

STATEMENT OF MARTIN T. POZESKY, ASSOCIATE ADMINISTRATOR FOR SYSTEM ENGINEERING AND DEVELOPMENT, BEFORE THE HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, SUBCOMMITTEE ON TECHNOLOGY, ENVIRONMENT, AND AVIATION, CONCERNING THE FAA'S RESEARCH, ENGINEERING, AND DEVELOPMENT PROGRAM. MARCH 24, 1994.

Mr. Chairman and Members of the Subcommittee:

I am pleased to appear before you today to discuss the FAA's research and development program. Accompanying me this afternoon are Harvey Safeer, Director of the FAA Technical Center, and Steven Zaidman, Director of my Research and Development Service.

Mr. Chairman, our fiscal year 1995 budget request is \$266.8 million. This is a 5 percent increase above our 1994 level of approximately \$254 million. This funding will enable us to continue research and development in a number of critical aviation areas including aircraft and airport safety, security, air traffic control, hazardous weather, noise and emissions reduction, and aviation human factors.

As with past practice, we intend to continue leveraging our resources with those of other federal laboratories with cooperative R&D with the private sector, and where appropriate, with foreign civil aviation authorities. Mr. Chairman, I would like to share with the Committee examples of such programs as illustrative of our partnerships with other research and development facilities, and with the aviation industry. I will focus today particularly on GPS and aviation weather.

We are extremely proud of the research we have accomplished and the products we are now delivering on the Global Positioning System, known as GPS. In December 1993, the Department of Defense declared GPS to be operational. This meant that the full constellation of 24 satellites was up and performing to specification. Secretary Peña and Secretary Perry have now reached formal agreement on use and operation of GPS to support civil transportation needs.

At the request of FAA, the RTCA, an advisory committee which recommends performance specifications for aviation products, formed a task force to develop a consensus strategy with

recommendations regarding early implementation of a satellite navigation capability in the United States. The task force, composed of representatives from many segments of the user community, reached a solid consensus that users want, need, and are ready to implement GPS in virtually all aspects of aviation operations.

We endorse the RTCA recommendations and they match our belief in the potential for GPS in the civil aviation world. To this end, we are pursuing a very aggressive program to implement GPS in our National Airspace System as early as possible. We have demonstrated the utility and benefits of GPS for aircraft operating over the ocean, which falls outside of most radar coverage, and contains no surface navigation aids. We have also conducted demonstrations using GPS to land aircraft in various stages of instrument flight. At present we are experimenting at Boston Logan airport with a prototype GPS system which monitors aircraft and vehicle movements on the airport surface to assist in runway incursion prevention.

Just last month, FAA certified the first GPS receiver for use in aircraft flying under instrument conditions for enroute through non-precision approaches to airports. This summer, FAA will issue an implementation order permitting the use of privately owned differential ground stations, located at airport sites, which provide precision landing guidance in limited visibility weather conditions (known as Category I weather) at that airport.

Mr. Chairman, we have also completed the bulk of our research on the feasibility of GPS to provide Category I landing guidance at virtually all major airports across the entire United States without the need to install additional equipment at these airports. This system, which we call the Wide Area Augmentation System, would eliminate the need for local ground systems to be placed at each airport. In their place, we would install about 25 ground reference stations across the country which give aircraft navigational guidance across a wide regional area. We successfully demonstrated this concept earlier this year by completing coast-to-coast flights using a prototype Wide Area Augmentation System. The system used both GPS, INMARSAT communications satellites, and

several ground reference stations. Successful Category I landings were made both at Crow's Landing, California, a NASA facility, and at Atlantic City International Airport, by our Technical Center.

We are working closely with several universities, NASA, and industry to demonstrate by early 1995 the feasibility of GPS to support Category 2 and 3 landings, that is landings conducted under extremely limited visibility conditions. The research performed to date looks very promising. We plan to award a series of contracts this Spring to have industry design an avionics system and fly GPS Category 2 and 3 approach and landings to demonstrate that indeed, the science works in real life.

Clearly these kinds of GPS applications have the potential to significantly increase the efficiency and safety of our aviation system. However, we need not wait to demonstrate all possible uses of GPS flight before putting this technology into the hands of the user. Instead, our philosophy is to make available approved equipment specifications, associated hardware, and flight procedures so that pilots have access to GPS at the earliest opportunity.

One example of the benefit of rapid GPS deployment is FAA approval on the use of GPS by Continental Express airlines. Continental Express is conducting GPS instrument approaches into Aspen Colorado. We will soon give similar authorization for GPS use into Steamboat Springs, Colorado. To date over 150 GPS approaches have been flown into Aspen during instrument conditions. As GPS is the only navigation aid available, this means more than 150 flights would have been diverted to an alternate airport. Instead, all of these flights and their 10,000 passengers arrived safely at their intended destination.

Given what we have learned about the potential for GPS to support civil aviation operations, we believe it is reasonable to conclude that GPS may one day be considered a national resource, not just in aviation, but for virtually all modes of transportation.

Mr. Chairman, I am also pleased to report significant progress in our aviation weather program. Technical advances in aviation weather research through modern communications, advanced computer programs, and new ground and satellite sensors are making it possible to achieve unparalleled improvements in our ability to forecast aviation weather on scales of accuracy not considered feasible several years ago.

FAA is working in partnership with NASA, the National Oceanic and Atmospheric Administration (NOAA), and with the National Center for Atmospheric Research to improve the quality and timeliness of winds aloft data, predict the paths of storm cells, identify airspace subject to icing, and forecast ceiling and visibility data at airports.

We have in place Cooperative Research and Development Agreements with 4 commercial weather vendors, where FAA and industry will provide a demonstration, beginning next year, of improved aviation weather forecast information to controllers. The government will provide weather data to industry who in turn, will present this data in easy to understand graphics, requiring no further meteorological interpretation. Weather prediction and observation in the terminal area is especially critical to flight safety and airport capacity. Our new prototype Integrated Terminal Weather Information System, developed at MIT Lincoln Laboratory, has proven very effective in detecting dangerous microbursts near airports and has been operating at Orlando for more than a year. This year we will be evaluating an enhanced system capable of improved storm tracking at Orlando and Memphis Airports.

We are continuing our efforts toward achieving a predictive capability for inflight icing. This winter, a major field effort is underway at the Denver Air Traffic Control Center area to test new computer models for improving predictions of inflight icing. Further tests are planned in Chicago and areas along the northeast to assure a national predictive capability. We are also working with United Airlines in testing improved snowfall prediction methods to assist airlines in meeting deicing regulations.

We are actively working on technologies which can better detect ice on aircraft surfaces prior to flight. For an ice detector to be effective, not only must it be able to detect very thin layers of ice on critical surfaces, it must also discriminate between ice, water, and deicing fluids. Last year we issued a solicitation to identify promising technologies, and we now intend to issue several contracts to industry and grants to universities toward development of an icing sensor.

I would like to conclude my remarks on our weather research activities with information on FAA's windshear alerting systems program. Windshear is a sudden forceful down-current of air, often found in the vicinity of thunderstorms. As such, windshear is a hazard to aviation, especially if operators of low flying aircraft are unaware of its presence. Our very successful joint venture with NASA has led to the development of a forward looking airborne windshear detector. This new technology will warn flight crews of dangerous windshear presence some 20 to 30 seconds in advance of an encounter, giving pilots adequate time to avoid flying into the hazard.

Mr. Chairman, this concludes my formal opening statement, but I would be remiss if I neglect to mention the work that you, the ranking minority member, and the full Committee have done in enhancing FAA's Research and Development program. Under your oversight, our R&D program continues to make significant contributions in aircraft safety, security, and air traffic management. Through your guidance, we have delivered products to the field while developing a base of future technologies with collaboration with national research laboratories, and academia.

Mr. Chairman, this concludes my formal remarks and I would be pleased to answer any questions you might have.