

more in any one year (adjusted for inflation.)

In conducting these analyses, the FAA has determined:

(1) This rule has benefits that justify its costs. This rulemaking does not impose costs sufficient to be considered "significant" under the economic standards for significance under Executive Order 12866 or under DOT's Regulatory Policies and Procedures. Due to public interest, however, it is considered significant under the Executive Order and DOT policy.

(2) This rule will have a significant impact on a substantial number of small entities.

(3) This rule is in accord with the Trade Agreement Act.

(4) This rule does not impose an unfunded mandate on state, local, or tribal governments, or on the private sector.

The FAA placed these analyses in the docket and summarizes them below.

Benefits of the Final Rule

Introduction

The implementation of this rule contributes to a long-standing effort by the Congress, the FAA, international aviation authorities, and industry to increase the use of Collision Avoidance Systems (CAS). Specifically, the expected benefit of this rule is a reduction in the risk of midair collisions involving at least one cargo airplane.

There are many levels of safety built into the Air Traffic Control System that guard against the risk of midair collision. However, when human errors by pilots or controllers, or equipment failures occur, safety margins erode. In some instances, separation between aircraft is lost. Many different factors apply in such cases. There are such a variety of circumstances that it appears no single measure can entirely eliminate the risk of midair collision.

Traffic Alert and Collision Avoidance System (TCAS) has been proven effective in providing additional protection against collision. TCAS was designed to supplement the safety margins of the ATC system by providing protection when other means fail. At present, TCAS is required in certain passenger-carrying airplanes and has also been voluntarily installed on some general aviation (primarily business) aircraft. In addition to the United States requirements, Europe, India and, recently China require collision avoidance systems. Within the air cargo industry, Northwest Airlines and Polar Air Cargo have already equipped their cargo airplanes with TCAS II and the all-cargo airlines Airborne Express and

FedEx are voluntarily equipping their fleets with TCAS II. This voluntary compliance reduces the benefits of this final rule from those cited in the NPRM.

Commenters' reports, Near Midair Collision (NMAC) filings, and the National Transportation Safety Board (NTSB) recommendations attest to occasions where safety benefits improved by using TCAS equipment. Often, these reports suggest that TCAS served as the final safety net that prevented an accident. A pilot's and a controller's view of a situation may differ, particularly in the degree of imminent danger associated with a loss of separation.

The potential benefits of TCAS II have been studied by extensive computer simulations and validated by tens of millions of hours of operational experience. These safety benefits have been recognized by the International Civil Aviation Organization (ICAO) in its worldwide recommendation for TCAS II installation, which affects both passenger and cargo carriers.

The worst midair collision occurred between a cargo airplane and a passenger airplane in India with nearly 350 fatalities. At the time of this writing another midair collision occurred with a cargo airplane and a passenger airplane in Europe. This most recent accident is a painful reminder that such accidents do occur.

A Look at the Environment

Although no passenger air carrier airplanes have been involved in a midair collision since they were required to carry TCAS II, other types of airplanes continue to experience midair collisions. During the period 1994–1997, 61 midair collisions in the U.S. airspace have occurred resulting in 92 fatalities and 26 injuries. No collision involving a cargo airplane (which would be affected by this rule) occurred, but the following describes a recent near miss.

Two U. S. cargo airline airplanes nearly collided at flight level 330 over Kansas on March 2, 1999. A McDonnell Douglas cargo DC-10 had departed from Portland, Oregon, and was enroute to Tennessee. The other airplane was a cargo Lockheed L-1011 that had departed from Los Angeles, California, and was proceeding to Indiana. The minimum distance between the two airplanes at the time of the near-collision was reported as a quarter-mile (ATC recorded radar data) or 50–100 feet (crewmember estimate). The DC-10 captain reported that he never saw the L-1011 approaching. The L-1011 crewmembers saw the DC-10 to the left and slightly behind them at nearly the

same altitude and took evasive action to avoid a collision.

The (NTSB)'s investigation of the NMAC determined that air traffic controllers in two different air route traffic control centers failed to properly transfer control and radio communications for each airplane to the next sector that the flights would fly through according to their flight plans. As a result, both airplanes were not on the proper radio frequency (were under no one's control) as their flight paths converged at the same altitude over Kansas. While ATC was aware of the pending conflict, the controllers were unable to issue control instructions to separate the two airplanes, because they could not communicate with the flight crews on the proper radio frequency.

The NMAC also highlighted a difference in the TCAS requirements between passenger and cargo airplanes. Currently, regulations require passenger carrying airplanes with more than 30 passenger seats operating in U. S. airspace to be equipped with TCAS II which alerts flight crews of potential conflicts and, if necessary, instructs them to climb or descend to resolve the conflict. Cargo airplanes receive no TCAS information because they are not currently required to be equipped with TCAS. This could cause a potential safety hazard because a cargo pilot without the advantage of a TCAS RA may inadvertently select the same response as the RA provided to the passenger airplane pilot.

Risk Assessment

The above discussion outlines in general terms the benefits of equipping airplanes with TCAS II. In an effort to place these benefits in a more quantified context, the FAA performed the following risk assessment based on a study performed by MITRE.¹

The scant air cargo airplane data in the United States on midair collisions and NMACs does not allow a definitive analysis of the numbers of accidents likely to be avoided by installing TCAS on cargo airplanes. Fortunately, there has been no actual midair collisions in U.S. airspace involving cargo airplanes affected by this rulemaking action. However, it does not follow from this circumstance that the risk of a midair collision involving a cargo airplane is zero.

The following risk assessment attempts to arrive at a reasonable approximation of the risk of a MAC

¹ The Mitre study, "Assessment of Midair Collision Risk and Safety Benefits of TCAS II for Cargo Aircraft", June, 1999, is available in the public docket for this rulemaking action.