OBIGGS Utilization
In Inaccessible Areas

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Background

- The FAA recently has released an NPRM requiring the reduction of flammability within heated fuel tanks (affecting over 3,200 in service aircraft)

- The most likely method of conformance is the utilization of an On Board Inert Gas Generating System (OBIGGS)
Background

- CAA Paper 2002/01 (FAA Reference DOT/FAA/AR-02/50) determined that 90% of non-survivable hidden area fires could be prevented if extinguished within 8 minutes.

![Graph showing cumulative probability distribution of time to become non-survivable.](image)

- 90% of hidden fires could be accommodated if the hidden area was inerted within 8 minutes.
Background

- With inerting systems now/soon to be on board, an integrated fire protection system to provide protection for these hidden areas may be feasible.

- Such a system would provide enhanced fire protection while utilizing a system already installed, thus saving on cost, weight and space on board the aircraft.
OBJECTIVES

• Design and install an NEA distribution system for fire protection of the overhead area of the FAAs 747SP and 737 test articles
• Examine the effect of various conditions on the ability of the OBIGGS to successfully protect the overhead area:
  • Bleed air pressure
  • OBIGGS feed pressure
  • OBIGGS back pressure
  • Permeate pressure (altitude)
  • Ventilation
  • Etc.
• Future work may include expanding the OBIGGS system to other hidden areas aboard the aircraft (E/E bays, wheel wells, etc.)
TEST ARTICLES

• 747SP equipped with OBIGGS installed in the empty pack bay utilizing up to 6 ASMs
• 737 aircraft in process of being equipped with a single ASM OBIGGS

• Instrumentation allowing for monitoring of oxygen at 12 locations in overhead area of each aircraft
• NEA flow and purity also measured as well as various system pressures
TEST CONFIGURATION – 747SP

From OBIGGS

From OBIGGS

Vacuum Source

Current Test Section (STA 1241)
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TEST SECTION – 747SP

- Located at approximately STA 1241
- Approximately 20 ft. wide, 5 ft. tall at center
- Cross-sectional area of approximately 42 ft\(^2\)
TEST CONFIGURATION – 737

Current Test Section

From OBIGGS

From OBIGGS'
TEST SECTION – 737

- Approximately 9 ft. wide, 10 in. tall at center
- Cross-sectional area of approximately 3 ft\(^2\)
CURRENT STATUS

• Preliminary testing on 747SP with a single NEA deposit location has confirmed the need for a vacuum source (or other method) to control the spread of NEA

• Vacuum pump has been installed in forward cargo bay of 747SP and is plumbed to test section
  • We are awaiting electric hookup for the pump before we can begin testing

• OBIGGS and test instrumentation build up on 737 is underway