



Interagency Aviation Accident Prevention Bulletin



No. IA APB 21-02

May 19, 2021

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Subject: Terrain Awareness Warning Systems (TAWS), Traffic Alert and Collision Avoidance Systems (TCAS), and Automatic Dependent Surveillance Broadcast (ADS-B) capabilities in wildland firefighting operations.

Area of Concern: Flight Safety

Distribution: All Aviation Activities

Discussion: A few years ago, a helicopter equipped with an Enhanced Ground Proximity Warning System (EGPWS) impacted trees during fire suppression operations ([ANC17LA051](#)). The National Transportation Safety Board (NTSB) discovered that the pilot elected to inhibit the audio warning portion of the system and as a result, did not hear any alerts the system produced during the operation. The reason the pilot inhibited the audio during aerial firefighting operations was to limit (what many consider to be) nuisance alerts while preparing for the drop, tracking other aircraft, and communicating on radios and with the other pilot inside the aircraft. The issue involves when and where the pilot elects to inhibit these aural warnings. Obviously, a terrain awareness system will produce many unwanted warnings when (intentionally) operating at low altitudes in close proximity to the terrain however, it should be operating and providing those alerts when operating outside of that environment.



A system helpful in avoiding mid-air collisions is a Traffic Alert and Collision Avoidance System (TCAS). The TCAS, also known as the Airborne Collision Avoidance System (ACAS), is an airborne system designed to increase cockpit awareness of nearby aircraft and serve as a last defense against mid-air collisions. The system monitors airspace around an aircraft for other transponder equipped aircraft of their relative location and altitude thus enhancing their ability to avoid a potential collision. TCAS operates independently of ground-based equipment. Currently, most aircraft used for aerial supervision are equipped with a TCAS. There are some limitations in that it will only indicate other aircraft that possess a transponder and receiving that signal.



That said, it's possible for other aircraft to be in the area and not show up on the TCAS. This is why TCAS is supplemental to actively scanning to "see and avoid."

The next generation of traffic avoidance is ADS-B In/Out. Automatic Dependent Surveillance–Broadcast (ADS-B) is a satellite-based surveillance system by which an aircraft's position can be determined and periodically broadcast via satellite navigation, enabling it to be tracked. The information can be received by air traffic control (ATC) ground stations as a replacement for secondary radar. ADS-B will eventually replace the current transponder system that communicates identification and position information to ATC.

ADS-B has two levels of service known as ADS-B (OUT) and ADS-B (IN). ADS-B (OUT) is position reporting only, and ADS-B (IN) is a more complete service that receives data transmissions to the cockpit from ATC and other aircraft. Both levels of service use GPS

technology to determine an aircraft's location, airspeed and other data, and broadcast that information to a network of ground stations. The data is then relayed to ATC displays and to nearby aircraft equipped to receive it via ADS-B. Operators of aircraft equipped with ADS-B (IN) can receive weather and traffic position information delivered directly to the cockpit. But again, always remember that see and avoid comes down to your eyes on the actual aircraft and not the digital display!

These technologies can be used to significantly improve an aircrew's situational awareness, but can also pose a threat if they become a "nuisance" in task intensive environments. Operators using aircraft equipped with a terrain or collision avoidance warning system should have standardized policies and procedures that address when pilots should inhibit alerts to better manage distractions and balance competing demands. Distracting alerts while operating in the low-level environment needs to be balanced with other operations where the system would enhance the crew's ability, especially while operating in reduced visibility (i.e. smoke) and rising terrain.

Technology is a great tool to assist us with our **visual** responsibilities to "see and avoid" terrain and other traffic.

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