

STATEMENT OF JOHN KERN, DIRECTOR OF FLIGHT STANDARDS, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION, SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT, CONCERNING THE TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM. SEPTEMBER 25, 1986.

Mr. Chairman and Members of the Subcommittee:

I am John Kern, FAA's Director of Flight Standards. I am pleased to have the opportunity to appear before the Subcommittee today to discuss the efforts we have made to develop a Traffic Alert and Collision Avoidance System (TCAS).

FAA and industry have worked for many years to develop a workable collision avoidance system. It has long been recognized that a practical collision avoidance system, which works independently of and as a back-up to the air traffic control system, would provide an added margin of safety to airspace users. Achieving that objective, however, has not proven easy. In fact, it has been one of the most complex R&D efforts with which we and the aviation community have dealt.

Our current TCAS program is the outgrowth of intensive efforts and assessments of several types of potential systems. For example, in the late 1960's and early 1970's, work concentrated on investigating the merits of three potential Airborne Collision Avoidance Systems (ACAS). Under this program, an aircraft

equipped with an ACAS would have been protected only from another aircraft carrying an ACAS. Therefore, the protection afforded by ACAS was limited until significant numbers of aircraft were equipped with ACAS. An alternative approach sponsored by the FAA in 1974 considered the feasibility of a Beacon Collision Avoidance System (BCAS), which would offer significantly greater protection to airspace users since it offers protection from all aircraft equipped with Mode C radar transponders. Since the vast majority of the aircraft in the U.S. are equipped with transponders, protection afforded to BCAS-equipped aircraft would be substantial from day one.

We established the feasibility of the BCAS concept in 1976, and, following an extensive consultation process with users who stated a clear preference for BCAS over ACAS, the FAA concentrated its efforts on the development of BCAS. Early efforts concerning BCAS were devoted to improving the threat evaluation and maneuver selection logic and in improving hardware/software techniques concerned with surveillance, threat detection, and threat tracking. Further improvements and refinements led to the current program for an improved aircraft collision avoidance concept which is known as TCAS. TCAS built on the BCAS efforts by adding upgraded air-to-air communications techniques and providing a full range of equipment alternatives to make available some degree of collision protection for the full spectrum of airspace users. Moreover, TCAS equipment operates independent of ground equipment.

There are three versions of TCAS: TCAS I, TCAS II, and TCAS III. TCAS I is a system which generates traffic advisories only. TCAS II will generate traffic advisories and resolution advisories. Resolution advisories tell a pilot what maneuver to undertake to avoid another aircraft. In the case of TCAS II, only up or down maneuvers are provided by the equipment. TCAS III will generate both traffic advisories and resolution advisories, advising the pilot to turn left or right or up or down.

TCAS II is now in the implementation phase of development. Engineering development has been completed, and Minimum Operational Performance Standards (MOPS) have been approved by the Radio Technical Commission for Aeronautics (RTCA) for TCAS II. The principal focus of our TCAS II efforts is now on operational evaluation in airline aircraft. Two projects are underway for this purpose. A prototype TCAS II unit has been certificated by the FAA for operational evaluation in a Piedmont B-727 aircraft. This first operational use of TCAS by a scheduled airline is currently expected by the end of this year. The other operational evaluation effort is the Limited Installation Program (LIP), which is proceeding concurrently with the Piedmont effort. Under this program, 14 TCAS II commercial quality units will be manufactured; seven by Allied Bendix teamed with United Airlines; and seven by Sperry/Dalmo Victor teamed with Republic and Piedmont Airlines.

The first TCAS II unit is scheduled for delivery to United Airlines in February 1987; the issuance of a Supplemental Type Certificate is projected for April 1987; and flight evaluation is projected to begin in May 1987.

With respect to TCAS III, considerable progress has been made. We have made a number of flight tests of the experimental system in the vicinity of the Technical Center, and conducted a series of test flights in the Los Angeles Basin area to determine operational characteristics in the highest air traffic density. These tests led to improvements in the threat evaluation and maneuver selection logic, which will be tested in an additional series of flight tests. We expect a MOPS to be completed in September 1987. Insofar as TCAS I is concerned, an RTCA working group has met this month to incorporate the final technical changes and editorial corrections to the MOPS for TCAS I. Final approval of the MOPS is anticipated this December.

As indicated, TCAS II is the system furthest along in development, and is designed for scheduled airline usage. Given the stage of development of this program and its expected safety benefit in reducing the threat of midair collisions, Administrator Engen announced last week his intent to issue a Notice of Proposed Rulemaking (NPRM) which will propose requiring the carriage of TCAS II units by airlines.

The specifics of the NPRM have not finally been decided within the agency, and work remains to be done to more fully definitize the benefits and costs associated with promulgating such requirements. Nevertheless, we believe there is adequate safety justification to initiate such a proposal and have begun our efforts in that regard. We expect to issue the NPRM next year, and to begin the process of receiving public comment on how best to shape our regulatory requirements in this area. As I noted, it is premature to set out any more precisely the specifics of what we will propose, but given the nature of the issue we expect that a rulemaking project in this area will be fairly protracted in nature.

We are confident of the benefits of our TCAS program, and are optimistic about the additional safety that can be achieved within our National Airspace System through the introduction and use of such equipment. This program will help supplement our efforts generally to improve the protection afforded airspace users, and, in our view, will offer a positive contribution to improving the safety of our Nation's airways.

That completes my prepared statement, Mr. Chairman. My associates and I would be pleased to respond to questions you may have at this time.