

to create the yardstick to evaluate the margin of safety of TCAS alternatives. UPS further contends that, because PL 100–223 calls for the FAA to implement horizontal guidance and PL 106–181 requires conflict resolution guidance, Congress likely required the deployment of an ADS–B-based collision avoidance system. UPS states that TCAS has neither of these capabilities.

Finally, UPS makes suggestions to amend the proposed regulatory text. It recommends that we eliminate the requirement that an equivalent system be capable of coordinating with TCAS units. It suggests instead that an equivalent system reduce the risk of collision to a level equivalent to the reduction provided by a TCAS II that meets TSO C–119a. It also recommends that we add the requirement that any collision avoidance system used must comply with PL 100–223 and provide horizontal resolution.

One commenter believes the rule will not improve safety in the national airspace system (NAS), because its restrictive nature could prevent new and improved systems from being developed. More specifically, he contends that the rule will stifle the development of ADS–B's pertinent application, Airborne Conflict Management (ACM), which he says will improve safety and increase capacity in the NAS.

The commenter adds that TCAS does not resolve all potential collision encounters, but that ADS–B contains more information content, resulting in more effective collision avoidance maneuvers in both the horizontal and vertical planes. He believes that ADS–B can be used to develop a more effective collision avoidance system and traffic management system than TCAS. The commenter argues that TCAS is not totally independent from the ground-based secondary surveillance radar system because it shares the transponder and altimeter in the aircraft. According to the commenter, the altimeter is a common point of failure that can result in false TCAS resolution advisories.

The commenter disagrees with our proposal to require maneuver coordination for any equivalent system used in lieu of TCAS. He states that the ACM sub-group of RTCA–186 has been working on a system that could overcome some of the limitations of TCAS and has determined that coordination is not necessary. He concludes his comment with recommendations to change the regulatory text. He suggests that we eliminate the provisions that an equivalent system be capable of

coordinating with TCAS units. In place of it, the commenter suggests adding that equivalent systems reduce the risk of collision to a level equivalent to the reduction provided by TCAS.

Another commenter also supports the potential of ADS–B as an equivalent system to TCAS. He believes that TCAS was the correct system for collision avoidance before the development of global positioning systems (GPS). However, according to the commenter, the FAA made two mistakes implementing TCAS requirements: (1) Not recognizing the contribution GPS would eventually make to traffic conflict and collision prevention, and (2) using Air Traffic Control Radar Beacon System (ATCRBS) Mode S as the vehicle for TCAS. He believes that these two mistakes caused collision avoidance to cost 10–100 times what it should and that it still experiences false alarms. According to the commenter, pilots ignore half of all TCAS resolution alerts (RAs) because they feel that although TCAS has prevented some collisions, it will eventually cause one.

The commenter argues that the Capstone project in Alaska shows that ADS–B is a mature system, capable of providing collision avoidance functions. (The Capstone project is an FAA-funded evaluation, in which ADS–B is installed on certain airplanes under controlled conditions. The Capstone project is further explained in the FAA's response to this comment below.) He states that the accuracy and integrity of ADS–B nearly eliminates the need for collision avoidance. He adds that the susceptibility of ADS–B to the loss of GPS will be eliminated when the FAA and other agencies adopt the existing Loran-C as the back-up navigation source.

The commenter makes suggestions to amend the proposed regulatory text. He recommends, identical to UPS, that we eliminate the requirement that an equivalent system be capable of coordinating with TCAS units. He suggests instead that an equivalent system reduce the risk of collision to a level equivalent to the reduction provided by a TCAS II that meets TSO C–119a. He also adds that the proposed rule document has too many errors to list and that RTCA would address those issues.

FAA's Response to ADS–B Comments

The FAA supports the development of ADS–B. The intent of the rule is to provide the opportunity for future equipment to be certified to either meet or exceed the collision avoidance function of the current TCAS system. The burden to show equivalence is on

the applicant. The developers of ADS–B have not requested that FAA approve ADS–B as equivalent to TCAS. Some commenters referred to systems being studied by RTCA; however, the FAA did not receive comments from RTCA.

While the FAA has set out the elements it considers to be part of a TCAS equivalent such as interoperability, it is not appropriate in this rule to set specific technical standards for individual equipment. It is not the intent of the FAA to approve or disapprove equipment as equivalent to TCAS through this regulation. If, in the future, a collision avoidance system is presented to the FAA for certification and approval, we will examine the applicant's data to determine if the system is equivalent.

The FAA agrees with Eurocontrol that it would be beneficial for there to be agreement between Authorities as to what would constitute equivalence, and that ICAO would be the appropriate forum. An international agreement on equivalence could open the door for new technologies. The FAA, however, must have its own standard for findings of equivalency. It is our intent to then make every effort to harmonize these standards.

It is our position that an equivalent system to TCAS II must be interoperable with TCAS II, provide protection against the same population addressed by TCAS II, and coordinate with currently approved devices meeting the requirements of §§ 121.356, 125.224, and 129.18. This is what we interpret Congress to mean when it defined in 49 U.S.C. 44716(g)(3) collision avoidance equipment as "equipment that provides protection from mid-air collisions using technology that provides a margin of safety of at least that same level as provided by the collision avoidance system known as TCAS II." While Congress did not specifically use the term "interoperability," the FAA has determined that without interoperability, another alternative collision avoidance system would not be equivalent to TCAS.

Although commenters suggest that an alternative system to TCAS need only provide an equivalent reduction in collision risk, we are responding to a Congressional direction that requires more than just a reduction in collision risk. Congress mandated "collision avoidance equipment that provides protection from mid-air collisions using technology that provides cockpit-based collision detection and conflict resolution guidance, including display of traffic; * * *" Congress has defined collision avoidance equipment as technology equivalent to TCAS. At this