

TCAS Technology and Requirements

The Traffic Alert and Collision Avoidance System (TCAS), also known as the Airborne Collision Avoidance System (ACAS) is an airborne system designed to increase cockpit awareness of nearby aircraft and service as a last defense against mid-air collisions. The system monitors airspace around an aircraft for other transponder equipped aircraft that may present a collision threat. TCAS operates independently of ground-based equipment to provide pilots with guidance on how to avoid a potential collision.

The first generation technology, known as TCAS I is able to monitor the traffic situation around an aircraft and provide details on the bearing and altitude of nearby traffic. It can also generate collision warnings known as a “Traffic Advisory” (TA). When a TA is issued, the pilot is notified of the threat, but must determine the necessary collision avoidance procedure.

The second generation technology, known as TCAS II provides the pilot with specific instructions on how to avoid the conflict with traffic. These instructions are known as a “Resolution Advisory” (RA) and may instruct the pilot to descend, climb, or adjust vertical speed. TCAS II systems are also able to communicate with each other to ensure that the RA provided to each aircraft maximizes separation.

Regulatory Requirements

Aircraft registered in the U.S. and operating under Part 91 of the FARs are not required to be equipped with TCAS. However, if an aircraft is equipped, it must be an approved system operating under the regulations contained in FAR 91.221. For operations conducted under FAR part 135, the aircraft must be equipped with TCAS if it is turbine powered and has 10 to 30 passenger seats (FAR 135.180). Whether the aircraft is operated under part 91 or part 135, if it is equipped with TCAS II, it must be version 7 (TSO C-119).

The European Aviation Safety Agency (EASA) requires ACAS II (effectively TCAS II, version 7.1) for all fixed wing turbine powered aircraft that have a maximum takeoff weight of greater than 5,700 kg (12,566 lbs) or have more than 19 passenger seats. This requirement applies to all flights conducted in European Union airspace.

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