

# International Systems Fire Protection Working Group

## Active Fire Protection in Hidden Areas



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NTSB review of crew actions during in-flight fires has resulted in a series of recommendations calling for improved crew training and modification of cabin interiors to improve access to fires burning behind panels.

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## In-Flight Fires Cited in NTSB Recommendations:

Delta Flight 2030, MD-88, emergency landing at Cincinnati, Sept 17, 1999  
Flight attendant discharged halon extinguisher into return grills to extinguish fire.

AirTran Flight 913, DC-9-32, emergency landing at Greensboro Aug 8, 2000  
Electrical fire in cockpit bulkhead, no attempt made by flight attendants to extinguish fire.

American Flight 1683, MD-80, emergency landing at Dulles Nov 29, 2000  
Lightening strike induced arcing above cabin ceiling. Halon extinguisher discharged into access hole cut with pocketknife, extinguishing fire.

Air Canada Flight 797, DC-9, emergency landing at Cincinnati June 2, 1983  
Fire in aft lavatory behind sidewall, eventually destroyed aircraft, 23 fatalities.

## Fire in Hidden Area Outboard of Cargo Compartment (Cheek)



Delta MD-88, Northern Kentucky, 9/17/99



## Fire in Hidden Area Below Cabin Floor (Cheek)



Delta MD-88, Northern Kentucky, 9/17/99

# Fire in Bulkhead, Spread to Area Above Cabin Ceiling (Overhead)



AirTran DC-9-32, Greensboro, 8/8/00



# Fire in Bulkhead, Spread to Area Above Cabin Ceiling (Overhead)



AirTran DC-9-32, Greensboro, 8/8/00



# Fire in Bulkhead, Spread to Area Above Cabin Ceiling (Overhead)





# Fire in Hidden Area Above Cabin Ceiling (Overhead)



**AAL      N3507A**  
**DC9-82 11/30/00**



# Fire in Hidden Area Above Cabin Ceiling (Overhead)



AAL#6 N3507A  
DC-9-82 11/30/00

## Fire in Lavatory Area Hidden Space



AirCanada DC-9, Cincinnati, 6/2/83



## Fire in Lavatory Area Hidden Space



AirCanada DC-9, Cincinnati, 6/2/83

# Fire in Cheek Area, Spread to Area Above Cargo Compartment



AirTran DC-9-32, Atlanta, 11/29/00

# Fire in Cheek Area, Spread to Area Above Cargo Compartment



AirTran DC-9-32, Atlanta, 11/29/00



# Fire in Cheek Area, Spread to Area Above Cargo Compartment



AirTran DC-9-32, Atlanta, 11/29/00

## Fire in Hidden Area Below Cabin Floor (Cheek)



Delta L-1011, Frankfort to Atlanta, 1991



# Fire Under Cargo Compartment Floor





## Fire Under Cargo Compartment Floor



AirCanada 767, Toronto, 2002

## New Recommendations for 2002

(A-01-83) Issue Advisory Circular (AC) that describes the need for crewmembers to take immediate and aggressive action in response to signs of an inflight fire.

(A-01-84) Require principal operations inspectors to ensure that the contents of the advisory circular are incorporated into crewmember training programs.

(A-01-85) Amend Part 121.417 to require participation in firefighting drills that involve actual or simulated fires during crewmember recurrent training and to require that those drills include realistic scenarios on recognizing potential fire situations, locating the origin of the fire, and fighting hidden fires.

(A-01-86) Develop and require implementation of procedures or airplane modifications that will provide the most effective means for crewmembers to gain access to areas behind interior panels for the purpose of applying extinguishing agent to hidden fires. As part of this effort, the FAA should evaluate the feasibility of equipping interior panels of new and existing planes with ports, access panels, or some other means to apply extinguishing agent behind interior panels.



# Coordinated Approach to Hidden Fire Protection

Material Flammability

Accessibility

Detection

Suppression

Fire Fighting Procedures

Training and Equipment for Pilots & F/A's



# Detection and Suppression of Hidden Fires



## Accessibility

Feasibility of ports, access panels for discharging handheld extinguishers

## Detection

Particle Sensing (Photoelectric, Laser, Light Attenuation, Ionization)

Gas Sensing (Semiconductor, Infrared, Electrochemical)

Temperature Sensing (Metallic Resistance, Thermistors, Piezoelectric, Fiberoptic)

Visual

## Suppression

Manual (handheld extinguishers)

Automatic (heat activated, or other control system linked to detection)

*What is the role of ventilation?*

# Interior of FAATC's 747SP

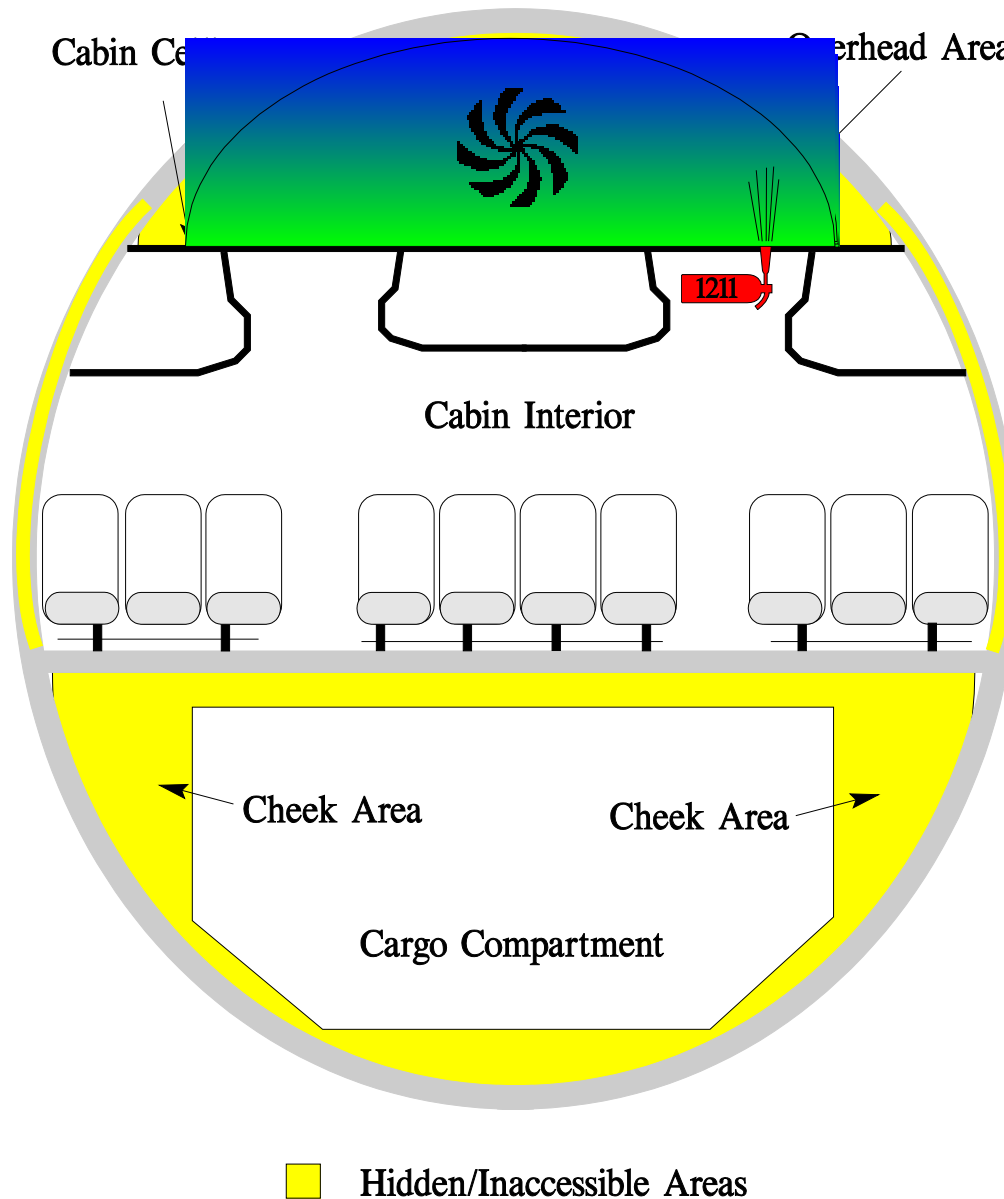




## Overhead Area of 747SP

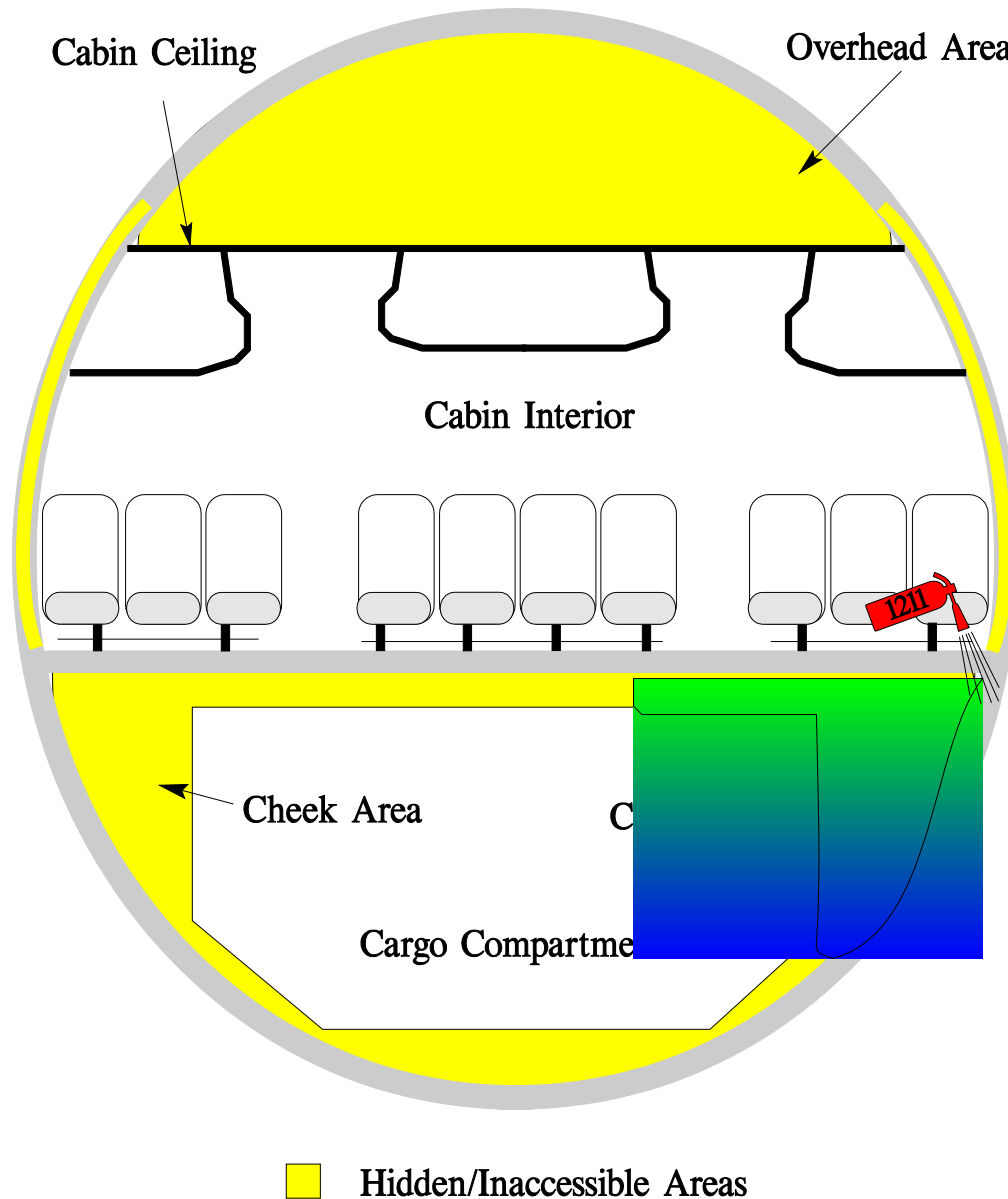


# Effectiveness of Handheld in Widebody Overhead Area





# Effectiveness of Handheld in Widebody Cheek or Sidewall Area



# Future Hidden Fire Test Article





