STATEMENT OF JOSEPH DEL BALZO, EXECUTIVE DIRECTOR FOR SYSTEM DEVELOPMENT, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE COMMITTEE ON GOVERNMENT OPERATIONS, SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION, CONCERNING THE DEPLOYMENT OF AIRPORT SURFACE DETECTION EQUIPMENT. JULY 10, 1991.

Madam Chair and Members of the Subcommittee:

I welcome this opportunity to appear before you today to discuss the Federal Aviation Administration's (FAA) Airport Surface Detection Equipment (ASDE-3) program. With me today is Mr. Norbert Owens, Deputy Associate Administrator for Air Traffic. We have been working diligently with the research and development of this system, and we expect ASDE-3 to serve as a cornerstone of our airport and air traffic control system's efforts to reduce runway incursions.

ASDE-3 is a ground search radar surveillance system, designed to replace the vacuum tube technology of ASDE-2, which was deployed between 1958 - 1960. ASDE-3 employs solid state technology and, unlike ASDE-2, performs exceptionally well in rain, contains a variable range feature and requires less maintenance than its predecessor.

## ASDE-3 PROGRAM HISTORY

ASDE-3 research and development began in February 1976 when the FAA issued a Request for Proposal for a prototype ground surveillance radar system. Cardion Electronics was awarded a contract in May 1977 and delivered a prototype system to the FAA

Technical Center in May 1979. Testing of this unit continued from July 1979 through February 1980. Based on this developmental testing, production specifications for ASDE equipment were developed. These were completed in September 1984 and a contract to Norden Systems, Inc., was awarded in September 1985. This contract called for delivery of the first ASDE-3 unit in September 1987.

However, Norden encountered unforeseen hardware and software problems during the design and testing of ASDE-3, and delivery of the first system was delayed approximately four years. Though we were disappointed with delays in delivery, the ultimate objective of any test and evaluation program is to identify potential problems and assure that system design goals are met. The ASDE-3 program is meeting that objective, as well as its revised delivery schedule.

Pursuant to that revised schedule, Norden delivered ASDE-3 units to our Aeronautical Center in May 1991 and to the FAA Technical Center last month. The San Francisco International Airport is scheduled to receive a unit in November 1991.

SIGNIFICANT PROBLEMS IDENTIFIED DURING ASDE-3 TESTING

During the testing phase of the ASDE-3 system at the Pittsburgh Airport, two significant problems arose -- antenna reflector delamination and split target imaging.

Antenna reflector delamination, seen as blistering on the antenna's skin, was first identified during testing of the unit at the Pittsburgh Airport. This problem required 19 months to resolve. For the first 12 months, Norden employed the resources of United Technologies Research Center to identify the cause of the delamination.

The delamination was found to be a production process problem caused by non-uniform mixing and application of the epoxy resin on the surface of the antenna reflector assembly. Subsequent stresses of starting and stopping the antenna caused the skin to pull away from the honeycomb support structure. Ultimately, 27 antenna assemblies had to be discarded and new reflectors were built to replace them. The new reflector assembly has successfully completed spin and heat tests that simulate 20 years of constant use.

A second potential problem that arose during testing was a phenomenon known as a split target. ASDE-3 radar receives reflected energy from vehicles and aircraft on the airport. In most instances, the radar shows only one target per vehicle or airplane. However, in some cases, such as certain large commercial aircraft, two split images will result from one aircraft. This is because very little energy is reflected from certain aircraft fuselages and results in a void of approximately

80 feet between targets on the radar screen. Split targets are particularly noticeable when decreasing the viewing range from its maximum of 24,000 feet to less than 10,000 feet.

Responding to this potential problem, we conducted an Air Traffic Operational Analysis in June of this year at the Pittsburgh site. Five full performance level FAA controllers, including a Pittsburgh tower controller, analyzed ASDE-3 and the split image problem. The participating controllers felt the split target issue was not significant enough to delay FAA acceptance and deployment of this system. They found ASDE-3 to be a vast improvement over other systems currently in use and determined it to be a useful tool for air traffic control facilities. They recommended, however, that the split-image issue continue to be analyzed.

Norden will continue to collect split-target data for analysis by imaging experts at MIT, Lincoln Labs and Sensis Corporation. We expect that these additional reviews will be completed soon and, if necessary, we will recommend a plan for resolving the split image phenomenon.

In addition to problems encountered with the antenna and radar imaging, problems with software development and debugging also contributed to ASDE-3 delivery delays. These software problems have now been resolved. While we have been disappointed by delivery delays, ASDE-3's substantial improvement over the existing ASDE-2 system is very encouraging.

After my visit to the Norden facility last week at Melville, New York, I can tell you that I am completely satisfied with the progress that has been made in the ASDE-3 program since we last appeared before you.

CURRENT STATUS OF ASDE-3

As I mentioned earlier, ASDE-3 units have been received at our Technical Center and at our Aeronautical Center. A third unit will be delivered to the San Francisco International Airport in November 1991. The Aeronautical Center unit will be used for the training of Airways Facilities Technicians on the maintenance of this system. In addition, the FAA Academy will provide training to controllers from facilities that are scheduled to receive ASDE-3 units. Utilizing a "cadre" system of training, instructors will hold a 3-day training course at the Pittsburgh site for designated controllers. These controllers will then return to their respective facilities and provide on-site ASDE-3 training to facility controllers. Training will include hands-on and classroom instruction. A draft ASDE-3 operators guide has been prepared and distributed for review and comment.

The San Francisco unit is particularly significant because it will permit us to begin our validation testing of the pre-production version of the Airport Movement Area Safety System (AMASS). This system is an enhancement to ASDE-3, using radar data to

display visual alerts on the ASDE-3 screen. In addition, it will sound an audible alarm in the tower. As you are aware, the San Francisco site was selected for this testing because it has a training air traffic control cab below an operational cab and we are able to operationally test AMASS without disturbing airport operations.

In addition to the three units scheduled for delivery this year, a total of 33 units will be delivered to 29 major airports by July 1993. These units will replace 13 existing ASDE-2 units and establish 16 new operational systems.

Madam Chair, ASDE-3 will not by itself prevent all airport accidents -- nor can it serve as a substitute for air traffic controller, pilot or ground vehicle operator vigilance. However, because it will significantly enhance our ability to separate ground traffic, it will be a valuable tool for FAA controllers. ASDE-3 and its enhanced version, AMASS, are the first step in our Airport Surface Traffic Automation program designed to prevent runway incursions and assist controllers in sequencing aircraft to enhance airport capacity.

Even while we are deploying state-of-the-art ASDE-3 technology, the FAA continues to look at numerous new initiatives to reduce the numbers of runway incursions.

When we testified before your Subcommittee last February, we had the opportunity to discuss the FAA's finalized Runway Incursion Plan. Briefly, that plan identifies 25 ongoing initiatives and approximately 20 new projects that we believe can contribute significantly to preventing surface collisions. The Plan also sets out an ambitious schedule for implementing these initiatives.

STATUS OF RUNWAY INCURSION PLAN

The Runway Incursion Plan is an evolving, proactive document that will be updated annually to address identified safety needs and priorities established by the FAA, the aviation community and new technology. We have used this Plan to shape our FY 92 budget request to fund priorities for such programs as airport signing, marking and lighting to reduce incursions. Since our Los Angeles hearing, the Runway Incursion Working Group held its first meeting on April 16, 1991. The Group is to meet again tomorrow, July 11, 1991, to prioritize issues and concerns relating to runway incursions. The Group will work closely with our Program Manager to improve and strengthen this Plan.

The FAA has also made substantial progress on projects identified in the Plan. A few key examples of this progress include:

- An Advisory Circular on runway and taxiway signs is being finalized. This document reflects the international

agreement among members of the International Civil Aviation Organization's Visual Aids Panel on airport signing.

- The first four Runway Incursion Action Team Reports have been received. These reports are prepared for individual airports and include industry and local airport involvement in their preparation.

- An Advisory Circular on low-visibility operations is being finalized.

- A Broad Agency Announcement, which solicits demonstrations of alternative technology, has been released. Contracts under this announcement could be awarded as early as October 1991.

- Stop Bar testing was initiated in March and is scheduled to be completed this winter. Stop Bars are light systems designed to control taxiway and runway intersection traffic.

- Safety training on ground vehicle operations for airport operators was conducted in March, and a second session is presently underway.

- A training video tape on runway incursions has been prepared and will be distributed for controller and pilot training.

- Successful testing of hold short lighting was recently conducted in Boston. We will continue to operate this promising system while we are preparing our final report on this testing.

We are very encouraged with the overall implementation of this Plan and the progress being made on the majority of initiatives. Of course, when development involves new state-of-the-art technology and equipment, unexpected problems can arise. Fortunately, problems that may cause project delays, such as we experienced with ASDE-3, have been infrequent.

We are presently preparing a report on the status of all 45 Plan initiatives for the House Subcommittee on Aviation. That report is scheduled to be completed this month, and I will be happy to provide a copy to your Subcommittee.

Madam Chair, we have made substantial progress on programs relating to airport surface movement and safety. Importantly, we are enjoying more industry and user involvement in this effort

than ever before. As I stated at the recent Los Angeles hearing before this Subcommittee, the FAA is committed to the research, development and implementation of measures to improve airport safety.

That completes my prepared statement. We will be pleased to answer any questions you might have at this time.