

Aircraft Cargo Compartment Fire Detector Certification.

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Abstract

Most of the cargo compartments on passenger carrying aircraft are required to have fire detection systems that provide a visible and aural alarm in the cockpit. Current regulations require that the detectors alarm within one minute of the start of a fire and at a fire size that produces temperatures significantly below those that will substantially decrease the structural integrity of the airplane. Flight tests are required to demonstrate compliance with these regulations. The fire detectors in use today are predominately photoelectric or ionization smoke detectors. While these detectors are effective at detecting actual fires they are also prone to alarm from airborne particles not associated with fires. The use of multiple sensors and appropriate alarm algorithms have the potential to better discriminate between actual fires and nuisance alarm sources.

The purpose of the project is to define the fires that should be detected and the production of smoke, heat and gases from these fires. The tests will be conducted in various sized cargo compartments to measure the accumulation of smoke, heat and gas species over time. The results of the testing will be used to determine effective alarm algorithms for multi sensor detectors and to specify the generation rates of the products of combustion from the fires for certification tests. Certification guidelines for using these types of fire detectors on aircraft do not currently exist.

The FAA Technical Center testing is part of a multiple agency effort on this subject involving NASA Glenn Research Center, Sandia National Laboratories, NIST and FAA.