we welcome the opportunity to provide the same information again. I think the record will clearly establish that there is no coverup.

Mrs. COLLINS. Mr. Jenkins, from the previous panel, indicated that we really haven't studied the operational effectiveness of the TNA; Mr. Belger. What would your comment be to that?

Mr. BELGER. Over 40,000 bags were sent through the TNA system in both San Francisco and Los Angeles. The FAA made a decision late last summer, well before the Pan Am Flight 103, to purchase at that time five systems. It was our intent at that time to gain as much operational information as we could with those five systems.

When 270 people were very tragically killed in December, the balance of what we had intended to do was dramatically upset. We accelerated everything that we were doing to try to be as responsive as humanly possible to the threat of international terrorism.

We increased the buy. We put more money into getting the five that we had already ordered more quickly. We made the decision that we would deploy those six as quickly as possible, learn as much as we can from those six before we actually require the use of the others.

We don't have the luxury of waiting any longer. I don't think the American public should allow us to wait any longer. We think we have a system that can be used in a operational environment. It is not the best. It is larger than we would like. It costs more than we would like. It is slower than we would like. The false alarm rate is higher than we would like. The detection capability is less than we would ultimately like.

No one in the last 2 days, however, has said it is not the best available. The American public, the folks who fly on U.S. air carriers, deserve to benefit from the best equipment that we can possibly give them.

Mrs. COLLINS. Mr. Belger, you said just now in your testimony that we weren't tied to the TNA and that there are other alternatives that you are looking at. When do you suppose you might be able to make some kind-of decisions about the other alternatives?

Mr. BELGER. The answer to that question primarily is the ability of the manufacturers to provide the equipment to us for us to test. I am personally aware of several other manufacturers who are working on a TNA type of device—using TNA technology that would be more accurate—who claim that they will have a device for us to test early next year. I am sitting on pins and needles waiting to test it.

Mrs. COLLINS. What about some of the other technologies we heard about today? Have those been considered?

Mr. BELGER. Absolutely. We have, as you have heard, funded vapor detection technology for many, many years. Our approach to vapor detection initially several years ago is that it seemed to be the best technology for us to pursue to check people. You heard about a test done at Boston Logan. You heard about other tests to test people for explosives. The vapor detection technology—we determined years ago was the best approach to take. We are continuing to fund that.

We have found, though, that we still need to do a great deal of work on the sensitivity of that technology and the speed of that technology. We don't think it is ready to be deployed yet.

We have heard about the vapor detection systems, some of which cost in the low hundreds of thousands of dollars. I don't think anybody would claim that they have the detection capability or the sensitivity of TNA. But a tough question that we have to answer is, is there a way to fit that technology into the security system? Do they have a role in that system? Can they add value to what we are doing? We are continuing to look at that.

We have tested several different vapor detection technologies. I am not really enthused by the test results that we have received. But nevertheless, we are continuing to work with all these people.

Mrs. COLLINS. The panel that just preceded you mentioned there is probably a place for all the various technologies in trying to develop a 100 percent secure system.

Do you agree with that?

Mr. BELGER. I don't know if I agree with that. That gets to the question I as asking.

Mrs. COLLINS. Would Mr. Wall have the answer to that?

Mr. WALL. Well, there is a question of how to combine technologies.

It is not obvious how to do it at this point.

In the usual way we think of combining sensors like the military might in multiple-sensor type systems, each sensor has to have a certain robust characteristic to itself.

So if we combine a second sensor with thermal neutron activation, it itself has to be a sensor with very good performance or the overall combined system has a much lower effectiveness.

We reduce false alarms in a multiple sensor system, but at the cost of reducing effectiveness.

Mrs. COLLINS. Mr. Salazar, why hasn't or has the FAA—well, the statement was made the FAA has not used the National Academy of Sciences as, perhaps, it should as an independent body to evaluate technologies.

The first question. Has the FAA utilized the National Academy of Sciences? If not, why not?

Mr. SALAZAR. Absolutely we have. As a matter of fact, we got a preliminary report and they briefed our Administrator within the last 6 weeks, Madam Chairwoman.

Some of their insights were on target with what we have been doing. They endorsed many of our approaches to research and development.

Some of the things that they very clearly said to us and it has been spoken by the panel before us, too, concerning the expertise of our research and development effort is that they said that the FAA has been doing an excellent job of deciding where not to spend the Government's money.

So it has had an opportunity to wring out a lot of these technologies. It has made recommendations. Its final report will be issued. We look forward to working with them.

Mrs. COLLINS. Mr. Nielson.

Mr. WALL. May I add one other point?

Mrs. COLLINS. Sure.

Mr. WALL. The National Academy declined to become a testing facility or testing mechanism for the FAA. They did agree to help us establish a standard procedure that would be used on all explosive detection systems and we worked together with them on this.

Mrs. COLLINS. Did they say why they so declined?

Mr. WALL. The National Academy is actually made up of people who volunteer their time. They are often associated with industry or academia.

In general, they don't have the time to spend weeks on a test and evaluation of a given detection device. So we are looking for alternatives such as the National Bureau of Standards.

We had informal discussions with Sandia about being that type of testing facility. But the National Academy will certainly play a role in establishing what the test protocols would be.

Mrs. COLLINS. Mr. Nielson.

Mr. NIELSON. Yes. I have just one major question and a couple of minor ones.

A previous panel, two previous panels ago, talked about the desire to get involved in the process. They feel you have frozen them out.

SAIC is the only one involved. Several suggested—EG&G particularly—suggested whatever is learned about TNA should be shared with other manufacturers so they can get involved in the act.

How do you react to the charge the FAA has been slow to share TNA data with other potential contractors?

Mr. WALL. Let me try to answer that.

We very much wish to share that information to make it available to the scientific community. There are procurement rules and legal issues involved.

We have not gotten a clear definition of what information we are able to pass along under Federal acquisition regulations.

Mr. NIELSON. Would you agree that since we are trying to get the very best possible system, the more people involved, and more competition might produce it faster?

Mr. WALL. Absolutely.

Mr. NIELSON. What is your proposal to bring others into the group then?

Mr. SALAZAR. If I may, Mr. Nielson, I think giving them the incentive to get into the market was partially accomplished by our rulemaking effort, a clear announcement that we have established a policy that makes sure that anything that goes aboard an airplane is going to be checked through some form of high-tech explosive detection system.

Mr. NIELSON. You agree with Mr. Wall. You are agreeing to share the TNA——

Mr. SALAZAR. To the extent it doesn't violate proprietary or patent rights, of course, sir.

Mr. NIELSON. So that other people can manufacture it?

Mr. SALAZAR. Absolutely, Mr. Nielson. It should be noted——

Mr. NIELSON. What is the timetable for that? When are you going to do that?

Mr. SALAZAR. I don't have a timetable for that, sir. It is a legal issue.

Mr. NIELSON. When can we expect to learn what the timetable is?

Mr. SALAZAR. I can go back and press for an answer and provide it for the record.

Mr. NIELSON. Within 48 hours?

Just kidding.

The other question I was going to ask is, there were suggestions made by a number of witnesses, and particularly the members of the Survivors and others, that you should go, that you have done everything wrong, and so forth.

Do you want 1 minute in rebuttal?

That is all I will give you, 1 minute to rebut those charges made by the various groups yesterday.

Mr. SALAZAR. Well, I don't plan to resign, if that is the answer. I am a career civil servant. I have been employed in civil aviation since 1972.

I grew up in the ranks in civil aviation security. I started as a GS-7 inspector in the field in California.

Mr. NIELSON. To what extent are those charges unfounded or unfair?

Mr. SALAZAR. They are unfounded because unfortunately they are not—they don't have all the facts. They are dealing with a high degree of emotion and unfortunately when emotion gets in the way, oftentimes facts don't seem to be real relevant.

Mr. NIELSON. The other question was along with that, that the FAA was overly bureaucratic and the bureaucracy that we have moves slowly and doesn't change its mind readily. Do you think that is part of the system?

Mr. SALAZAR. It is a gigantic check and balance system, sir, between the three branches of Government. It is a gigantic bureaucracy. There is no other way to describe it. It is large and cumbersome.

It doesn't move; it can't move quickly. We set quite a record in civil aviation security in putting out a final rule for explosive detection systems. Where traditionally you hear about a rulemaking process being 3 years long, we were able to get that rule on the street in 5 months.

Mr. NIELSON. Thank you. No more questions.

Mr. BELGER. May I respond to that briefly? I promise I won't take more than 30 seconds.

Mr. NIELSON. I think my time is gone. If the chairwoman will indulge you, can he answer the question?

Mr. BELGER. I don't accept the bureaucracy's copout. I don't accept it. I don't believe it.

Mr. NIELSON. I just repeated it.

Mr. BELGER. I spent a great deal of time with the FAA Administrator, and the Secretary of Transportation. There is no bureaucracy—no bureaucratic hold up in the FAA in what we are trying to do. Some of these are touchy decisions.

We are trying to make those decisions as quickly as possible. To get an explosive detection rule out that puts a potential $800 million burden on the industry in a matter of a couple of months is absolutely unprecedented.

We spent an enormous amount of time, thought, and logic into doing that very quickly. I don't accept the bureaucratic argument. I don't feel constrained by any bureaucratic tugging or pulling.

We have got license to do what is best for the American traveling public.

Mrs. COLLINS. The time of the gentleman has expired.

Mrs. Boxer.

Mrs. BOXER. I am glad, Mr. Belger, you don't feel constrained because you are the first person I ever met from the Federal Government that hasn't felt constrained by the bureaucracy.

Mr. BELGER. That doesn't mean I am not thwarted by it sometimes.

Mrs. BOXER. I understand you said it was unprecedented to have the airlines pick up this tab of $100 million. There is enough money in the trust fund now to by 6,000 of these machines which you said—I am not taking a position on the machinery, that is your job—you said the public expects it, demand it, it is the best equipment we can give and we are going to do it.

It seems to me—why isn't FAA saying let's go into that trust fund because this is a big burden. Mr. Jackson of BWI said airlines shouldn't be expected to spend such an enormous amount. So in other words I sense a bit of contradiction; on the one hand, a real desire to move forward on this, on the other, perhaps a reticence to come to Congress or tell the administration we have to do more. Madam Chairman——

Mr. BELGER. I need to clarify one thing you said. Perhaps I wasn't clear. I did not mean to say that the cost to the carriers was unprecedented. What I said was getting that rule out so quickly was unprecedented.

Mrs. BOXER. That is not how it came out.

Mr. BELGER. That was my thought. Getting the rule out——

Mrs. BOXER. There is a lot of backing and filling going on in this hearing. Let me, if I could, reclaim my time because I have such a short amount of time. My Chair is very strict on that.

I want to make my other point, if I can. I am very happy, Madam Chairman, you have the FAA back, first of all, to give them a chance to respond. They have done that very articulately.

Second, it gives us a chance to sum up how we feel, which I would like to do at this point in open session. You have in fact endured a lot of criticism the last couple of days, which I hope you will take in the spirit of being constructive.

I think one of the things Mr. Belger said in his opening was that Congress had laid down the challenge of the equipment and we met the challenge. You know, therein lies a problem to me. It seems to me in the area of airline security, airport security, protecting the traveling public, you should be laying down the challenge to us, not vice versa.

You should be coming here pounding the table and saying we need more money. This equipment is out there. These systems were out there. It seems to me that the Congress is having to pound the table to you and then you respond and in some cases very well and in other cases maybe not as well as I would like to see.

I hope when you leave here today maybe you will look at this as a bit of reversal that some of us would like to see you challenge us to meet the task, because it would be very refreshing if we could have that.

Mr. Salazar, you clarified your point. Mr. Vincent came forward and said in very moving testimony that he couldn't sleep because he felt there was a coverup not of a specific incident, but of the fact that you are leading the American people to believe that we have the preeminent system in the world.

You clarified and said well, I meant in general, not specifically in the area of security. So who is preeminent in security, if not us?

Mr. SALAZAR. For the scope of operation and volume?

Mrs. BOXER. No.

Mr. SALAZAR. Define it then, Mrs. Boxer.

Mrs. BOXER. Who has the safest system in place now. Don't talk about volume. I don't think that is particularly relevant. When we find a good way to teach a kid in second grade, we test it out on a few kids in class.

Let me finish my point, please.

If it works, we apply it to the whole school. If it works there, we apply it to the whole district. And if it works there, to the whole State. If it works there, a few more States, et cetera. So to say that El Al isn't really that relevant because it is a small volume and it is a different threat, you have been contradicted on that point.

It gives me a problem. Now, you said today we were not No. 1. We are not preeminent in security. I am asking you who is?

Mr. SALAZAR. There is no one that is perfect in civil aviation security.

Mrs. BOXER. Is there no one who is better than we are?

Mr. SALAZAR. Clearly El Al has gotten some procedures that are very good. But let me finish, Mrs. Boxer.

Mrs. BOXER. OK.

Mr. SALAZAR. El Al is a government operation. They use military. It is manpower intensive and, Mrs. Boxer, they also—the Government of Israel underwrites $30 million worth of losses a year for that carrier. Now, if you are suggesting that we go into a posture of underwriting all losses for security for U.S. air carriers, that is a different issue.

Mrs. BOXER. Mr. Salazar, I am not suggesting anything other than saying to you if in fact El Al is the best, we need to know the cost of that system. We need to know—maybe we do want to go that way. maybe it makes sense.

We have $6 billion sitting in an airport trust fund. If we can't do it by laying it on the private sector, we may have to get more involved. So that is all I am trying to say.

Well, I am glad you put it on the record. Now, Mr. Belger said my hat is off to American Airlines. They do a super job. I am quoting him now. "My hat is off to them."

Why not, as I asked American Airlines, mandate that kind of program on all of our airlines? If American Airlines can do it, why not the others, Mr. Belger?

Mr. BELGER. I tried to speak to that. We will make a decision about that very quickly. I met with several of the carriers. They have some innovative ideas. We have some innovative ideas. I spoke about the automated passenger screening profile system. We have to merge those ideas together.

Mrs. BOXER. Listen. We are talking, it seems to me, about a problem you, yourself, expressed. You said it very beautifully. We can't afford to wait. The time is now. We have machinery that works. It is not the greatest, but we are going to lay it on the private sector.

Now, we also know that El Al works. We know it works. Mr. Salazar said today it is the best that there is. Why wait? American Airlines is proving that it is good. Why wait? I would leave that as a rhetorical question needing no response.

Please challenge us. If you do, I think you will find a very responsive Congress.

Thank you, Madam Chairman.

Mrs. COLLINS. The time of the gentleman has expired.

We note there is a vote on in the House of Representatives and when we return, we are going to go into executive session, as has already been agreed to by the full subcommittee.

We are going to recess now for 1 hour. At that time, only those people who have been asked to be in executive session will be allowed in our room. You already know the room number. We expect to see you there 1 hour from now.

Thank you.

[Whereupon, at 1:45 p.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

APPENDIX

Material Submitted for the Record

PAN AM

Pan American World Airways, Inc.
1200 - 17th Street, N.W.
Suite 500
Washington, D.C. 20036

The following statement was issued today by Thomas G. Plaskett, Chairman and Chief Executive Officer of Pan American World Airways and Pan Am Corporation.

"The Federal Aviation Administration's letter alleging certain discrepancies in December 1988 is currently under review by Pan Am and we will respond to it in accordance with FAA procedures. But, in our view, the matters raised were generally of an administrative, rather than substantive nature. The December inspection followed a previous inspection in October 1988 which resulted in no civil penalties being levied against Pan Am. In addition, there is no evidence that any of the items noted in the December inspection by the FAA were in any way related to the bombing of our aircraft last December.

"As the FAA itself has said in its statement, Pan Am has satisfied the FAA that the noted deficiencies have been corrected. Continued compliance and a strong commitment to the safety and security of our passengers remains our paramount objective. Therefore, we will continue to work together with the FAA and other U. S. carriers in a spirit of cooperation to further strengthen what is today the industry's most comprehensive aviation security program.

"However, it is our strongly held view that aviation security is a shared responsibility between air carriers and their governments, and that governments must place more emphasis on interdicting terrorism as the best means of protecting air travelers."

September 20, 1989

SCINTREX
security systems

September 18, 1989

Ken Salaets
Government Operation Committee
2153 Rayburn Building
Washington, D.C.
20515

Fax: 202-225-3974

Dear Mr. Salaets:

Scintrex is a diversified high technology company engaged in the design, development and manufacture of precision instrumentation and equipment for use in a number of areas including the geophysical, nuclear, defence and security sectors. For over 25 years, Scintrex has manufactured state-of-the-art instrumentation which has been used in critical applications requiring high sensitivity, ruggedness, reliability and the capability to operate under extreme climatic conditions. Scintrex operates out of a 70,000 square foot facility located in Concord, Ontario, Canada. There are 150 employees of which 25 % are employed in Research and Development.

The company is divided into three divisions, Geophysical, Analytical and Nuclear. The major market served in the Analytical Division is the Security sector. Our goal in the Security Market is "To produce and market highly sensitive instrumentation satisfying the ever demanding needs of the public and private sector".

We currently have four products in the security sector, the EVD-1 Portable Explosive Detector, the Walk-Through (Passenger-Screening) Explosive Detector, the Explosive Detector for Baggage Screening and the TND-1000 Trace Narcotics Detector.

Security Systems

EVD-1 Portable Explosives Vapour Detector

The EVD-1 is the explosives detector which has been introduced into daily service as part of the security program at all Canadian International Airports. Based on gas chromatography, the unit can detect trace amounts of chemical compounds given off by a wide variety of explosives, to a sensitivity of a few parts per trillion. These compounds can be added directly during the manufacturing stage or indirectly through the recycling of ingredients and/or through the storage of explosives. The high sensitivity of this instrument, coupled with its full portability, simple operation, and freedom from false alarms enables more reliable and effective detection of concealed explosives in aircraft, luggage and other inaccessible locations.

The unit consists of two components, a handsampler and a main analyzer unit. A sample of air is obtained in a sample tube via the handsampler and the sample tuue is then analyzed on the main unit. The result is displayed in 1.5 minutes.

World wide attention has been focused on the Scintrex EVD-1, in both the civilian and military security sectors, as the instrument which best represents the latest advances in the effective detection of hidden explosives. The EVD-1 meets rigid U.S. Military, NATO and Transport Canada specifications, thereby ensuring the user of the highest degree of ruggedness and reliability so far provided in any commercial explosives vapour detector. In addition to Canadian Airports, the EVD-1 is used routinely at airports in Switzerland, France and Spain. There are a total of 140 units used in security applications in the above mentioned countries and the United Kingdom, Italy, United States and Sweden. The unit price of the EVD-1 is approximately $40,000 U.S..

Please find attached a specification sheet, application reports and references for the EVD-1. The EVD-1 is recognized by security forces to be the most sensitive and specific explosive vapour detector available.

▶ ▶ ▶ SCINTREX
security systems

Rapid Explosive Monitor (Passenger and Baggage Screening Device)

At Scintrex, we believe that the best method of explosive detection is a "layering" effect. That is, detection capability is enhanced by employing several methods of detection. Vapour detection when combined with the new method of x-ray detection has been found to be a feasible and significant measure in the battle against terrorism.

The Rapid Explosive Monitor (REM) operates on the same, well-proven, vapour detection principle as the EVD-1, and is, therefore, characterized by ultra-high sensitivity and virtual freedom from false alarms.
Transport Canada has played a significant role in the development of the REM, providing funding, and knowledge of airport security gate monitoring.

The REM was designed as a passive device, passengers or operators are not exposed to any forms of radiation or chemical compounds.

The REM is to be combined with X-ray Monitors and Metal Detectors to provide analysis of explosive vapours in luggage and on individuals, respectively.

Combining the REM with the x-ray machine involves the placement of a sample chamber in front of the x-ray unit. Luggage is placed on a conveyor belt and led into the sample chamber. As it passes through the sample chamber, air representative of the interior and exterior of the luggage is sampled, concentrated and delivered to the analyzing unit. The luggage continues on the conveyor belt into the x-ray chamber and the results of the explosive analysis are displayed as the luggage leaves the X-ray unit. The sample chamber can be configured to fit most x-ray machines. The price of the sample chamber and analyzing unit (REM) will be approximately $85,000 U.S..

In the passenger screening device, as individuals pass through a Sample Chamber, a sample of air is obtained by a unique and extensive method of directed air flow. The air sample is analyzed by the REM and the result shown on a display screen. The walk-through will retail for approximately $85,000 U.S.

Please find attached preliminary specifications on the two REM devices.

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security systems

The passenger and baggage screening devices will be "field" tested in conjunction with Transport Canada in October 1989 at Pearson (Toronto) International Airport. We extend an invitation to you and your colleagues, to view the devices at this time.

If you have any questions regarding the enclosed material, please contact this office.

Sincerely yours,

Gail McCarthy

Gail McCarthy
Marketing Manager

cc Mr. Bernie van Kerre Broeck
General Manager

Dr. Seigel
President

RAPID EXPLOSIVE MONITOR

The Rapid Explosive Monitor (REM) is to be combined with X-ray Monitors and Metal Detectors to provide analysis of explosive vapours in luggage and on individuals, respectively.

Combining the REM with the x-ray machine involves the placement of a sample chamber in front of the x-ray unit. Luggage is placed on a conveyor belt and led into the sample chamber. As it passes through the sample chamber, air representative of the interior and exterior of the luggage is sampled and delivered to the analyzing unit. The luggage continues on the conveyor belt into the x-ray chamber and the results of the explosive analysis are displayed as the luggage leaves the X-ray unit. The sample chamber can be configured to fit most x-ray machines.

System Components and Dimensions

Sample Chamber:	58"l x 40'w x 52"h
Analyzer Unit:	40" x 20" x 30"
Gas Cabinet:	24" x 19" x 68"

Throughput

Twelve bags per minute.

Detection Limits

Less than 5 parts of EGDN (ethylene glycol dinitrate), EGMN (ethylene glycol mononitrate), MNT (mononitrotoluene), and MMAN (monomethylamine nitrate) in 10^{12} parts of air.

SCINTREX security systems

222 Snidercroft Road
Concord Ontario Canada
L4K 1B5

Telephone
Telex
Telefax

EVD-1 APPLICATION REPORT 1

Explosive Material (From Unknown Source)	Result	Location
Emulite	Positive	Sweden, 1986
PTN (plastic)	Positive	Sweden, 1986
TNT	Positive	Sweden, 1986
TVSP-20-72 (BDX)	Positive	Sweden, 1986
Dynamex	Positive	Sweden, 1986
Military Haxatol	Positive	Sweden, 1986
Sheet Explosive	Positive	Norway, 1986
Dynamite	Positive	Norway, 1986
TNT	Positive	Norway, 1986
PETN	Positive	Norway, 1986
HMX	Positive	Norway, 1986
Sheet Plastica	Positive	Norway, 1986
PETN	Positive	Denmark, 1986
TNT	Positive	Denmark, 1986
Amongelite	Positive	Denmark, 1986
Swedish Black Plastic	Positive	Denmark, 1986
Platter (English)	Positive	Denmark, 1986
PE-2	Positive	Denmark, 1986
Donarit	Positive	Denmark, 1986
C-4	Negative	Ministry of Transport, 1986
RDX	Negative	Ministry of Transport, 1986
Detaprime	Positive	Ministry of Transport, 1986
Black Powder	Negative	Ministry of Transport, 1986
Potassium Chlorate/Sugar	Negative	Ministry of Transport, 1986
"pure" RDX	Positive	Royal Canadian Mounted Police, 1986
CIL Emulsion Explosive	Positive	RCMP
Military C-4	Positive	RCMP
CIL Water Gel	Positive	RCMP
PETN	Positive	RCMP

EVD-1 APPLICATION REPORT 1

Explosive Material (From Unknown Source)	Result	Location
Powermex 500	Positive	RCMP
White Prills (Ammonium Nitrate)	Positive	RCMP
CIL Meteor (FFFG Black Powder)	Negative	RCMP
Hogdon Powder Pydrodex	Negative	RCMP
Expro 3031	Positive	RCMP
Tovex 4001	Positive	RCMP
Hercodyne SP60	Positive	RCMP
C-4	Positive	National Research Council
2-4 D.N.T.	Positive	National Research Council
Data Prime	Positive	National Research Council
Detonating Cord (PETN)	Positive	RCMP
Smith & Wesson Training Fuse	Positive	RCMP
Rifleite 303	Positive	RCMP
HMX	Positive	RCMP
Formex	Positive	France, 1987
Dynamite	Positive	France, 1987
Detonating Cord & Pentrite	Positive	France, 1987
PETN	Negative	France, 1987
C-4	Positive	France, 1987
Russian Explosive	Negative	France, 1987
Goma-2	Positive	Spain, 1986
TNT	Positive	Spain, 1986
Hexalita	Positive	Spain, 1986
Pentritita	Positive	Spain, 1986
Ammonium Nitrate	Positive	Spain, 1986
Czechoslovakian Explosive	Negative	Switzerland, 1986
Plastite	Positive	Switzerland, 1986
Volumex	Positive	Switzerland, 1986
Trotyl	Positive	Switzerland, 1986
Tovex	Positive	Switzerland, 1986

EVD-1 APPLICATION REPORT 2

Non-Explosive Materials	Result	Source
Methylene Chloride	Negative	Royal Canadian Mounted Police
1,1,1-trichloroethylene	Negative	
Freon 113	Negative	
Hexane	Negative	
Benzene	Negative	
Nitroglycerine Tablets	Positive	
Urea	Negative	
Aluminum Chloride	Negative	
Potassium Nitrate	Negative	
Ethyl Ether	Negative	
Spray Buff and Shine Wax	Negative	
Dutch Cleaner	Negative	
Window Cleaner	Negative	
Hand Soap	Negative	
Cigarette Smoke	Negative	
Merit Menthol Cigarillo	Negative	
Pipe Tobacco Smoke	Negative	
Acetic Anhydride	Negative	
Formaldehyde	Negative	
Ethylene Glycol	Negative	
Ethylene Clycol Monoethyl Ether	Negative	
Methanol	Negative	
Acetone	Negative	
Dichloromethane	Negative	
Methyl Ethyl Ketone	Negative	
Glycerol	Negative	
Hydronapthalene	Negative	

EVD-1 APPLICATION REPORT 2

Non-Explosive Materials	Result	Source
Ethyl Acetate	Negative	
Chlorform	Negative	
Styrene	Negative	
Listerine Mouthwash	Negative	
Klur Shoe Polish (Dark Brown)	Negative	
Estee Lauder Perfume	Negative	
Kerosene (deodourized)	Negative	
Dimethyl Phthalate	Negative	
Picric Acid	Negative	
Nitrobenzene	Negative	
Napthalene	Negative	
Bunker Oil	Negative	
Light Stove Oil	Negative	
Klur Shoe Polish (Black)	Negative	
L'indiret Perfume	Negative	
Oscar de la Renta Perfume	Negative	
Lepages Plastic Wool	Negative	
Resorcinol Waterproof Glue	Negative	
Lepages Strength Liquid Glue	Negative	
Lepage paper Cement	Negative	
Vinyl Plastic Repair Glue	Negative	
Elmers Epoxy Resin	Negative	
Elmers Epoxy Hardener	Negative	
Seal All (Silicon Sealant)	Negative	
Lepages Fabric Mender	Negative	
Lepages Miracle Mender	Negative	
Lepages Contact Cement	Negative	

REFERENCES OF THE EVD-1

1. Mr. Nick Cartwright
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IMATRON

SUMMARY OF CT EXPLOSIVES DETECTION DEMONSTRATION

INTRODUCTION

A demonstration of computed tomographic (CT) explosives detection was held on July 24, 1989, at Imatron, Inc. in South San Francisco. Attendees at this meeting were Carmen Munafo (FAA Technical Center), Gerald Meyers, J. Larry Verble, and William Sims (State Department), Rick Burdet (Navy EOD Test Facility, Indianhead), Don Gould and Ralph Schellenbaum (Sandia National Labs), Pat Shea (SAIC), and Don Hansen (Consultant to Bureau of Alcohol, Tobacco, and Firearms).

The meeting began with a briefing from Imatron personnel regarding the goals of the CTX 5000 project, the current status of the technical development, and the design of the demonstration and test protocols. The meeting then reconvened at the Scanner Test Facility for performance of the test scans and demonstrations of the 3-d workstation facility. Participating Imatron personnel were Charles Cooper, Douglas Boyd, Fred Roder, Kristian Peschmann, Sauveur Chemoni, Richard Alena, Jon Harman, and Roger Schulte.

EQUIPMENT

For purposes of this demonstration, an alpha version, automated, real-time threat recognition algorithm was developed and implemented. The functions of this algorithm are described under Procedure. A prototype CT system that is being used to test explosive detection concepts was used. This CT system is based on a compact gantry and software was that developed by Imatron for the U.S. Army as a prototype compact medical scanner (FMS 5000). This scanner was designed for deployment in military field hospitals throughout the world, and it is smaller, lighter, requires less peak power, and provides a higher continuous scan rate than any conventional scanner. These attributes are also ideal for the explosives detection application.

Imatron is currently developing a production, mobile CT system specifically configured for the explosives detection application. This new scanner, the CTX 5000, will employ many of the technological advances of the FMS 5000 and a modified scanning geometry to increase the scanned area without significantly increasing scanner size. The CTX 5000 will be available for field deployment in early 1990.

TEST OBJECTS

The threat samples used in this demonstration consisted of actual explosives and explosives simulants. These samples were supplied by one of the visitors on the morning of the demonstration and had not previously been seen at Imatron. The explosives consisted of the following:

> 4 oz. of TNT, in the form of one stick of military "dynamite," approx. 1 in. in diameter by 4 in. long, with a fuse well through the middle.
>
> Approx. 4 oz. of C-4, in the form of a rectangular block approx. 2 X 2 X 1 in.
>
> Approx. 20 in. of det cord, 25 grains/in. of PETN, in the form of a loose coil approx. 4 in. in diameter.

Figure 1 is a photograph of the explosives samples. In addition, a 1/8 inch thick sheet explosive simulant was prepared by Imatron. SAIC provided a C-4 simulant and a dynamite simulant. Each SAIC simulant weighed several pounds.

For the automated detection scanning demonstrations a suitcase and a briefcase were used. The suitcase contained books, a gel shaving cream, a conventional shaving cream, a stick deodorant, suntan lotion, and clothing, in addition to the TNT and C-4 samples. The simulated sheet explosive was placed within the stack of books. The briefcase contained a small tape recorder, books and papers, a law enforcement shield, and misc. items. In three successive scans the three explosives samples were placed above or below the tape recorder. The briefcase was provided by a site visitor on the morning of the demonstration.

In addition to the automated detection scanning demonstrations, recorded images from three other test suitcases were used to demonstrate the capabilities provided by CT three-dimensional imaging. The first suitcase, a duffle bag, contained a fully functioning radio-cassette player with approximately 9 oz. of plastic explosive simulant in each end. The bag also contained a shaving kit, a book, and clothing. The second suitcase was configured to represent a typical woman's suitcase and contained a hair dryer, curling iron, cosmetics, shoes, and clothing, as well as three sticks of a simulated packaged high explosive. The third suitcase was configured to represent a typical man's suitcase, and contained a shaving kit, books, magazines, and clothing. A sheet explosive simulant was sandwiched between the books and magazines.

PROCEDURE

For the automated detection scanning demonstration, the explosives samples were placed in test suitcases at locations unknown to the scanner operator. The test suitcases were then placed on the scanning table and SP (scanned projection radiography) images were obtained. (In this mode, the x-ray source and detector array remain fixed and the object is translated through the gantry over a period of approximately 3 seconds. The image created is similar to that produced by a conventional concourse x-ray system.) The SP images were then subjected to the automated threat detection algorithm. This algorithm identified contiguous high-density regions, mapped them to segment the image into high-density "objects," and selected the CT scan planes to intersect these objects. An SP image, with the results of the automated threat recognition algorithm overlayed, is shown in Figure 2. CT scans of the planes selected by the automated algorithm were then acquired at a scan speed of 4 sec/scan. In the resulting images, pixels with values in the explosives range appeared in red. The automated threat detection algorithm then identified the explosives and explosives simulants within the cross section.

In addition to the automated detection demonstrations, the capabilities of a real-time, three-dimensional imaging system supplied by Reality Imaging (VoxelFlinger TM) were demonstrated using CT data previously acquired for three test suitcases. Specifically, the participants were shown that:

1. The suitcase images could be rotated and viewed from any angle in real time; 3-d shaded surface displays were produced of certain density ranges.

2. By windowing the CT values and/or by using cut planes to define a region of interest it was possible to strip away unwanted clutter, leaving just the explosives samples; and

3. By using a "radiographic" 3-D display mode, it was possible to dissolve away all pixels not in the explosives range leaving a radiograph of only explosive objects.

RESULTS

A. Automated Detection Tests.

All the live explosive samples and explosive simulants were found by the automatic detection algorithm for each suitcase configuration. No false alarms were observed.

1. Suitcase tests of 4 oz samples and sheet explosive.

The explosive samples and sheet simulant were correctly flagged by the algorithm in each test. Figures 2 and 3 show typical images of the CT scanning demonstration. Figure 2 shows both the automatic selection of scan slices from the projection image (left) and a cross section at one of the selected slices showing the shaving gel, suntan lotion, stick deodorant, and shaving cream, along with the 4-oz. TNT and C-4 samples (right). These samples were automatically flagged as explosives as shown by the blue markers in the images.

2. Suitcase test of SAIC simulants

Figure 4 is a cross section of the suitcase showing the considerably larger SAIC- supplied C-4 and dynamite simulants. The detection algorithm individually detects each component of the SAIC test objects.

3. Briefcase tests of 4 oz samples and detonating cord.

The 4 oz TNT and C-4 samples, were correctly identified by the threat detection algorithm, with no false alarms. Two short lengths of detonating cord were visible in the image and highlighted in red. The detonating cord was not automatically detected because the amount was below the threshold of the algorithm. The algorithm was set at approximately 2 oz.

Figure 5 is a cross section image of one of the briefcase tests in which the C-4 sample was placed directly below the metallic tape recorder. In this image the color red is used to indicate pixels in the explosives range, while the blue boxes with X's represent the threats automatically identified by the detection algorithm. Some red pixels occur at the edges of metal objects, but the amount of these is below the detection threshold and no false positives are produced.

B. Results of the Demonstration of 3-D Imaging.

The 3-D imaging demonstration showed the capability of the CTX system to rapidly display additional 3-dimensional information regarding threat objects within a suitcase. This can be used to determine type, packaging, location of the explosive, the type of detonator, the timing mechanism etc. This mode may also be used to screen suitcases that produce false alarms.

The results obtained for the duffel bag containing the radio-cassette player are shown in Figures 5 through 9. Figure 5 is a photograph of the bag contents set out on the scanning table. Figure 6 shows the opened radio-cassette player, revealing the explosives simulants. Figure 7 is an SP view of the bag. It clearly shows the presence of the radio-cassette player, but reveals nothing of its contents. Figure 9 is a single CT scan through the bag. The explosives simulant is highlighted in red by the system. Figure 9 is illustrative of the results shown on the

3-D imaging workstation. The image at the top left shows essentially the entire bag, created from a series of CT images. The images on the top right and bottom left show this same bag (from different perspectives) with increasingly more of the low- and high-density materials stripped away, leaving only the explosive-like voxels (volume elements). Finally, the image on the bottom right is a perspective "radiographic" image of the bag showing the configuration of the solid explosive simulant.

CONCLUSIONS

The scanning demonstration confirmed the ability of Imatron's CTX prototype to detect very small amounts of explosives in a totally automated fashion. Projection x-ray images were automatically analyzed to select CT scan planes and 4-oz. TNT and C-4 samples (each approximately four cubic inches) were flagged by color coding and automatically identified by an automated threat detection algorithm. Likewise, a 1/8 inch thick sheet explosive simulant was found in automatic mode. The sensitivity level for the demonstration was set at approximately 2 oz.

It was also demonstrated that real-time manipulation of three-dimensional data obtained by CT provides an unambiguous means of assessing the location, configuration, and amount of explosives present in a suitcase. Thus CT provides a means of effectively dealing with false alarms, while at the same time providing invaluable information to the bomb disposal personnel.

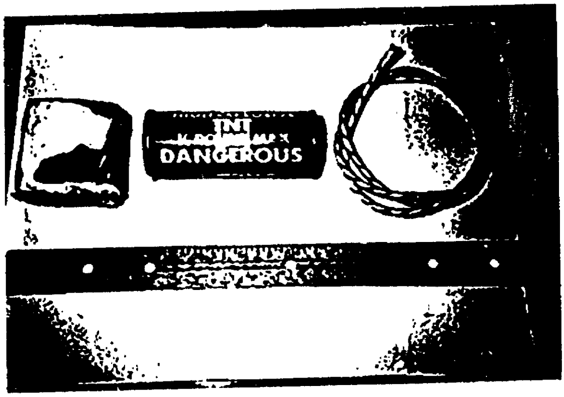

Figure 1. Explosive samples provided on the day of demonstration. The block is 4 oz of C-4, the cylinder is 4 oz of TNT, the cord is standard detonating cord.

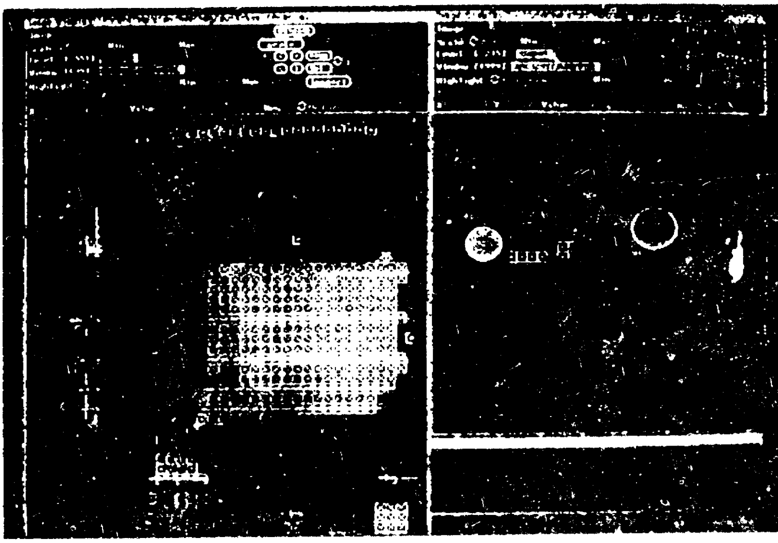

Figure 2. On the left is a scanned projection image of one of the test suitcases. Threat areas are shown in red and identified into objects as shown by the blue cross hatching. The detection algorithm has selected several optimal CT scan planes for inspection of the threat objects.

On the right is the CT image from one of the automatically selected scan planes. Visible in the image are shaving gel, suntan lotion, stick deodoratn, shaving cream, and the 4 oz. samples of TNT and C-4. The TNT and C-4 are highlighted in red since they are within the density range of explosives. The blue squares with x's show that the automatic detection algorithm has identified these two objects as explosives.

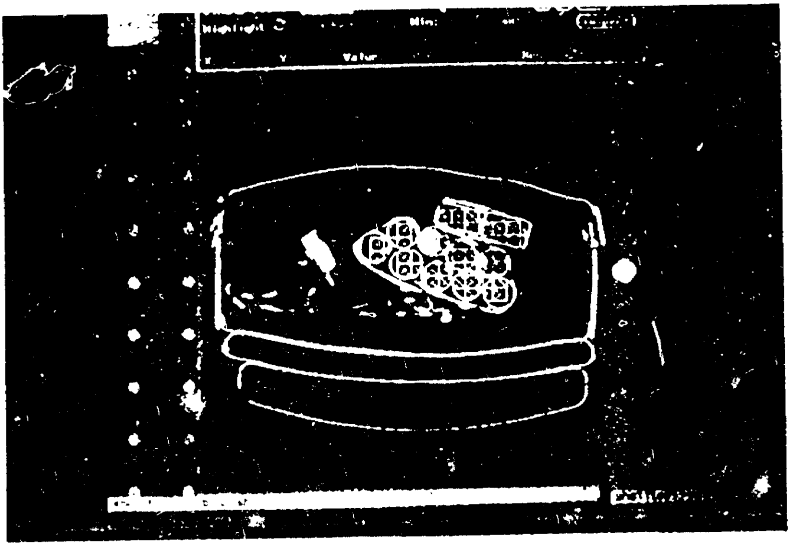

Figure 3. CT image of large C-4 and dynamite simulates provided by Science Applications, Inc. These simulants are highlighted in red. Here the automatic detection algorithm (blue markers) has identified each of the individual components of these two simulants as explosive.

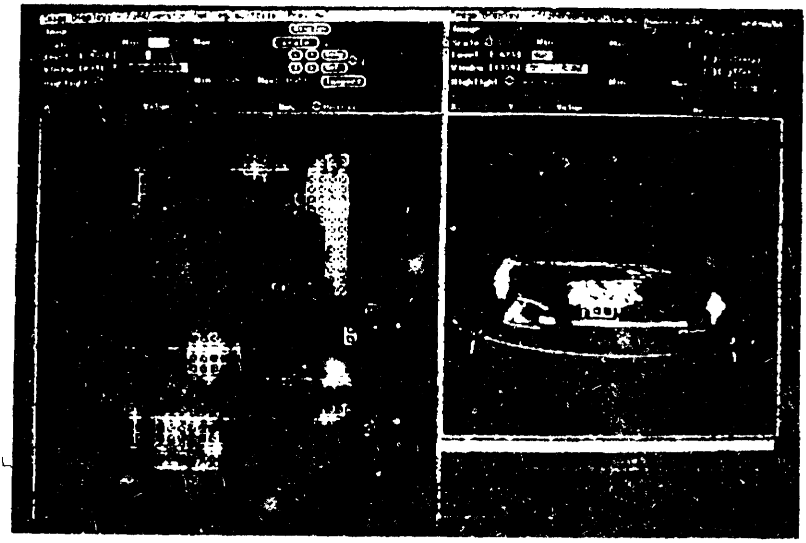

Figure 4. CT image of briefcase showing the 4 oz. C-4 sample (red) immediately underneath a metallic tape recorder. The blue markers indicate that the automatic detection algorithm has correctly identified the explosive.

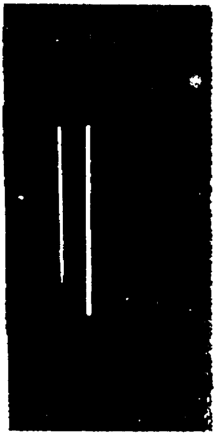

Figure 5. Photograph of the contents of a duffle bag.

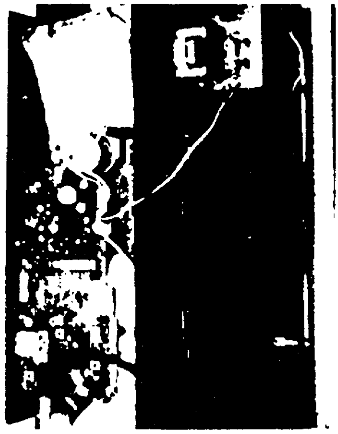

Figure 6. 9 oz. C-4 simulant in plastic bags placed in a "Crown" radio-cassette player.

Figure 7. Scanned projection image of packed duffle bag.

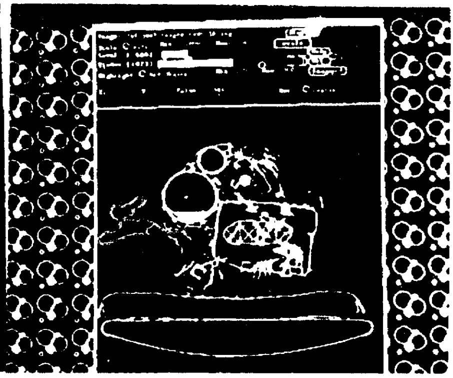

Figure 8. CT image through bag showing simulant (red).

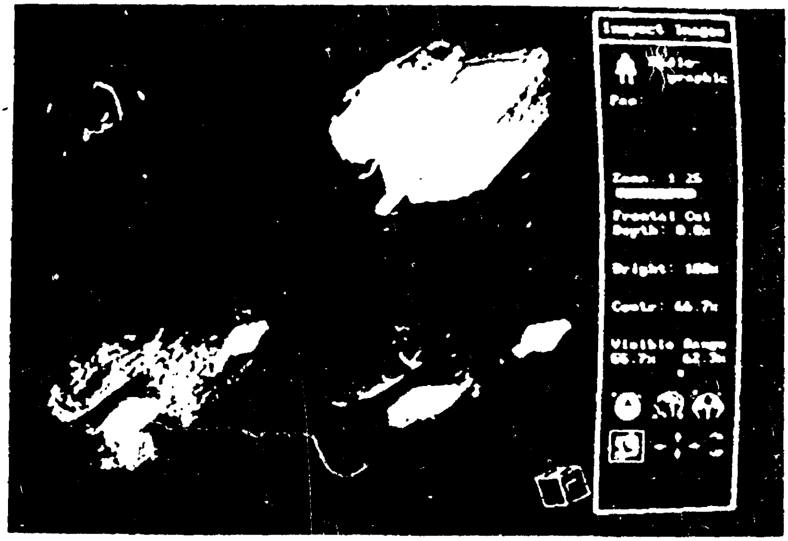

Figure 9. Three-dimensional images of duffle bag produced using a real-time, 3-D, workstation (VoxelFlinger TM); showing the full bag (top left), isolation of radio and other high density objects (top right), surface display of explosive simulants (bottom left), and radiographic view of explosive simulants only (bottom right).

N-Ray Explosive Scanning Systems Inc.

19 September, 1989

Ken Salaets
Government Operations Committee
2153 Rayburn Bldg.
Washington, DC 20515

Dear Ken:

N-Ray is pleased with the opportunity to give testimony regarding the FAA ruling amending 14 CFR Part 108 (Explosive Detection Systems (EDS) for Checked Baggage). We hope that this information sheds more light on the problem of the deployment of explosive detection equipment.

N-Ray will supply improved second generation products that could satisfy the current FAA rulings on use of TNA and the performance to be achieved in fact, our second product will exceed the required performance by a large amount, allowing detection of smaller quantity of explosive. N-Ray, however, is concerned that the current ruling will require the use of expensive, complicated, equipment. We feel that a better solution can be devised if the FAA reevaluates the performance criteria that it has set. Presented here are N-Ray's comments on the FAA ruling, an introduction to N-Ray, a technical description of the NRAY-XR, and cost and operational considerations. N-Ray is also concerned about the recent criticism of SAIC's performance under the FAA contracts to develop Thermal Neutron Activation (TNA) based explosive detection systems. We would like to take this opportunity to refute these allegations.

As many people may know, N-Ray's senior staff was part of the SAIC team that developed the first EDS systems. SAIC performance was superior to any other company in proving thermal neutron activation as a viable means for explosive detection. Other companies which worked on the problem failed to accomplish in eight years what SAIC did in eighteen months. The SAIC team worked at night and weekends on their own time. We believed EDS to be critical to the flying public's safety and we were dedicated to doing the best possible job. The leaders of the team were concerned only with providing the best possible technology and, in fact, provided this. SAIC's performance was exemplary, and we, as former members of the team, resent any implication stating otherwise.

COMMENTS ON THE FAA RULING

43010 Christy, Fremont, California 94539, USA (415)623-1351 FAX (415) 623-8656

The FAA decision to move ahead with TNA technology was an excellent response to the urgency imposed by public pressure and Congress. However, N-Ray views certain aspects of the FAA ruling as impractical. It does not take into account current airport security operations. The FAA requirement for a high level of automated decision making has several detrimental effects.

1) Increases instrument cost.

2) Increases the complexity and computing requirements beyond practicality.

3) Lowers the throughput of baggage.

4) Reduces detectability and increases nuisance alarms, which ultimately require human intervention anyway.

By including a human element as part of the decision-making process, the entire security screening can be handled simply and efficiently on the spot. A system operator is necessary anyway for security and handling nuisance alarms. The current screening procedures make use of an operator so why not use his psychological profiling and the human brain's innate ability for image processing as input into the final decision? The human brain is more efficient, more accurate than automation software and many times faster than a computer for eliminating nuisance alarms. A human in the decision loop will also maximize passenger throughput, eliminate the need for multiple security check points, and simplify the EDS equipment requirements. The total system then becomes more reliable and less of a financial burden on the airlines.

INTRODUCTION TO N-RAY

N-Ray Explosive Scanning Systems spun off from SAIC this year. N-Ray was incorporated in February, 1989 and is pursuing the design of second generation explosive detection systems. Each member of the N-Ray design staff was a key member of the SAIC team that designed, built, and tested the original TNA EDS systems. This experience amounts to more than twenty man-years.

N-Ray will ultimately provide a wide range of EDS products, but currently, two products are in development which are designed to be incorporated into existing security procedures as a supplement for x-ray scanners currently used for explosive detection. This will eliminate the need for major airport reconstruction and additional personnel.

TECHNICAL DESCRIPTION

N-Ray's first product is the NRAY-XR, a Thermal Neutron Activation-based explosive detection system that will be situated in front of an X-ray machine. This system can be configured with various options to accommodate several performance and throughput levels. It is designed to specifically meet the demands of the FAA ruling with regards to explosive detection, and airport operations; being as fast, small, and inexpensive as possible. Ease of production and low maintenance are also integral parts of the design. The explosive detection system's operator alert system will notify the x-ray operator to the presence of a possible explosive. The operator can then use the x-ray image to further inspect the bag for other signs of an explosive device such as timing circuitry or a detonator. In this way, an operator will be occasionally alerted by the explosive detection system, rather than having to carefully inspect every bag that passes through an x-ray machine. The NRAY-XR is designed to be a relatively small, cost effective device that can easily be integrated into existing security procedures and can use existing security personnel.

A schematic diagram of the NRAY-XR is shown in Figure 1. The rough dimensions, shown in the diagram will result in a fully integrated system (including the x-ray machine) that is slightly smaller than 14 ft long and 6 ft wide. Initially, the system will utilize a small californium source although the long term capability of retrofitting with a neutron generator is possible. The use of a small source will result in a lower dose rate to operators, baggage, and the public. A belt speed of 40 - 48 ft/min. (compatible with most x-ray machines) will ensure sufficient throughput of baggage. In order to keep the performance high while reducing the cost as much as possible, several innovative design features including the addition of non-TNA technologies are being incorporated into the NRAY-XR. These will ensure that the FAA detection specifications are met. The intent of the NRAY-XR design is to use the existing x-ray operator to clear nuisance alarms by visual inspection.

N-Ray's approach is to improve its systems based on customers' experience with the NRAY-XR. N-Ray is working closely with many airlines and will continue to do so during all stages of the development process.

PRODUCTION COST

Production of the NRAY-XR is scheduled to begin in June, 1990. At steady state, we plan to produce approximately eighty (80) units per year. Cost of a basic system is projected to be approximately $600k per basic unit and $50k for the integrated x-ray scanner.

OPERATIONS COST

The operational costs of the NRAY-XR will be considerably lower than first generation systems. The NRAY-XR relies on current security personnel and figures into existing security procedures. There should not be any impact on operations; no additional handling of passenger baggage is required. Training of the

N-Ray XR
Mated with X-Ray Unit

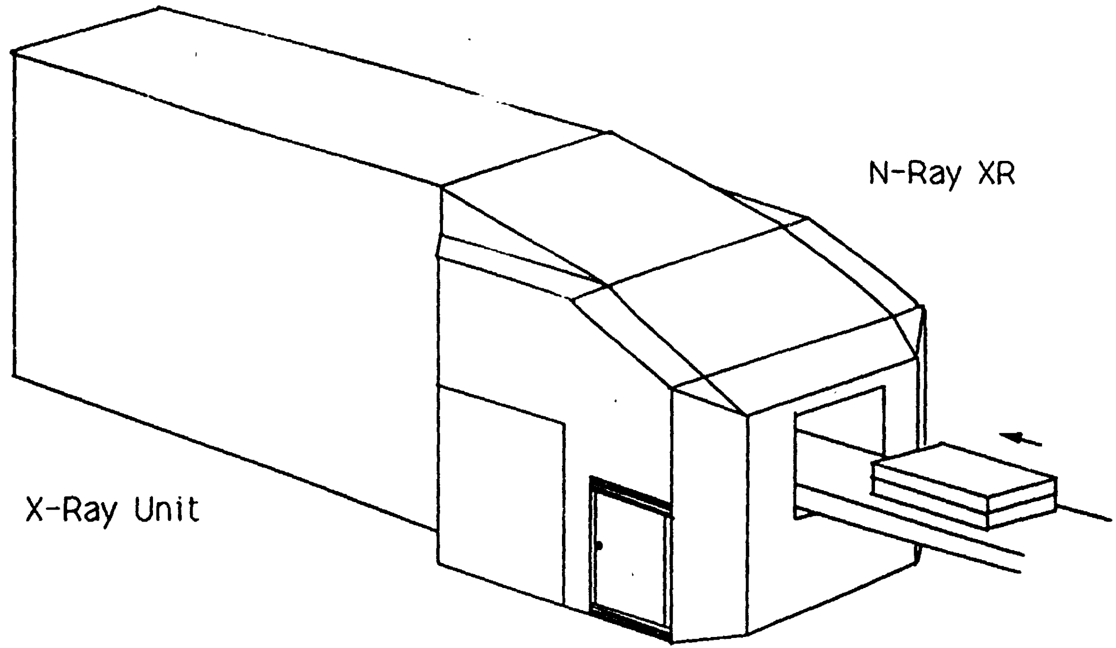

FIGURE 1

operators is expected to be less than one day and should not factor in as a substantial operations cost.

CLOSING

In summary, N-ray feels that the FAA should re-evaluate its specifications which are held in confidence by potential EDS vendors. For any EDS machine at least one operator is required. The operator of the NRAY-XR would be mostly idle, watching passengers and baggage flow, until the N-Ray operator alert system sounds an alarm. Then the operator zooms to the indicated portion of the luggage and looks for the signs indicating a possible bomb or clears the bag as a false alarm. Although N-Ray is currently developing a next generation fully automated EDS system in addition to the NRAY-XR, we would prefer to be offering the NRAY-XR savings to the airlines. This does require operator participation, but offers greater performance than a fully automated system currently can. We project that the NRAY-XR will result in less than one percent (1%) nuisance alarms. Meanwhile, the free market competition will itself lead to the performance required by the FAA, at a weight and cost that will be welcomed by the airlines.

Thank You,

Henry Bernatowicz
President, Acting CEO

NRAY P. O. Box 3315, Fremont, California 94539, USA (415)623-1351 FAX (415)651-3766

STATEMENT OF
DR. RUSSELL C. DREW
PRESIDENT, VIKING INSTRUMENTS CORPORATION
FOR THE
SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION
OF THE
HOUSE COMMITTEE ON GOVERNMENT OPERATIONS
AT THE
HEARINGS ON DETECTION OF EXPLOSIVES FOR CHECKED BAGGAGE

Madam Chairwoman:

I appreciate this opportunity to present Viking's views on the Federal Government's efforts to define and implement a viable approach to the detection of explosives that may be present in checked baggage on board commercial civil aircraft. I am representing Viking Instruments Corporation, a small business located in Reston, Virginia. We produce advanced Gas Chromatograph (GC) and Mass Spectrometer (MS) systems and other packaged sensor systems to solve environmental, industrial process, security, and chemical analysis problems for government, industry and academia.

My statement will highlight some of the recent advances in explosives detection technology that represent important alternatives to the thermal neutron analysis (TNA) devices currently favored by the FAA. The objective of my statement is to encourage the Congress to delay premature purchase of TNA explosives detection systems, and instead devote additional funding to an accelerated program to develop truly effective detection technologies.

The fast analysis of small amounts of explosives in checked baggage with minimal false alarms is a very challenging problem. The detection system must be able to recognize the explosives and distinguish them from a variety of backgrounds or interferants. It must also process each item of baggage in less than 6 seconds, be compatible with baggage handling procedures and spaces, and be affordable in the large numbers required if a truly effective screening capability is to be put in place. When all of these criteria are applied together, the technology options that can adequately meet these performance and cost goals are quite limited.

The current TNA detection approach has some important drawbacks when considered in the light of the above criteria. I certainly agree with the comments of Chairwoman Collins filed with the FAA Docket, regarding the defects in TNA performance and will not repeat them here. I should note, in addition to those defects, TNA installations occupy a very large amount of space and require major expenditures for housing the units and giving them adequate reinforced concrete foundations. This will disrupt the layout of current baggage handling systems and raises serious questions about the degree to which the multiple installations at major airports can be accommodated. Perhaps one of the most significant performance defects is that TNA will not detect explosives if they do not contain nitrogen. Unfortunately, there are several explosives in this category that could be used by terrorist groups. This defect will make the system vulnerable to terrorists using these non-nitrogen based explosives. One can be assured that terrorist organizations will very quickly be aware of this vulnerability and will choose explosive compounds that by-pass the system. Then the massive investment in TNA machines, becomes mostly worthless.

With these significant defects in the performance and cost of the TNA approach, it is wasteful to make a large commitment to such machines, as contemplated by the FAA in the Regulations. It is also dangerously self-deluding to believe that such machines alone would give significant protection from terrorist bomb attacks. The only protection would be from those individuals who were so poorly informed that they did not know how to circumvent the TNA system. While such protection is, by itself, of some value, it is not something one should spend multiple millions of dollars procuring and advertising to the public as a "solution" to the problem of bombs on aircraft.

What is needed is a defense in depth, that is, multiple means for intercepting, identifying or detecting explosives that make use of the best combination of technologies possible. In view of the serious flaws in the TNA system, we believe that deployment of TNA systems should be strictly limited to an initial small number, 6-8, that would be placed in key overseas and U.S. ports of entry.

This limited deployment would have some symbolic value and could serve as a deterrent for some forms of terrorist activity. It could also serve as the first step in building a multi-element deterrent capability. For example, a future possibility is that a small number of TNA systems might become part of a mixed strategy of screening baggage using complementary techniques. A random selection process would prevent a terrorist from knowing which bag would be subject to a particular type of detector. This would force the terrorist to use multiple countermeasures making the bomb more visible and detectable by one or more detector systems.

Limited deployment of TNA devices should be accompanied by a vigorous, and expedited development effort by the FAA, directed to alternative detection systems. These detection system alternatives should be carefully screened to ensure a high probability of meeting the desired criteria, i.e. the characteristics identified above. In particular, they should be able to detect <u>all</u> of the various explosives that are available, not just the common nitrogen-bearing types, they should be capable of being packaged to be compatible with existing airport handling systems, should be affordable, that is, be deployable at many thousands of sites at unit costs of $150,000 to $250,000 or less, should be capable of processing bags at a high rate, at least 10 bags per minute or greater, and should be applicable to both carry-on as well as checked baggage.

I would like to give a brief overview of one approach that we believe meets all of the above criteria. The detector technology that meets these criteria is based upon state-of-the-art mass spectrometry, coupled with a new, and proprietary sample collection and concentration system.

Mass spectrometry, with its high specificity, wide applicability, and high sensitivity, has played and will continue to play an important role in the detection and identification of explosives. Laboratory analysis of explosives and forensic detection of explosive residues depend upon the power of mass spectrometry to give the most definitive detections of unknowns possible. Until very recently mass spectrometers have been largely restricted to the laboratory because of their size and the degree of training that was required to operate them. But the demand for more precise and more sensitive information about constituents of unknown samples in the environment and elsewhere has brought about a new generation of mass spectrometer instruments. These instruments have become smaller, more power-efficient and have been successfully coupled with microprocessor operating and data systems such that the skill level of the operator can be considerably reduced.

Perhaps the best example of how far mass spectrometry has progressed is the incorporation of mass spectrometers in NASA spacecraft, most notably the miniaturized instrument that was landed on the surface of Mars and operated successfully for over a year before it was turned off. This instrument proved that mass spectrometers could be made reliable, rugged, very compact, highly automated, yet sensitive and capable of research-grade performance. Viking Instruments Corporation is exploiting this Mars lander mass spectrometer technology in a family of terrestrial instrument systems of equivalent, or superior performance. These latest developments in state-of-the-art mass spectrometry have not been provided the opportunity to be demonstrated in an effective system targeted to the problem of explosives detection in baggage. We believe that it is possible to do so using a system design that makes use of the properties of explosive molecules as part of the system design and overcomes the defects that were previously associated with vapor detection systems.

The key to incorporation of mass spectrometry as an effective system for explosives detection is to optimize the sensitivity and selectivity of the MS configuration for explosives detection and then interface the mass spectrometer to an optimum sample inlet and processing stage to achieve maximum integrated system performance. The combination of recent developments in the field appears to make such an integrated system possible for the first time. Viking Instruments Corporation
has defined such a system and proposed the system to the FAA, but as yet, no decision has been made regarding funding support.

One of the most important elements of the system is the ion source. There has recently been a breakthrough in this area at the Oak Ridge National Laboratory, where a very high performance ion source has been developed that is particularly well-suited to explosives molecules. This is the Atmospheric Sampling Glow Discharge Ion Source (ASGDIS). This source has been demonstrated on two tandem mass spectrometers, instruments that have both high sensitivity and selectivity, and which perform their analysis in less than one second, so they are compatible with the short sample processing times required by the FAA. The sensitivity of these systems is better than a part per trillion for explosives molecules, and they have the advantage of not being limited to detecting only nitrogen-containing explosives. Mass spectrometry can detect a wide variety of such compounds, and can be targeted to new compounds, if they should be discovered to be a threat.

With this sensitive detector, the important role for the other components of the system is to optimize the extraction and collection of molecules of any explosives that may be present and deliver these molecules to the detector with minimal losses. For this, Viking Instruments Corporation has designed a baggage sample collection system that makes use of a proprietary technique for extracting the highest possible sample levels from the item being processed. This technique makes constructive use of the properties of explosives molecules to derive more than enough sample from a bag containing a bomb to give the detector a strong signal, well above any background. While the details of the approach cannot be discussed in open testimony, they can be provided on a privileged basis to Members of Congress or government employees with the need-to-know. We believe that some degree of secrecy should be afforded the details of detection systems performance as a general matter, in order to make the job of those who will try to circumvent such systems much more difficult.

The resulting system is one that is compact, significantly less bulky than the typical X-ray system for monitoring carry-on bags, and which will fit easily into the flow patterns of both checked luggage and carry-on bags at airports. There is no potentially harmful radiation involved, the unit is highly automated and does not need to be continuously monitored by an operator, has an exceedingly small false alarm potential, processes bags at a rate of at least 10 per minute, does not require special foundations or mounting pads, is readily portable using small hand trucks, and will be relatively low cost, that is, in the range of $150-$250,000 in small production quantities.

What is needed now is a commitment by the FAA to aggressively pursue such new systems capabilities while limiting their mandated deployment of currently available, and I would maintain, inadequately performing systems such as the TNA. FAA should seek out new approaches like the mass spectrometry system I have outlined as well as other attractive technologies, and commit the necessary funds for accelerated development and proof-testing of the best of these on an expedited, high priority basis. They should be prepared to work with private sector firms in collaborative ventures and bring the airlines and airport operators together to work out the best systems solutions to the problem.

We should not be stampeded into a premature commitment to large, fixed investments in inadequate technology, and wind up with a large "white elephant" on our hands, even though the French UTA event is fresh evidence of the seriousness of the threat.

Thank you Madam Chairwoman, for this opportunity to present our views on this most pressing problem affecting air travel throughout the world.

ENTREPRENEURS NUCLEAR de las AMERICAS

WASHINGTON, DC
CORPUS CHRISTI, TEXAS
MEXICO CITY, DF

CABLE "ENA"

September 20, 1989

M. Ken Salaets
Government Operations Committee
2153 Raeburn Office Building
Washington, DC 20515

Good Day Mr. Salaets:

Thank you for returning our phone call of 09/18/89.

Attorney Robert Burke, a partner in ENA and legal counsel, will attend the Pan Am hearings as an observer for us.

Included in this letter is a synopsis of ENA's "DEE VEE" ~~means~~ U.S. patent Office registered design for a positive ~~means~~ (obviously!!) to detect terrorist explosives in cargo, luggage, etc.

As noted, the unit can permanently be fixed in a place at airports or other embarkation points, or it may be mobile.

Capital costs are well within the budget of any airport or port authority and operating costs are comparable to present day search and X-ray surveillance units.

Our objective is to determine valid interest sufficient that ENA can justify the expense of a full-sized pilot unit for demonstration purposes.

We will appreciate your acknowledgement of receipt of the enclosed information, and request that your office keep 'ENA' currently informed of the activities and opportunities in this particular anti-terrorist field.

Sincerely yours,

Wm C Triplett

William C. Triplett
Director R/D ENA

Enclosure: DEE VEE information

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BOX 517
CAMP WOOD, TX. 78833
(512) 597-5294

Summer address & phone

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MEXICO CITY, D.F.

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DETONATION VAULT
"DEE/VEE"

Foreward:

Present methods used to detect Terrorist explosive devices hidden in cargo, luggage, etc. to be placed aboard public/private conveyances, (particularly aircraft) to detonate later with catastrophic results, basically involves x-ray, hand search, sniffing dogs, etc.

Unfortunately these multiple methods have not proven more than marginal safety, as witnessed by the several severe Aircraft destructions and massive loss of life during the past five years.

E.N.A. has approached the problem in a completely different manner - to design a unit which scans the cargo and deliberately detonates any such Terroristic devices, BEFORE loading in a safe and secure manner. This we have been able to accomplish.

100.0 Description of the "DEE/VEE"-

A high-strength reinforced concrete vault, preferrably set underground, in a safe and secure area, at a calculated distance from both Cargo Bay and ultimate destination,i:e. Aircraft is "fed" by conveyor belt, through a tunnel system from Cargo Bay to unit for scanning. Multiple "Blast Blankets" plus other proprietary means, protect the tunnel and "innocent" targets from damage.

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Cargo/luggage, one by one, pass through the vault, at a traverse dwell time of 10 seconds for each article.

Each article is subjected to multiple type scanning devices: Ultrasonic, EMF, High Frequency Radio Waves, Nonthermal Laser, Barometrics - as examples, but not limited to these technologies.

A terrorist device thus exposed to such multiple scanners, will detonate within the vault.

Blast Blankets plus proprietary other means, will protect the other Cargo/luggage units from damage. The preformed, light foam roof plug, which normally protects the interior of the vault, acts as a safety "valve" to vent the explosion harmlessly. It is expendable.

ENA's scanning unit is placed in a separate chamber and its energy sources are directed into the "DEE/VEE" via quartz/sapphire windows, which are thermal and blast proof.

All "innocent" articles traverse the "DEE/VEE", and exit via conveyor tunnel to the waiting conveyance (Security measures at Conveyor/conveyance juncture must be rigid to prevent terrorist access at this point.)

Scanning/detonating means will be added or changed as the occasion demands to meet changes in explosive terrorist devices.

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200.0 Disadvantages of the "DEE/VEE"

1. Time - Increased time will be required to handle cargo because articles must be loaded correctly aboard the feed conveyor. (This can be obviated by design of conveyor.) Dwell time in "DEE/VEE" of 10 seconds per article is of minor consequence.

2. Damage to Electronics Not Terroristic - Camera film, Electronics, microchips within many everyday appliances for personal use may be damaged by the scanning units. Printed circuitry will be disrupted, even if non-terroristic. Solution-

a) Adequate warning to effect removal

b) Hard inspection

c) Prohibition of such articles

3. Psychological

Although set in a safe and secure place, a detonation occurring within the vault and vented to the ambient environment will certainly be observed by boarding passengers, crew and ground handling personals, which may have two possible results. 1) A feeling of more security, 2) Fear, inordinately, but quite possibly phobia, generated by the public following such an explosion.

Solution: Adequate D/R education of public. 4 rigid, no exception (Embassy Articles NO exception) rules regarding every boarding article being required to pass through the "DEE/VEE" will also require absolute, totally trustworthy supervisory personnel and ground handlers to see that not one article boards without subjecting it to "DEE/VEE"

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screening, means increased costs of operation.

5. Danger of a Missed Terrorist Device

Accepting the fact that no machine is 100% perfect operative 100% of the time, there is always the possibility that a "Glitche" will occur. Such an event would definitely negate the assurred security provided by the "DEE/VEE", and it follows that a catastrophic would occur.

Such events can be minimized to "Force Majeur" by constant inspection, adjustments, repairs, and maintenance as needed.

6. Cost of unit, installation and operation

Certainly the cost of such Hi-tech equipment will not be minimal, but the loss of a multi-million dollar transporter, and perhaps hundreds of lives, and the law suits and recovery there from must be equated against the capital and operating costs of the "DEE/VEE". The result will show that the "DEE/VEE" (TM) is quite cost effective.

EG&G INSTRUMENTS GROUP
40 William Street, Wellesley, MA 02181 USA
(617) 431-4259 FAX (617) 431-4153

October 4, 1989

Congress of the United States
House of Representatives
Government Activities and Transportation
Subcommittee of the Committee on
Government Operations
Rayburn House Office Building, Room B-350-A
Washington, D.C. 20515-6146
Attn: Ken Salaets

Subject: Additional Comments For the Record

Dear Mr Salaets:

I have attached a copy of additional comments which we wish to include for the record regarding the recent hearing on aviation security, conducted by the House Subcommittee on Government Activities and Transportation.

Thank you.

Sincerely,

David S. deMoulpied
Manager, Business Development

ADDITIONAL COMMENTS FOR THE RECORD

SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION

COMMITTEE ON GOVERNMENT OPERATIONS

UNITED STATES HOUSE OF REPRESENTATIVES

HEARING ON AVIATION SECURITY

DAVID S. DEMOULPIED

MANAGER BUSINESS DEVELOPMENT

EG&G INSTRUMENTS GROUP

EG&G INCORPORATED

Madame Chairman:

As the largest supplier of security x-ray screening equipment in the world, and in the light of some of the testimony on September 26, we wish to expand upon our remarks concerning the overall capabilities and effectiveness of our existing equipment.

Our dual energy x-ray product, the E-Scan system, has been widely adopted throughout the aviation industry as the current standard for checked luggage inspection.

PanAm, United, Northwest, American, Eastern, Continental, and Delta have procured over 200 units for this purpose since the ICAO passed Annex 17 requiring security measures to be applied to checked baggage on international flights. Other major international carriers have followed their lead and we now have over 350 E-Scan systems installed at major airports worldwide for this use. In addition, many other E-Scan systems are being used for carry-on baggage inspection around the world.

The reason our current equipment has achieved such widespread use is that aviation security professionals have found the E-Scan to be the most proficient, cost effective method available today for inspection of checked luggage and the detection of concealed weapons and explosives.

The E-Scan dual energy x-ray system provides a color image which separates organic, inorganic, and opaque materials. The E-Scan achieves a level of operator awareness and discrimination that far exceeds the capabilities of any black and white system. The use of a single color monitor avoids the confusion inevitable in competing backscatter systems which use multiple monitors.

The assigned deep orange color for organic materials which might include explosives, is far more likely for an operator to see than is the case with several black and white images.

Electronic devices are very apparent on the E-Scan system with the assigned blue color for inorganic materials. Plastic explosive materials concealed in electronic devices are also distinct from the surrounding components in many instances.

EG&G Astrophysics is the only manufacturer, to our knowledge, to supply training support for our advanced technology systems. The E-Scan Small Parcel Inspection Training Program and Large Parcel Inspection Training Program are unique in the industry. We retained leading aviation security professionals to devise this program for us and we are in the forefront of providing training assistance and support to our customers to supplement their ongoing training programs.

It would be impractical to install the SAIC TNA explosive detection systems everywhere needed due to the considerable size, cost, and speed problems of the SAIC TNA systems. At <u>half</u> the size, <u>one-tenth</u> of the cost, and <u>triple</u> the processing speed, the E-Scan system can provide vitally needed protection today.

While we will vigorously pursue the development of the next generation of explosive detection equipment which may or may not be TNA, those concerned with aviation security matters should not lose sight of the fact that the E-Scan is a proven cost-effective technology available now.

EXPLOSIVES DETECTION USING ENERGETIC PHOTONS

Jerome R. Clifford, R. Bruce Miller, Wm. F. McCullough, and Wm. K. Tucker*
TITAN/Spectron Development Laboratories
P.O. Box 4399
Albuquerque, NM 87196

ABSTRACT

TITAN Technologies is testing a new technique called EXDEP (EXplosive Detection with Energetic Photons) for detecting explosives. The technique uses an x-ray beam to photoactivate the nitrogen in an explosive. Following the activation, the resulting nitrogen isotope decays with a ten minute half-life emitting a positively charged positron. The positron immediately annihilates producing two 511 keV photons which are counted using sodium iodide scintillation detectors.

EXDEP works because most commercial and military explosives contain ≥18% nitrogen. Possible signal contaminants which also undergo photoactivation generally have short half-lives or reaction threshold energies above 15 MeV. Because the nitrogen reaction threshold is 10.6 MeV, the signal-to-background ratio can be enhanced by tuning the accelerator to around 14 MeV. Copper, zinc, and silver which also produce annihilation photons can be distinguished using conventional x-rays to determine the higher density metal.

Experiments, supported by the Defense Advanced Research Projects Agency, have shown that EXDEP can detect several hundred grams of mock TNT explosives. The experimental results agree with our model calculations, and the model has been used to determine the optimum accelerator and detector parameters to achieve >99.8% detection probability with a <0.2% false alarm probability. TITAN, under Sandia National Laboratories funding, is designing, constructing, and testing a prototype EXDEP system including the RF LINAC and detector components.

The EXDEP technique can be used to search for unexploded ordnance and terrorist devices. It can be configured with a computer tomography x-ray unit to inspect luggage at airports or parcels at bulk mail facilities. A portable EXDEP unit can be used by bomb squads to determine the presence of explosives in packages or confined spaces.

---

* Sandia National Laboratories, Albuquerque, NM 87185

EXPLOSIVES DETECTION USING ENERGETIC PHOTONS

INTRODUCTION

TITAN Corporation has developed a novel explosives detection technique using high energy x-rays to illuminate the explosives and using simple scintillation detectors to "observe" the activated explosive. The technique is called EXDEP for EXplosive Detection using Energetic Photons. The technique has been used successfully to detect several hundred grams of mock TNT. Calculations show that the technique can have a detection probability of >99% with a false alarm probability of <1%. The EXDEP technique would probably be combined with a conventional x-ray device in a luggage inspection system to achieve a very low false positive detection probability at a high throughput rate.

EXDEP CONCEPT

The EXDEP concept is shown schematically in Figure 1. A radio frequency linear accelerator (RF LINAC) is used to produce an electron beam with an energy about 13.5 MeV. The electrons strike a tantalum or tungsten target and produce bremsstrahlung radiation with an end-point energy equal to the electron beam energy. The x-rays interact with the explosive and activate the nitrogen via a photonuclear reaction. The stable nitrogen isotope N-14 thus converts to the radioactive isotope N-13, which then decays with a 10-minute half-life via positron emission to C-13. The positron immediately annihilates producing two 511 keV photons that are easily detected and counted using standard scintillation detectors.

Two factors make the EXDEP particularly suited for explosives detection. First, nearly all commercial and military explosives contain greater than 18.5% nitrogen. Second, the relatively low nitrogen photonuclear activation threshold energy at 10.6 MeV and the subsequent ten minute half-life positron decay is a rather unique combination. Most other elements common in nature have photonuclear reaction thresholds above 14 MeV, produce no positron, or have very short or very long half-lives. Those few elements which do react similarly to nitrogen, and thus could contaminate the nitrogen signal, are typically metals (copper, zinc, or silver) which have much higher mass densities. Simple x-ray techniques can be used to discriminate against these metal objects.

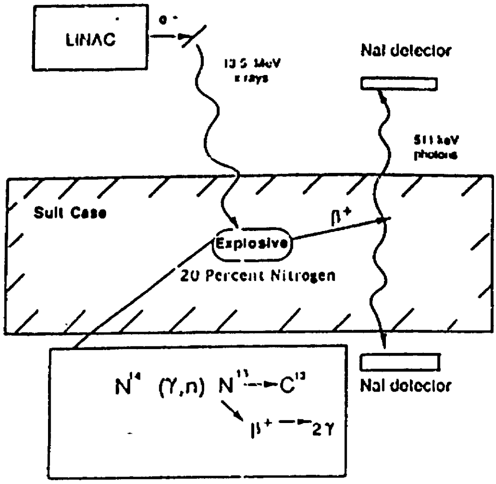

Figure 1. EXDEP concept.

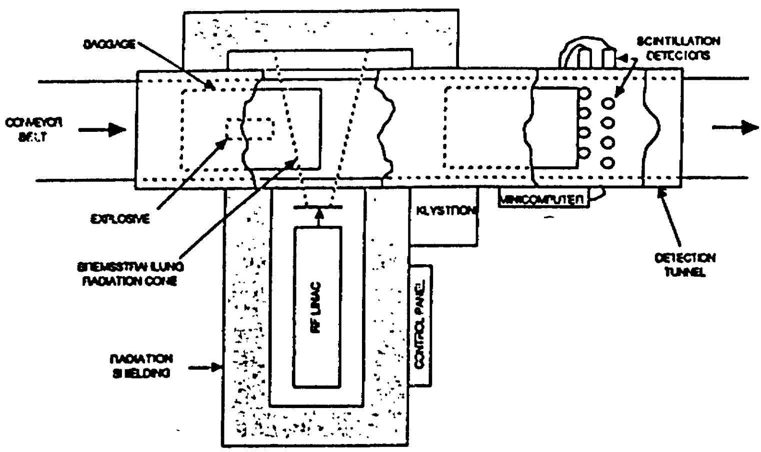

Figure 2. EXDEP detection system schematic.

EXDEP would work as shown in Figure 2. The baggage to be inspected is placed on a conveyor, which carries it past the explosive detection device consisting of an energetic x-ray source and a two-dimensional array of scintillation detectors. The electron beam spot size, location, and angle of incidence at the converter are controlled to provide the necessary area of coverage on the baggage. Upon entering the baggage, the bremsstrahlung photons are attenuated by Compton scattering and pair production interactions. Both of these processes generate an intense, prompt, scattered photon flux. This flux, however, is not detected by the scintillation detection system because of a physical separation between the source and detector, detector collimation and shielding, and/or detector gating, if necessary.

Since the nitrogen in the explosive has a photoneutron threshold which is substantially lower than that of most common elements, proper adjustment of the electron beam energy allows activation of the nitrogen in the explosive without activating the nuclei of the surrounding materials. This is shown schematically in Figure 3 where the bremsstrahlung spectrum is overlaid on the cross section for nitrogen, oxygen, and aluminum. The goal is to maximize the overlap of the bremsstrahlung spectrum with the nitrogen cross section while minimizing the overlap with other elements.

The photons which result from the annihilation of the positrons are attenuated by photoelectric and Compton scattering interactions, but a substantial number can escape from the baggage and be detected. Using the two-dimensional array of scintillation crystals provides an imaging capability. Also, a positron emission tomography detection system similar to that used in medical diagnostics could be used for high resolution images of the positron emission region. The use of PET scans systems would be considerably slower, however, than use of a collimated detector system or a gamma-camera.

Finally, the baggage goes through a conventional x-ray system or a computer tomographic x-ray system to produce a density image of the luggage and contents. The density image can be overlaid on the activation image and an expert system could distinguish between signals from a metal contaminant or nitrogen. A simple knowledge-based algorithm, which incorporates the specific activity measurements with a measurement of the volume of the activated material, can then accurately detect the presence of explosives.

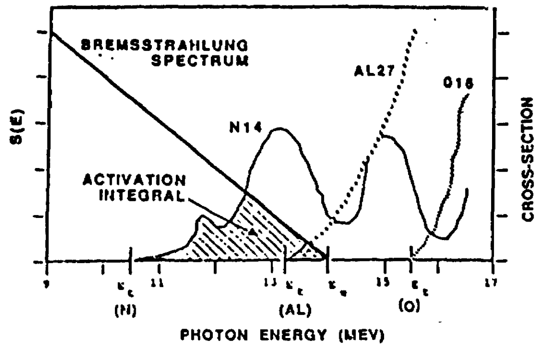

Figure 3. Explosive detection principle of operation.

EXDEP MODEL

We have developed a computer simulation model of the EXDEP technique to improve our understanding of the relevant physics issues. The model contains all aspects of the explosive verification scheme shown in Figure 4. These include generation of the x-ray beam, production of radioactive nitrogen in the explosive and radioactive isotopes from the luggage contents, attenuation of the annihilation radiation through the luggage materials, and detection of the annihilation photons by the detectors.

In order to estimate the photon source strength required for the explosive detection problem, consider the geometry of Figure 2. An electron accelerator produces a beam of current I and voltage V which strikes a high-Z converter, producing x-rays with a characteristic bremsstrahlung spectrum, $S(E,E_p)$, where E is the incident electron energy and E_p is the photon energy.

We have performed many calculations using the Monte Carlo electron-photon transport computer code TIGER[1] to determine the photon flux distributions shown in Figure 5 and to estimate the optimum bremsstrahlung target geometry.[2] In general, we have found that a target thickness of about 0.25 times the CSDA (continuous slowing down approximation) range in the particular target material is best. Moreover, almost all of the useful bremsstrahlung photons are forward scattered into a 30° cone angle.

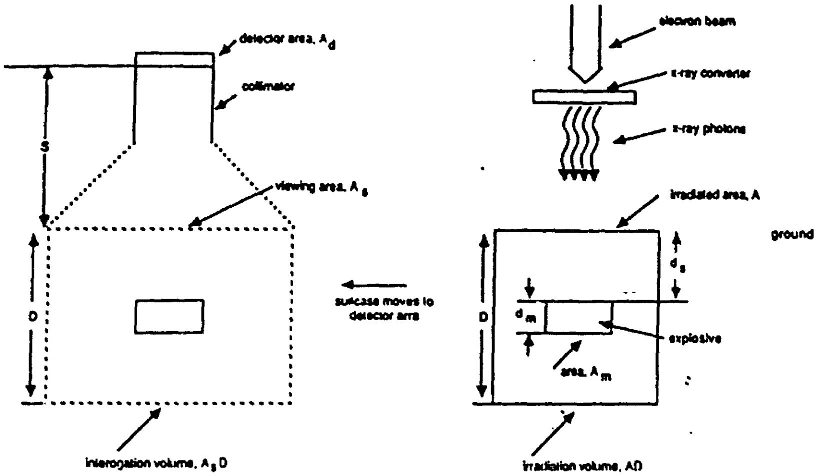

Figure 4. Explosive detection model.

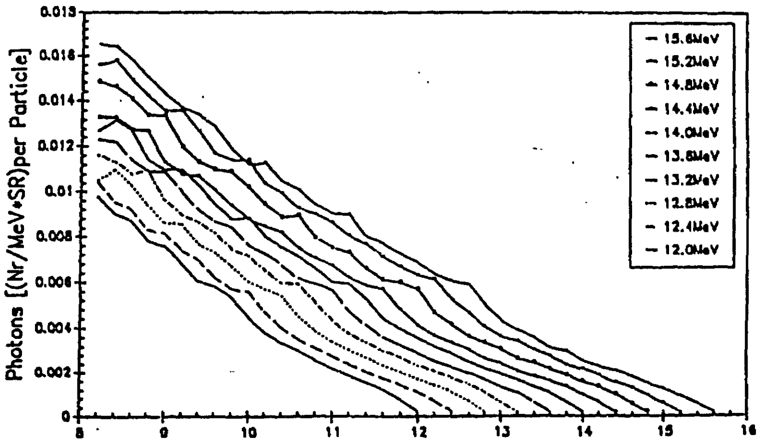

Figure 5. TIGER calculation of photon flux distributions for 12.0 to 15.6 MeV electrons on the converter.

Now consider the explosive material with n N-14 atoms per unit volume being irradiated by a uniform flux $F(E_p)$ of photons per unit area per second. The number of N-13 atoms produced per unit volume per second will be appropriately given by

$$\frac{N_{13}}{A_e d} = n\int_{E_t}^{E} F(E_p)\, \sigma(E_p)\, dE_p \tag{1}$$

where d and A_e are the average thickness and cross-sectional area of the explosive volume, and $\sigma(E_p)$ denotes the energy-dependent photonuclear cross-section for N-14. E_t is the threshold energy for the photonuclear reaction and E is the maximum photon energy in the spectrum.

In general, the photon flux $F(E_p)$ will consist of both unscattered photons and photons which have been scattered through interactions with other materials in the baggage. In the 10-15 MeV range the total photon absorption cross-section is very nearly equal to the total attenuation cross-section. Hence, a useful first approximation is that each photon interaction simply removes that photon from the beam. Thus, we will neglect contributions to the N-13 population which might result from any scattered photons. The flux $F(E_p)$ is modeled as the unscattered bremsstrahlung spectrum at the surface of the explosive matter, i.e.,

$$F(E_p) = I\, S(E,E_p)\, e^{-\mu\rho x} \tag{2}$$

where μ is the average photon absorption coefficient, ρ is the average density of the baggage material, and x is the average depth of the explosive material in the baggage. Thus, neglecting the small energy variation in μ, the number of N-13 atoms produced per unit volume per second becomes

$$\frac{N_{13}}{A_e d} = nIe^{-\mu\rho x}\int_{E_t}^{E} S(E,E_p)\, \sigma(E_p)\, dE_p \tag{3}$$

We define the integral in this equation as the figure-of-merit, f(E), for the nitrogen activation efficiency. We have evaluated the figure-of-merit f(E) using the cross-section data of Figure 3 and TIGER-generated bremsstrahlung spectra for several electron energies. The result is shown in Figure 6.

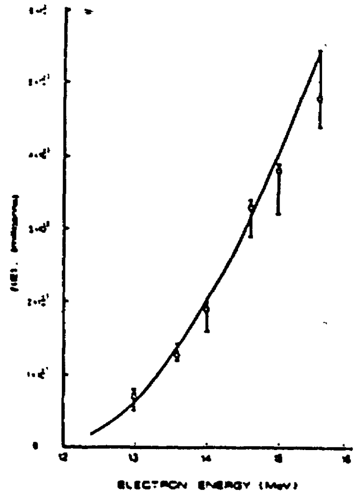

Figure 6. Figure-or-merit integral, f(E), in millibarns, for nitrogen as a function of incident electron energy.

From the above equation, the number of N-13 atoms produced in the explosive in a time Δt will be approximately given by

$$N_{13} = nd\left(\frac{A_e}{A}\right)(0.625 \times 10^{19} Q)\, e^{-\mu\rho x}\, f(E) \tag{4}$$

where we have assumed that the bremsstrahlung photons enter the baggage at approximately normal angles of incidence. The factor (0.625×10^{19} Q) represents the total number of electrons incident onto the bremsstrahlung converter in a time Δt, i.e., $Q = I\Delta t$. The area term A represents the effective spot size of the bremsstrahlung radiation core as the photons pass through the baggage. It is determined by the electron beam spot size and angle of incidence at the converter, and the distance from the converter to the baggage.

The product ($n\, d\, A_e$) is just the total number of N-14 atoms in the explosive. If M_e is the total mass of the explosive in kilograms, and η is the nitrogen weight fraction, then ($n\, d\, A_e$) = $4.3 \times 10^{25}\, \eta M_e$. The f(E) data of Figure 6 have been presented in units of millibarns.

Recognizing that 1 mb = 10^{-31} m^2, we have for the number of activated nitrogen 13 atoms in the explosive

$$N_{13} = (2.69 \times 10^{13})\eta M_e(kg)\, Q(C)\, f(mb) \frac{e^{-\mu\rho x}}{A(m^2)} \tag{5}$$

As soon as the N-13 atoms are created they will begin to decay by positron emission, with a half-life $t_{1/2}$= 600 s. Assuming that the bremsstrahlung pulse time Δt is much shorter than the half-life, the N-13 population can be modeled as

$$N_{13} = N_{13}^0\, e^{-t/\tau} \tag{6}$$

where $N_{13}{}^0$ is the initial N-13 population and the decay constant τ is related to the half-life by $\tau = t_{1/2}/(\ln 2)$.

To determine the probability of these photons reaching a detector, it is necessary to account for the various attenuation processes in the baggage, as well as the solid angle that the detector subtends. The explosive is modeled as a point source positron emitter. Accounting for the solid angle and attenuation effects, the total number of annihilation photons reaching the detector after a time t following the irradiation is given by

$$N_p = 2(N_{13}^0 e^{-t/\tau}) \frac{e^{-\mu_1 \rho x_1}\, A_d}{4\pi x_1^2} \tag{7}$$

where A_d is the effective area of the detector, x_1 is the average distance from the explosive to the detector, and μ_1= 0.1 cm^2/g is the absorption coefficient of 511 keV photons.

The count rate for the annihilation photons will be given by

$$\dot{C}_e = \left| \frac{dN_p}{dt} \right| \varepsilon \tag{8}$$

where ε is the photon detection efficiency. Finally, the total number of counts registered in a counting interval Δt_d (assumed to be much less than t) will be

$$C_e = \left|\frac{dN_p}{dt}\right| \varepsilon\Delta t_d = 2\varepsilon\left(\frac{\Delta t_d}{\tau}\right)\left(N_{13}^{0}e^{-t/\tau}\right)\frac{e^{-\mu_1\rho x_1}A_d}{4\pi x_1^2} \quad (9)$$

CALCULATIONS OF NITROGEN SIGNAL

We now estimate the source strength for a particular example. Assume that 1 kg of ammonium nitrate ($\eta = 0.35$) is located in the center of a typical baggage with dimensions 35 cm x 60 cm x 75 cm and a mass of 40 kg. Using an average absorption coefficient for 10-15 MeV photons of 0.02 cm^2/g gives $\mu\rho x = 0.15$. For an electron energy of 14 MeV, f = 0.002 mb from Figure 6. We further assume that the conveyor passes through a tunnel that is 40 cm x 70 cm, and that the irradiation spot size of the bremsstrahlung is A = 40 cm x 40 cm = 0.16 m^2. Then the total number of activated N-13 atoms created in the explosive in an irradiation time Δt would be

$$N_{13} = 1.0 \times 10^{11} Q(C) \quad (10)$$

We now assume a linear array of 2-inch diameter, 2 inch-thick NaI(Tl) scintillation detectors located immediately below the conveyor belt. Thus, we use $x_1 = 18.5$ cm, $A_d = 20$ cm^2, and $\varepsilon = 0.9$. Ten seconds following the irradiation of the 1 kg explosive, the total annihilation photon count from the activated N-13 atoms in the explosive in one detector will be

$$C_e = 6.0 \times 10^5 Q\Delta t_d \ \text{cts} \quad (11)$$

Finally, assuming that the explosive is a simple cube approximately 9 cm on a side, and that the conveyor moves at a forward rate of about 35 cm/sec (12 units/minute), then the time that the explosive is in the irradiation zone is about one second. Also, the explosive will move past the detector in about 0.25 seconds. If the LINAC operates at an average current of about one milliampere, then Q = 1 mC. Further, assuming a counting interval of 0.25 sec, then the total number of counts registered by a single detector in the linear array will be about 150 ± 12. This count rate is sufficiently high that there can be considerable flexibility in performing trade-offs to optimize system performance. For example, it may be desirable to use more, smaller, detector crystals, or to lower the accelerator current, or perhaps increase the conveyor speed, etc. In addition, the count rate (about 600 cts/sec) is low enough that the detection electronics will not be saturated.

EXPERIMENTAL DATA ON EXPLOSIVES DETECTION

Two sets of experiments have been conducted to show that the EXDEP technique is effective at detecting explosives. The first was a proof-of-concept explosive detection experiment performed by TITAN using the 100 MeV RF LINAC at Lawrence Livermore National Laboratory (LLNL). This effort was jointly sponsored by Sandia National Laboratories (SNL) and the Defense Advanced Research Projects Agency (DARPA). The primary experimental objective was to demonstrate that the photon activation approach can easily detect the appreciable nitrogen in the explosive within a background resulting from (γ,n) reactions in some common elements, which were soil constituents in this case.

Using nitrogen cross section data and soil constituent ratios, we made qualitative estimates of the signal strength of the activated N-13 nuclei, as well as anticipated background activation levels. We determined that the optimum maximum energy of the bremsstrahlung spectrum was in the range of 13-15 MeV, and that the LINAC should deliver approximately 1 mC of accelerated electron charge. The anticipated signal-to-noise ratio for a 5 kg explosive charge (containing 20% nitrogen) buried a few inches deep in soil was of the order of 40.

Melamine (~67% nitrogen by weight) was used to simulate the explosive for safety reasons. The melamine was placed in silica sand and peat. The sand was expected to be reasonably free of trace elements, consisting primarily of silicon and oxygen. Since both of these elements have very high (γ,n) thresholds, essentially no activation was anticipated, provided the kinetic energy was kept below 15.7 MeV (the oxygen activation threshold). The peat, on the other hand, was expected to be rich in organic matter, as well as trace minerals.

These targets were mounted on a carriage assembly whose position was remotely controlled using a constant velocity motor. A sketch of this experimental geometry is shown in Figure 7. The detector, a 3-inch diameter x 3-inch thick NaI(Tl) crystal was located approximately six feet from the beam line. Following the irradiation the target was moved to the detector location at 0.1 ft/second.

Activation decay data following separate irradiations of the melamine, sand, and peat targets are shown in Figure 8. Clearly, there was substantial activation of the nitrogen in the melamine, while the activity in the sand and peat targets was only marginally above the background of the irradiation cell. In other words, the activity induced in the bare melamine was approximately 40-50 times higher than the activity induced in either the peat or the sand.

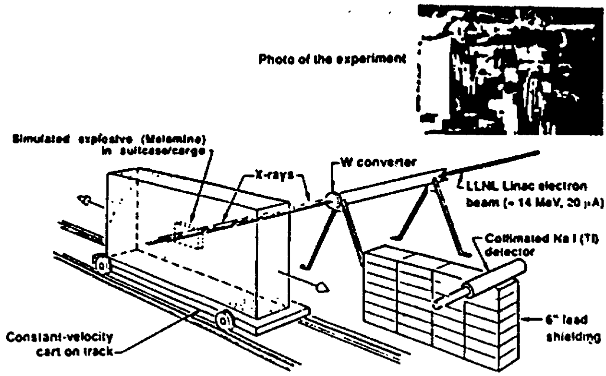

Figure 7. Experimental configuration for detecting explosives with electron beams.

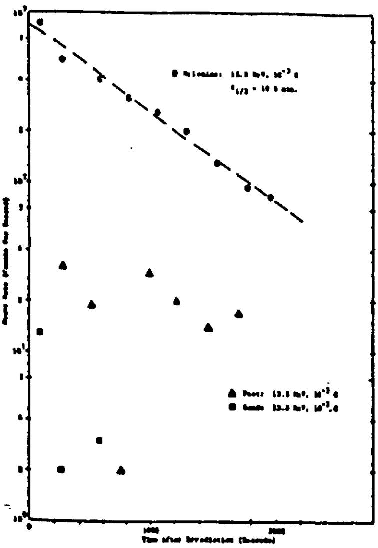

Figure 8. Radioactive decay of the melamine, sand, and peat targets for the 13.8 MeV accelerator tune.

After the irradiation, the target was moved back and forth in front of the detector with a constant velocity drive motor, at a nominal speed of 0.1 foot/second. The resulting strip chart recorder traces, taken at a recording speed of one inch per twenty seconds, are shown in Figure 9. It was rather easy to discern the position of the melamine as it was moved transverse to the front of the detector.

A second set of experiments to benchmark the model and calculations was done at the 90° port of the DOE 32-MeV LINAC operated by EG&G at Santa Barbara, California. The experimental setup is the same as shown in Figure 7, and a schematic of the nuclear counting electronics is shown in Figure 10. A 4 in x 4 in x 16 in NaI(Tl) detector with a counting efficiency of 95% was used. The two timing single channel analyzers had windows set for the 511 keV photopeak and the region just below the photopeak, which was used to monitor the background. A Na-22 radioactive source was used to calibrate the entire system.

The bremsstrahlung radiation pattern was measured using thermoluminescent dosimeters (TLDs) at 13 and 14 MeV. The dose falls off to 90% in 2 degrees and 50% in 14 degrees from the beam center axis. The energy analysis of the beam was set to an energy spread of ±3% by the bending magnet fields and collimation slits at the quadrupole magnets. After turning the accelerator, the slits were opened up during the explosives irradiation.

The detector was located a distance from the beam line determined by the speed of the cart. We wanted to have a three second delay between irradiation and detection. The NaI detector was placed in a lead brick cave to shield it from background radiation produced by the LINAC. Most of the experimental runs occurred when the detector was 38 cm from the box surface and at the same height as the explosive.

Melamine was again the main component of the explosive simulant with ascorbic acid and sugar used as filler. TNT equivalent explosives of 10, 6, 1 and 0.2 kgs were examined. The mock explosives were again placed in or on a soil background. The cart/explosive was stationary in the beam during irradiation, then it would move down the track and in front of the detector. For most runs, a detector scan was taken immediately following the irradiation and again five to ten minutes later. The second scan data was used to determine the counts solely from the explosive after most of the soil activity had died away. Figure 11 shows a representative data set for a 6-kg explosive.

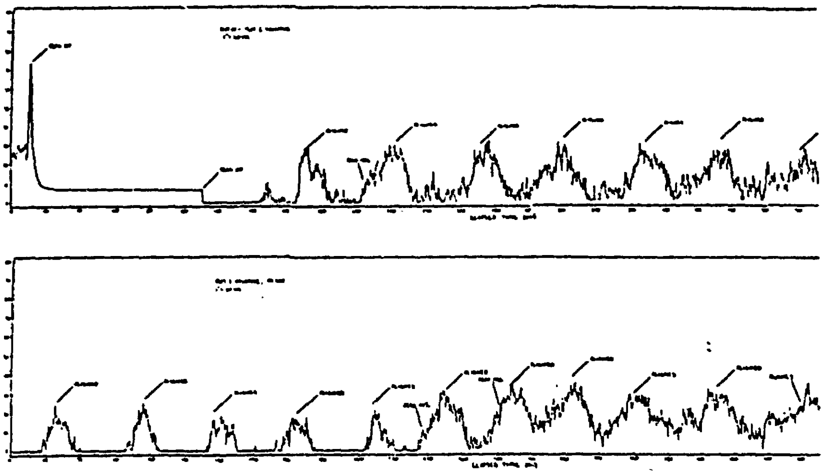

Figure 9. Strip chart recorder traces for melamine buried in peat.

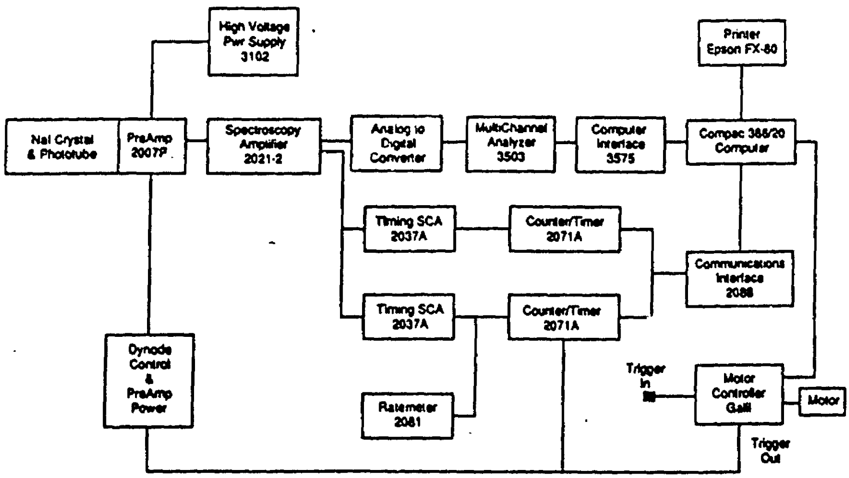

Figure 10. Schematic of detector system.

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000031 000181 000033 :0241833       -1.20     -0.21      7.20      0.55
000033 000182 000021 :0274491        0.80      0.14      8.20      0.62
000031 000164 000041 :0307229       -1.20     -0.21     -9.80     -0.74
000027 000183 000030 :0339730       -5.20     -0.92      9.20      0.70
000027 000182 000034 :0372325       -5.20     -0.92      8.20      0.62
000037 000183 000034 :0405074        4.80      0.85      9.20      0.70
000033 000153 000034 :0437748        0.80      0.14    -20.80     -1.58
000026 000179 000022 :0470425       -6.20     -1.09      5.20      0.39
000045 000181 000026 :0503040       12.80      2.25      7.20      0.55
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000088 000264 000037 :0566533       55.80      9.83    190.20     14.43
000093 000434 000047 :0593243       60.80     10.71    250.20     19.74
000068 000337 000047 :0615952       35.80      6.31    163.20     12.38
000056 000261 000041 :0634731       23.80      4.19     87.20      6.61
000059 000215 000023 :0649504       26.80      4.72     41.20      3.13
000041 000207 000033 :0660263        8.80      1.55     33.20      2.52
000045 000179 000038 :0667139       12.80      2.26      5.20      0.39
000043 000195 000029 :0669964       10.80      1.90     21.20      1.61
000039 000189 000028 X0670038        6.80      1.20     15.20      1.15
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Figure 11a. 6 kg explosive 5 sec after irradiation.

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000018 000160 000016 :0274178       -7.80     -1.54     16.00      1.33
000031 000152 000008 :0306916        5.20      1.02      8.00      0.67
000022 000144 000026 :0339535       -3.80     -0.75      0.00      0.00
000022 000125 000020 :0372024       -3.80     -0.75    -19.00     -1.58
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000037 000149 000020 :0502707       11.20      2.20      5.00      0.42
000028 000171 000023 :0535458        2.20      0.43     27.00      2.25
000023 000183 000025 :0566240       -2.80     -0.55     39.00      3.25
000040 000206 000025 :0593006       14.20      2.80     62.00      5.17
000032 000188 000015 :0615746        6.20      1.22     44.00      3.67
000029 000158 000016 :0634574        3.20      0.63     14.00      1.17
000028 000141 000024 :0649392        2.20      0.43     -3.00     -0.25
000032 000121 000029 :0660167        6.20      1.22    -23.00     -1.92
000042 000150 000015 :0667088       16.20      3.19      6.00      0.50
000025 000149 000023 :0669946       -0.80     -0.16      5.00      0.42
000033 000150 000023 X0670039        7.20      1.42      6.00      0.50
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Figure 11b. 6 kg explosive 8.5 min after irradiation.

The results of the experiment are summarized in Table 1. EXDEP could detect 10 and 6-kg mock TNT explosives buried with 10-cm soil overburden, 1-kg mock TNT explosives with 5-cm soil overburden, and 0.2-kg mock TNT explosives on the soil surface. The experimental results generally agree with the model calculations but have rather large errors due to detector activation from the room background radiation. Only one set of runs were completed during the experimental series. To reduce the error and improve the data, we plan to run several more tests, preferably with baggage rather than soil.

Table 1. Summary of Results of Experiment

EXPLOSIVE (kg)	SOIL	DEPTH (in)	CHARGE (μc)	TIME (sec)	TLD (kR)	COUNTS (200 ms)	EXPT C_m	CALC C_m
10	Sand	4	1012	15	2.11	225±20		
6	Lat	4	1103	?	2.17	260±21	124±48	107
1	S & S	2	992	14	2.15	243±24	35±50	69
1	Sand & Soil	Surf	1008	21	2.24	565±36	406±56	438
0.2	Lat	Surf	1000	15	--	287±26	150±54	87

FALSE ALARM REDUCTION

Based on our calculations and experiments, the EXDEP concept appears to be capable of detecting bulk explosives in baggage and cargo. Baggage and cargo, however, can contain relatively pure elements that might be sources of positron decay that would compete with the nitrogen signal. Also, baggage could contain other nitrogen-containing compounds, like nylon and certain plastics, that could create undesirable false alarms.

An examination of the nuclear tables shows that the elements that could produce false alarms would include copper, zinc, silver, fluorine, bromine, and phosphorous. Almost all other elements have a photonuclear reaction threshold that is too high, do not produce an isotope that decays via positron emission, or have decay times which are either too short or too long to compete with the nitrogen decay. Table 2 shows how most of the abundant elements in the earth's crust, which should comprise most of the common articles routinely carried in baggage, can be eliminated from consideration.

Table 2. Characteristics of the Most Abundant Elements in the Earth's Crust

ELEMENT	WT.FRACTION*	ISOTOPE	REL.ABUND.	THRESH.(MEV)	HALF-LIFE
Oxygen	4.66E-1	O16	99.8%	15.7	2.07 m
Silicon	2.77E-1	Si28	92.2	17.2	4.2 s
Aluminum	8.13E-2	Al27	100	13.3	6.4 s
Iron	5.00E-2	Fe54	5.8	13.4	8.9 m
Calcium	3.63E-2	Ca40	97.0	15.6	0.9 s
Sodium	2.83E-2	Na23	100	12.4	2.6 y
Potassium	2.59E-2	K39	93.1	13.1	7.7 m
				13.3	0.95 s
Magnesium	2.09E-2	Mg24	78.7	16.5	12.0 s
Titanium	4.4E-3	Ti46	8.0	13.2	3.08 h
Hydrogen	1.4E-3	H2	0.015	3.0	no β+
Phosphorus	1.18E-3	P31	100	12.3	2.6 m
Manganese	1.0E-3	Mn55	100	10.2	no β+
Sulfur	5.2E-4	S32	95.0	15.1	2.6 s
Carbon	3.2E-4	C12	98.9	18.7	20.5 m
Chlorine	3.1E-4	Cl35	75.5	12.8	1.56 s
Rubidium	3.1E-4	Rb85	100	10.5	33 d
Fluorine	3.0E-4	F19	100	10.4	1.8 h
Strontium	3.0E-4	Sr84	0.56	11.5	33 h
Barium	2.5E-4	Ba130	0.10	-	no β+
Zirconium	2.2E-4	Zr90	51.5	12.0	78.4 h
Zinc	1.3E-4	Zn64	48.9	11.9	38.4 m
Nickel	8E-5	Ni58	67.9	12.2	36 h
Copper	7E-5	Cu63	69.1	10.9	9.8 m
Tungsten	7E-5	W180	0.14	-	no β+
Lithium	6E-5	Li6	7.42	-	no β+
Nitrogen	5E-5	N14	99.6	10.6	10.0 m

Of the seven elements noted above, the metals can be identified by conventional x-ray systems or three-dimensional computer tomographic x-ray systems. Bromine would not be a typical baggage component because of its corrosive and toxic qualities. If bromine were found in baggage, it should be identified as potentially dangerous.

Using the cross-sections for the fluorine and phosphorous isotopes, a figure-of-merit integral f(E) has been computed. The f(E) for phosphorous is almost identical to that of nitrogen, while that of fluorine is almost a factor of ten larger. The half-life of fluorine, however, is about 15 times longer than that of nitrogen, so that equal numbers of activated nitrogen, phosphorus, and fluorine atoms will have comparable specific activities. In addition, neither nitrogen nor fluorine have alternate decay branches, while P-30 has only a very small probability of producing a detectable gamma ray.

Thus it appears that the most important potential sources of false alarms for the EXDEP concept would be compounds that are rich in fluorine and/or phosphorous, as well as other nitrogen-bearing compounds. For example, it would probably be difficult to distinguish explosives from large quantities of freon, fluorocarbon plastics such as teflon, phosphate fertilizers, or polyamides such as nylon. Neither freon nor phosphate fertilizers are common in baggage. Pattern recognition techniques, density imaging, and signal processing techniques using expert systems may be useful in discriminating against the other potential sources of false alarms.

Based on this brief analysis, the false alarm rate for EXDEP should be comparable to that of other nitrogen detection schemes. Experimental tests using real baggage will be necessary to verify our analysis. These experiments should determine whether the elements noted above are false alarm problems and whether there are other false alarm sources which we have not identified.

CONCLUSION

On the basis of the calculations and experiments performed thus far, the EXDEP concept appears to be a very attractive candidate for the detection of bulk explosives in baggage and cargo. A two-dimensional array of scintillation counters, a gamma-camera, or a positron emission tomography system would provide a good imaging capability for the activation volume. In combination with a conventional x-ray system, the detection probability should be >99%, the false alarm probability should be <1%, and the throughput should be at least ten bags/minute.

REFERENCES

1. R.B. Miller, "The MIDEP Concept: Detection of Buried, Antivehicular Mines Using High Energy Photon Activation," SDL-87-0002, TITAN Technologies/Spectron Division, July 16, 1987.

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BEFORE THE
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20591

Petition of VICTIMS OF PAN AM FLIGHT 103
to require screening and inspection of checked
and carry-on luggage

PETITION FOR RULEMAKING

Pursuant to Rule 11.25 of the Federal Aviation Administration (FAA) Rules of Practice, "Victims of Pan Am Flight 103" respectfully petitions the Federal Aviation Administration to institute rulemaking to amend Part 108 of the Federal Aviation Regulations in order to require on international flights: 1) a positive match of checked luggage with passengers, and hand-inspection of all carry-on luggage; 2) that all checked luggage be examined by physical inspection, a TNA device or a colorized electronic x-ray; and until carriers have colorized electronic x-rays or TNA devices they must ban from commercial flights electronic equipment large enough to contain explosives that could destroy the plane.

Because of the ongoing terrorist threat to air travel, the situation is clearly an emergency. Accordingly, petitioner calls on the Administrator to adopt the proposed amendments immediately, pursuant to

14 CFR Sec. 108.25 (b) (3).

Victims of Pan Am Flight 103 is an unincorporated association, composed of 300 persons whose relatives were killed in Flight 103, that seeks to prevent similar tragedies.

I. THE NEED FOR INCREASED SECURITY

On Thursday, December 29, 1988, then FAA Administrator T. Allan McArtor released the following statement:

> [C]ivil aviation, despite detailed and sophisticated security practices, can still be vulnerable to criminal or terrorist acts. FAA, air carriers and sovereign nations alike must continue to do all that is technologically and humanly possible to reduce the travelling public's exposure to risk to such criminal acts. . . .

Administrator McArtor's sentiment is entirely correct. Unfortunately, not all that is humanly possible has been done to safeguard air travel from terrorists.

A. Pan Am Flight 103

Administrator McArtor's statement was made in the aftermath of Pan Am's infamous Flight 103 on December 21, 1988. Flight 103 originated in Frankfurt and was destined for New York, with a change of planes at Heathrow Airport in London. Shortly after departing London, the jumbo jet exploded at 31,000 feet over Lockerbie, Scotland. All 259 passengers and crew and 11 persons on the ground were killed in the worst air disaster in British history. Among the victims were approximately 200 Americans, including many students, military personnel, young businesspeople, and families returning from London to America for the holidays. Investigations subsequently determined that the explosion was caused by a plastic bomb hidden in a Toshiba radio/tape player and carried in the checked luggage compartment of the airplane.

It appears that lax security measures allowed the bomb in the checked baggage to be placed undetected in the cargo hold. Even though a credible bomb threat had been received and a written FAA alert issued, luggage was not searched and no extra security measures were undertaken at Heathrow airport.

The tragedy of Flight 103 highlighted the fact that airlines do not provide sufficient security against terrorist actions. For almost two years, improved x-ray technology for luggage inspection has been available, but some major carriers have refused to invest in it. Similarly, the policy of matching luggage with persons to prevent terrorists from planting a bomb in checked luggage and then not entering the plane has been used only sparingly by carriers.

After the tragedy of Flight 103, immediate action was obviously required to prevent similar events from killing hundreds of innocent persons. There is every reason to believe that terrorists have stockpiled devices of the sort that blew up Flight 103. Nevertheless, security measures taken since Flight 103 are unsatisfactory and millions of persons continue to travel at undue risk.

B. Security Since Flight 103

The FAA's response to the Flight 103 catastrophe was to announce mild measures that apply only to airports in Western Europe and the Middle East. On December 29, 1988, the FAA announced requirements for carriers flying from those areas to "complete 100% x-ray or physical inspection of all checked baggage" and to "perform positive match of passenger and baggage to ensure unaccompanied bags do not get on board the aircraft."

These measures are insufficient in several respects. First, Americans are targets of terrorist attacks all over the world, not only in Western Europe and the Middle East. The Japanese Red Army has been involved in attacks around the Pacific Rim. Recent revelations that fruit imported from Chile has been laced with cyanide serve to remind us that we are the targets of terrorists in South America as well. As there is a terrorist threat to Americans all over the world, it is a mistake to confine important security measures to a small percentage of flights.

In addition, the requirement of "x-ray or physical inspection" is inadequate because some carriers use insufficient x-ray devices and hand searches are generally not performed. The black and white x-ray devices used by some carriers are unable to distinguish between organic and inorganic material; they may, for example, be incapable of disintguishing between a book and a bomb.

A vastly improved x-ray device is available, which displays organic materials, including explosives, in a bright shade of orange. Blade weapons, knives or files are displayed in bright blue. Objects too dense to be penetrated, such as guns, are displayed in bright green. The colorized device's capacity to separate easily organic and inorganic materials, coupled with its single monitor displays, enables the operator to identify explosives and weapons much faster and with a far higher degree of accuracy than the black and white x-ray device.

The colorized x-ray device has been available since 1987, yet some major carriers of international flights do not use it. The device costs roughly $15-20,000, an expense that pales next to the loss of life that it can help prevent.

Finally, while the FAA and Department of

Transportation insist that the United States is in the forefront in the fight for increased security against terrorism worldwide, other countries have adopted sensible measures that have yet to receive authorization here. The British Department of Transportation has just prohibited electronic equipment in checked baggage and ordered that carry-on luggage be hand-inspected. The FAA should quickly implement these policies.

II. PROPOSED CHANGE

For the reasons set forth in this petition, Victims of Pan Am Flight 103 propose that Part 108 be amended by adding to the end of 14 CFR Sec. 108.9 (a) the following language:

For international flights, all carriers' security programs must include the following:

1) procedures to perform a positive match of passenger and baggage to ensure that no unaccompanied baggage gets on board an aircraft.

2) hand-inspection of all carry-on luggage.

3) the use of a colorized electronic x-ray device, TNA machine or physical inspection to search all checked luggage. Whenever a colorized x-ray reveals the presence of organic material, or a TNA machine indicates the presence of explosives, the luggage will be hand-checked.

4) until carriers have the colorized x-ray device or TNA machine, they must ban from commercial flights all electronic equipment large enough to contain an explosive that could destroy the aircraft.

Respectfully Submitted,

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Date: March 24, 1989

COMMENTS ON FAA DOCUMENT NUMBER 25849

This is submitted in response to Petition Document Number 25849, published in the Federal Register on Wednesday, June 7, 1989.

The Petitioner asserts that: "Because of the ongoing terrorist threat to air travel, the situation is clearly an emergency." The Petitioner continues: "Accordingly, Petitioner calls on the Administrator to adopt the proposed amendments immediately, pursuant to 14 CFR Sec. 108.25 (b) (3)."

I. THREAT TO CIVIL AVIATION

After examining the facts available in the public sector, I find that the Petitioner is overwhelmingly supported in his assertion that "... the situation is clearly an emergency." In support of this assertion I offer the following facts:

Item 1 August 11, 1982

An explosion occurred on a Pan Am B-747 enroute from Narita Airport, Tokyo, Japan to Honolulu Airport, Honolulu, Hawaii. The explosion killed a Japanese national and injured 15 other persons.

Note: The bomb was subsequently thought to be identical to the one found on a Pan Am B-747 in Rio de Janeiro on August 25, 1982 (see next item).

Item 2 August 25, 1982

An unexploded, improvised explosive device (IED) was discovered on a Pan Am B-747 at the Rio de Janeiro Airport on August 25, 1982. The FAA and FBI were given custody of the IED and returned it to the U.S. for examination and testing. The IED triggering mechanism contained an *electronic timer* and a *barometric sensor*. The explosive was a 4- by 10-inch sheet of 1/4 inch thick Semtex.

Item 3 September 23, 1983

A Gulf Air B-737 departed Karachi, Pakistan after security personnel discovered a person had purchased a first-class ticket for the flight about an hour before the scheduled departure time.

This person then checked a bag for the flight yet failed to board the flight to Abu Dhabi. An IED subsequently exploded in the aircraft cargo hold and the aircraft crashed in the desert killing all 112 persons on-board.

Item 4 <u>December 1983/January 1984</u>

A British national unknowingly carried an IED concealed in the lining of her suitcase from Athens, Greece to Tel Aviv, Israel, to London, England, and back to Athens. The suitcase IED failed to detonate as designed and was recovered by the Greek Police. The IED *triggering mechanism* contained an *electronic timer* and a *barometric sensor*. The suitcase had 1/4 inch *sheets of Semtex explosive* concealed inside the lining of the suitcase. The IED was *cleverly concealed* and very difficult to detect.

Item 5 <u>December 29, 1983</u>

A terrorist attempted to check a piece of luggage on an Alitalia flight from Istanbul, Turkey to Rome, Italy and then interline the bag to a Pan Am B-747 flight to New York. The suitcase was removed from the Alitalia flight before departure when the passenger failed to board the aircraft. The Turkish Police removed the bag and discovered an IED after the passenger failed to board the Alitalia flight to Rome.

Item 6 <u>January 18, 1984</u>

An Air France B-747 departed Karachi, Pakistan and suffered a loss of pressurization while climbing through 18,000 feet. After the aircraft safely returned to Karachi, a three by six foot hole was discovered in the aft cargo hold on the right side of the aircraft. Subsequent examination of the evidence by the FAA and FBI led to the conclusion that an IED in the bag of an UNESCO official had detonated causing the hole in the B-747.

Item 7 <u>June 23, 1985</u>

An Air India B-747 was lost in the Atlantic Ocean southwest of Cork, Ireland killing all 329 persons on-board.

Within one hour of the loss of the Air India B-747, an IED detonated in the baggage handling area of the Narita Airport, Tokyo, Japan, killing two baggage handlers and injuring several others.

Subsequent investigation by the Canadian authorities led to the conclusion that Seikh terrorists checked a bag on- board the Air India B-747 and another bag on-board a Canadian Pacific aircraft to Tokyo that was to be interlined to another Air India B-747 in Tokyo. The terrorists received boarding passes for both Canadian Pacific Flights; however, neither passenger boarded their aircraft.

An Indian Court of Inquiry subsequently concluded from circumstantial evidence that an IED was responsible for the destruction of the aircraft southwest of Cork, Ireland.

Item 8 April 2, 1986

An IED exploded in the cabin of a TWA B-727 enroute from Rome, Italy to Athens, Greece killing four persons. It was later concluded that the IED had an *electronic timer* and a *barometric sensor* and was probably placed on the aircraft by a passenger who boarded the aircraft on an earlier flight departing from Cairo, Egypt. *This IED is thought to have been identical to the device which exploded on the Pan Am B-747 on August 11, and the IED found on the Pan Am B-747 on August 25, 1982.*

Item 9 April 17, 1986

An Irish national attempted to board an El Al flight at the Heathrow Airport in London, England on April 17, 1986. She was discovered to be unwittingly carrying a functioning IED in a handbag.

The IED detonating mechanism, including the initiator (electric blasting cap) and timer, was contained in a fully functioning calculator. The calculator was lying on the bottom of the bag. Concealed inside the false bottom were approximately 3 pounds of plastic explosives.

The IED was discovered through the diligence and the highly professional security examination by El Al security agents. The IED had already cleared through the Heathrow security system without being detected.

Item 10 October 1988

Federal Republic of Germany (FRG) Police (BKA) raided a suspected Middle East terrorist "safe house" in West Germany. The BKA found what subsequently proved to be *several cleverly concealed sophisticated explosive devices. One IED was concealed inside a Toshiba BomBeat 453 Boombox radio. This IED had its own power source (batteries), independent of the batteries which powered the Toshiba radio. The Toshiba radio functioned as a normal radio. The IED initiator included a barometric sensor.*

Item 11 December 21, 1988

On December 21, 1988, Pan Am Flight 103 was destroyed by what was subsequently determined to be an IED shortly after the aircraft departed Heathrow International Airport in London, England. All 259 persons on board, plus 11 persons in Lockerbie, Scotland, were killed. Authorities from the United Kingdom and the United States have said publicly that Pan Am 103 was destroyed by an IED which was located in the left forward section of the forward cargo hold.

I include in my statement the FAA's own document (Attachment A) which details the overall sabotage threat to civil aviation. This document is replete with examples of explosive devices detonating on civil aircraft all over the world. In addition, I incorporate by reference, all classified data available to the U.S. Government, past and present, concerning the threat or threats to civil aviation. More specifically, I incorporate by reference, all classified data through all classification levels through Top Secret, Compartmented Intelligence, and above.

II. DISCUSSION

The Petitioner asks the: ". . .Federal Aviation Administration to institute rulemaking to amend Part 108 of the Federal Aviation Regulations in order to require on international flights: "(1) A positive match of checked baggage with passengers; (2) hand-inspection of all carry-on baggage; (3) examination of all checked baggage by physical inspection, a Thermal Neutron Analysis (TNA) device or a colorized electronic x-ray; and (4) a ban of electronic equipment large enough to contain explosives that could destroy the plane until carriers have colorized electronic x-rays or TNA devices".

I find considerable merit in the Petitioner's request. First, in 1986, the United States Government, as one of the then 156 Contracting States of the

International Civil Aviation Organization (ICAO) petitioned ICAO to change its Standards and Recommended Practices to require a passenger baggage reconciliation (match) on all international flights. This was proposed as a new ICAO Standard (requirement). The U.S. subsequently supported the adoption of a new ICAO Standard in Annex 17, Section 5.1.4 which:

> 5.1.4 Each Contracting State shall establish measures to ensure that operators providing service to or from that State do not place or keep the baggage of passengers who have registered, but have not reported for embarkation, on board the aircraft, without subjecting it to security control.

The U.S., along with other ICAO Contracting States, adopted this as an ICAO Standard effective December 19, 1987.

Therefore, U.S. airlines, as a U.S. Government regulated entity, are already required to comply with ICAO Annex 17, Standard 5.1.4. This Standard requires that unaccompanied baggage receive additional security scrutiny. In order to determine that unaccompanied baggage is loaded, the air carriers must make "A positive match of checked baggage with passengers" on international flights as the Petitioner requests.

Unfortunately, the U.S. has allowed U.S. airlines to evade the full intent and application of ICAO Annex 17, Standard 5.1.4. The Federal Aviation Administration allowed, and at some locations directed, U.S. airlines to examine all baggage by x-ray or physical inspection. By examining all baggage, the U.S. airlines could claim that it was unnecessary to conduct a positive match of checked baggage with the passengers. In this way U.S. airlines can claim that they have met the full intent of ICAO Annex 17, Standard 5.1.4.

X-ray screening units are not explosives detectors; they are imaging units. Explosives are usually very dense organic (nitrogen) substances. The x-ray units in use at the time of the adoption of ICAO Annex 17, Section 5.1.4 Standard in 1986/87 were standard transmission x-ray units. These standard transmission x-ray units were incapable of discriminating between organic and inorganic objects. The images displayed on the operator's television monitor were dependent on the density of the objects examined by the x-ray beam. The video images from these old technology x-ray units were usually displayed on black and white television monitors.

At the time of the adoption of ICAO Annex 17, Standard 5.1.4 in 1986/87, one major x-ray screening equipment supplier offered clients pseudo color images a color as an option. These x-ray units simply assigned a series of gray shades and displayed the image on a color monitor. The pseudo color option added nothing to the detection or discrimination capability of the x-ray screening unit. In other words, the pseudo color option did nothing to distinguish between organic and inorganic substances.

In 1986, a U.S. supplier of x-ray screening units offered a unit with the capability of discriminating between an organic object and an inorganic object. This first unit did not offer true colorized units but did offer pseudo color as an option. More significant was the fact that the x-ray screening unit could, for the first time, distinguish between organic and inorganic objects and provide more data to the operator on which to make a decision. (It should be recognized that an x-ray unit only displays images; the operator must interpret the images and decide if it is necessary or appropriate to open the bag and physically inspect the contents.) Nevertheless, this first unit had some considerable limitations and was not purchased in any substantial quantity.

In 1987, a second U.S. supplier of x-ray screening units offered an x-ray unit which for the first time offered excellent imaging capability of organic and inorganic objects. This supplier also offered, as a standard feature, a true color unit which again for the first time, displayed organic substances in one color and inorganic substances in a second color. Extremely dense objects, incapable of being penetrated by the relatively low power x-ray beams, were displayed in a third color.

By the time this second U.S. supplier of x-ray screening equipment began marketing its color unit, the first supplier had perfected its unit and was also offering color units. There are now a number of these advanced technology units in use by U.S. airlines at this time. Well over 100 more have been ordered by U.S. airlines since the Pan Am 103 tragedy on December 21, 1988. Most of these advanced technology x-ray screening units ostensibly are destined for use in satisfying the ICAO Annex 17, Section 5.1.4 Standard.

The advanced technology x-ray units capable of discriminating between organic and inorganic substances in passenger checked baggage, parcels, mail, cargo, etc., considerably improve the possibility of well-trained x-ray operators to detect explosives. As a specific example: the sophisticated Improvised Explosive Device in the Toshiba Bombeat 453 radio discovered by the FRG BKA in October 1988, reportedly contained eleven (11) ounces of plastic explosives in addition to an electric blasting cap (initiator) and batteries (electric power source to activate the blasting cap), separate from the batteries powering the radio. It short, it was a fully functioning radio.

If the batteries powering the radio were removed by security personnel, it would still have been a fully functioning bomb. A physical security examination, short of opening the radio, would not have discovered the IED hidden inside. An x-ray examination of this Toshiba radio/IED with the standard transmission x-ray might have discovered the IED hidden inside; however, it is probable that it would have evaded detection. On the other hand, if an advanced technology x-ray unit had been used in the examination, it is highly unlikely that a well-trained operator would have missed the orange glow from the 11 ounces of Semtex plastic explosive hidden inside the radio. The operator would have seen an organic substance in a completely inorganic object! My conclusion is that while an advanced technology x-ray screening unit is not an explosive detector, it can be used to considerably enhance a well-trained operator's probability of detecting explosives in baggage or other objects being placed onboard U.S. airlines.

As a consequence, I fully support the Petitioner's position on requiring the use of advanced technology x-ray units on the: "(3) examination of all checked baggage by physical inspection, a Thermal Neutron Analysis (TNA) device or a colorized electronic (*advanced technology x-ray*) x-ray." (Advanced technology x-ray with emphasis added) Nevertheless, I do not support the Petitioner's proposal for examination of checked baggage by advanced technology x-ray screening units *as a method solely independent of other security screening techniques.*

The Petitioner's proposal for examination of checked baggage by physical inspection is flawed to the extent that it can be considered independent of other security screening techniques. As noted above, the Toshiba Bombeat 453 radio discovered by the FRG BKA in October 1988 had its own self contained power source. Any purely physical inspection, short of actually opening the radio, would have missed the bomb hidden inside. Nevertheless, the Petitioner's proposal has merit to the extent the physical inspection complements other security techniques, i.e., the total security system.

One well-known international air carrier (non-U.S.) principally relies on psychological security screening of its passengers and then careful physical examination of articles associated with suspect passengers. This process is then complemented with a technology, i.e., x-ray, metal detector, explosives detectors, etc.

A physical search of a passenger and his/her articles can be a positive addition to the security system provided: (1) a psychological profile examination is first conducted of the passenger, (2) the security screener has been well trained and is experienced in the psychological examination of passengers, and (3) the person doing the search is knowledgeable, and is well trained and experienced in how to conduct the search and knows what to look for. A physical search by a poorly trained person who doesn't know what to look for is an invitation to disaster.

I will now examine the petitioner's proposal for: "examination of all checked baggage by . . ., a Thermal Neutron Analysis (TNA) device. The TNA is a true explosives detector. It bombards articles with thermal neutrons and examines the gamma ray emissions for a nitrogen signature. As noted above, explosives are usually densely packed nitrogen. The first generation TNA explosives detector will be approximately 6' wide x 8' high x 12' long and will weigh upwards of 20,000 pounds. It will examine bags at the rate of approximately one every 6 to 10 seconds or six to ten bags per minute. At this rate it would have taken from 49 to 82 minutes to examine two bags per person for the 245 passengers onboard the ill-fated Pan Am 103 on December 21, 1988.

These calculations are for ideal circumstances, i.e., if everything proceeds as planned and the TNA is used continuously for the 49 to 82 minutes immediately preceding the departure of the aircraft. Nothing is ever ideal, certainly not anything as dynamic as international aviation. A more realistic assumption would be that these times would be at least half again as long, i.e., 73.5 to 123 minutes. These calculations only consider the time necessary to examine <u>all</u> passenger baggage, they do not include other parcels, cargo, etc., which were on Pan Am 103, any of which could be used to conceal an IED. One can argue that the processing time can be accelerated by adding more TNAs. But who is going to do this at approximately $800,000 per unit? Moreover, where is one going to position these monstrous machines in an already crowded aviation terminal?

As demonstrated above, one TNA explosives detection unit is unlikely to effectively handle the screening of all baggage on <u>one</u> B-747. Most large international airports handle multiple B-747 flights during a very constricted two- to three- hour time span. Not only would this require multiple TNA units but it would probably become a logistical nightmare considering the slowness of the first generation TNA units. I believe that a better answer is available. Again, I return to the need for a comprehensive overall security system that: (1) uses psychological profiles to examine passengers, (2) physically examines articles being placed onboard U.S. airlines, (3) selectively uses technology, e.g., TNA, etc., to examine articles being placed onboard the aircraft, (4) sets a high selection and work standard for persons involved in the security screening of passengers and articles, and (5) establishes a minimum number of hours and a mandatory training curriculum for persons working in aviation security.

The current limitations on the TNA's processing speed and its immense size limit its overall contribution to the aviation security program. To be effective, the TNA's use must be incorporated into the overall security system parameters described above. The proper integration of the TNA into the overall security system can produce significant results. If the proper "people system" is established, baggage and other articles to be screened by the TNA can be significantly reduced. This will allow the TNA technology to be fully exploited; however, it also requires a substantial improvement in the total aviation security system as it relates to selection, training, motivation, and supervision of people. As noted earlier, one international airline (non-U.S.) has already established this system. The TNA can easily be integrated into its system.

The Petitioner's proposal for TNA examination of checked baggage is flawed to the extent that it does not demand other essential elements of an overall aviation security system. Nonetheless, the TNA is the first true explosives detector for baggage and similar articles. As such, it is a significant new development and should be immediately deployed for operational use and experience while more effective and efficient units are being developed.

I will next address the Petitioner's proposal for a "hand-inspection of all carry-on baggage; . . .". First the petitioner's proposal does not go far enough in providing any substantial assurance that sophisticated IEDs will be detected. A physical inspection of a passenger's carry-on baggage will not ensure that IEDs like the ones cited above (see threat section items No. 1, 2, 4, and 8.) will be detected. Again, I must emphasize that one security technique, applied in isolation and independent of several other proven techniques, is an invitation to failure and invites another disaster like Pan Am Flight 103.

A physical inspection of a suspect passenger's carry-on baggage is a vital part of any overall aviation security screening system. Nonetheless, a physical inspection can easily miss a sophisticated IED like those noted in the previous paragraph. Any physical inspection must be combined with a good psychological profile screening and the full application of the available state-of-the-art technology. A good example of where a physical inspection, without any technology examination, is prone to failure is the citation above on the difficulty of discovering the IED that was located in the Toshiba Bombeat 453 radio found by the FRG BKA in October 1988. Anything short of actually dismantling the radio, or examination by an advanced technology x-ray or an explosives detector, would have failed to detect the concealed IED.

I find myself in partial agreement with the Petitioner on physical inspection of carry-on baggage; however, I strongly believe that any physical inspection can be considerably enhanced by the application of a sophisticated psychological profile. This psychological profile should be used to identify passengers who should be carefully examined. The suspect passenger's baggage, both checked and carry-on, should be carefully inspected and examined. This will allow the security resources to be concentrated where they are likely to produce the greatest benefits, i.e., the suspect passenger.

I hasten to add that the current psychological profile in use by the U.S. at high-threat locations will not produce the results I envision above. In other words, the current psychological profile being applied by U.S. airlines in high-threat locations is not satisfactory. In addition, the selection of the people applying the profiles for U.S. airlines is inadequate, their training is grossly inadequate, and their supervision is unsatisfactory. As a comparison, the one international airline (non-U.S.) with an adequate aviation security system to detect sophisticated IEDs requires approximately 4 to 5 weeks of concentrated training for its security personnel. The FAA currently has not established time requirements for the training of security personnel. The FAA only loosely stipulates the curriculum that some of the security personnel will receive. The only exception to this is the initial and recurring training time for flight crew personnel. In summary, the FAA requirements for the training of individuals involved in the application of the aviation security system is grossly inadequate. I therefore conclude that the Petitioner's proposal that all carry-on baggage is the correct approach until adequate standards have been established by the FAA for the selection, training, and supervision of persons applying the aviation security processes.

The Petitioner also demands: "a ban of electronic equipment large enough to contain explosives that could destroy the plane until carriers have colorized electronic x-rays or TNA devices." Any traveler, especially in the international arena, will know the plethora of electronic equipment carried by passengers. This ranges from kids' electronic games, businessmen carrying laptop computers, sales and engineering personnel carrying sophisticated electronic equipment, to government agents and officials carrying highly classified electronic equipment. To consider ". . . a ban of electronic equipment large enough to contain explosives that could destroy the plane until carriers have colorized electronic x-rays or TNA devices" is to seriously disrupt commerce on the international scene.

Regardless of the serious disruption to commerce, the threat to civil aviation is real and substantial. The Petitioner's proposal for the ban of certain electronic equipment is based on a realistic premise. As noted above, electronic equipment has been used to conceal sophisticated IEDs. In fact, the bomb that destroyed Pan Am Flight 103 is alleged to have been concealed in a radio - perhaps identical to the Toshiba Bombeat 453 discovered by the FRG BKA in October 1988.

Based on these data, I believe that the Petitioner's proposal is reasonable and rational. I agree and support the Petitioner's proposal that a ban of electronic equipment large enough to contain explosives that could destroy an airplane should be imposed on U.S. airlines in high threat areas until they have installed and are using advanced technology x-ray equipment or TNA explosives detectors to screen such electronic equipment. Furthermore, I believe that it is incumbent on the U.S. Government to impose such a ban and to require, by emergency order, U.S. airlines to purchase and use advanced technology x-ray and/or TNA explosives detectors to examine articles being placed on U.S. airlines in high threat areas. Again, I add a note of caution: it is insufficient to impose any single element, e.g., advanced technology x-ray or TNA, to the exclusion of building the total security system needed to protect U.S. civil aviation against the existing sophisticated terrorist sabotage threat.

In summary, I find that the Petitioner's proposal is reasonable and rational: (1) a positive match of checked baggage with passengers is already required by ICAO Annex 17, Standard 5.1.4 and the U.S. Government should ensure that the U.S. airlines are not permitted to evade this requirement, (2) hand inspection of (all) carry-on baggage makes sense until the U.S. imposes improved security standards and requirements on U.S. airlines [once this improved security system is in place and fully effective, the hand inspection of (all) carry-on baggage can be changed to one more selective for suspect passengers. This presumes that these articles would continue to be examined by x-ray - hopefully advanced technology type], (3) examination of checked baggage by physical inspection, a TNA device, or an advanced technology x-ray capable of discriminating between organic and inorganic substances makes sense, provided it is implemented under a much improved overall security system for U.S. airlines, and (4) a ban of electronic equipment large enough to contain a sophisticated IED is logical and rational until and if the U.S. government requires U.S. airlines to use advanced technology security screening equipment in conjunction with the much improved aviation security system outlined in this document.

As an interested citizen, a frequent international business traveler, and a former member of the FAA I urge the FAA officials to adopt the Petitioner's proposal. Moreover, I solicit the FAA to develop and implement an aviation security system which will protect U.S. aviation against the sophisticated sabotage threat it has faced since August 1982.

I assert that the Federal Aviation Administration, in the consideration of adoption of the Petitioner's proposal must not only consider the data outlined in the public record but must also review exhaustively the non-public record in possession of the FAA, the CIA, the NSC, the NSA, and any other U.S. government department, agency, or body. Specifically, I assert that the FAA must exhaustively review, in the discharge of this petition, all sensitive non-classified security data, and all classified data relating to the threat to civil aviation up through and including all Top Secret and Compartmented Intelligence Information.

Sincerely,

Billie H. Vincent

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