Integrated Fire Protection Systems – Update

RGW CHERRY AND ASSOCIATES
AERONAUTICAL AND SAFETY ENGINEERS

Presentation to Transport Canada November 2008
– Fire & Cabin Safety Research

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Acknowledgements

We would like to thank

Transport Canada

The U.S. Federal Aviation Administration

The U.K. Civil Aviation Authority

for the collaboration and support given to this project since its conception

Integrated Fire Protection Systems

Overview of Concept

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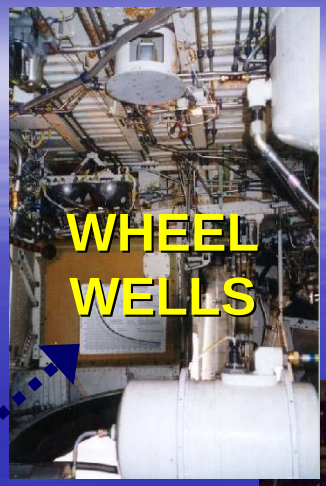
WATER MIST


CARGO
COMPARTMENTS


WHEEL
WELLS


CABIN


OBIGGS
OBOGS


EQUIPMENT
BAYS


FUEL TANKS


HIDDEN
AREAS


PASSENGER
O2 SUPPLY

Integrated Fire Protection Systems

Cargo Compartment Water Mist/Inerting System Concept

ICAO: *"Industry and the scientific community need to redouble their efforts to find suitable replacement agents for halon in civil aircraft. In particular, a halon replacement for cargo compartments is critical."*

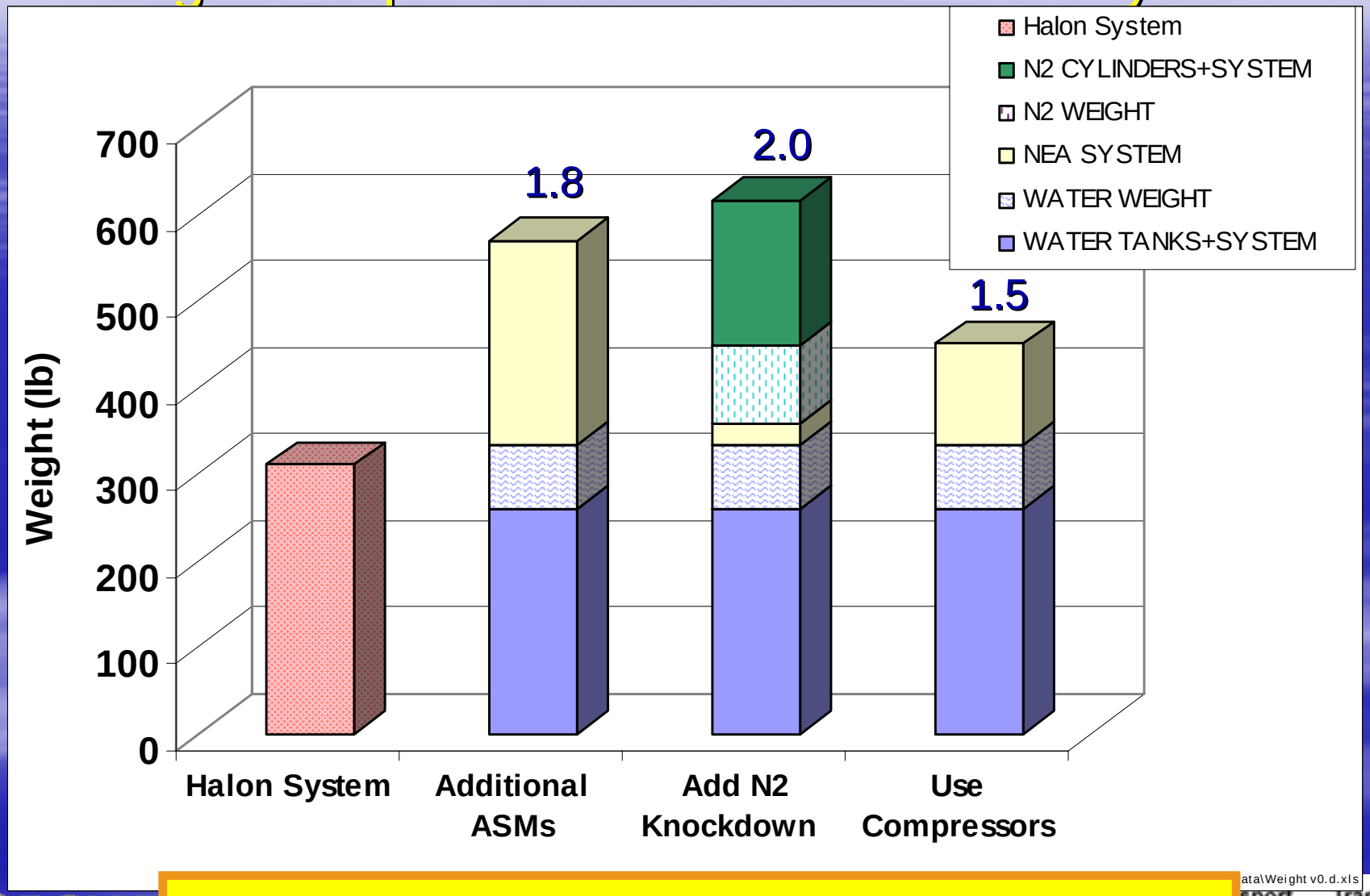
Halon replacement fire suppression system utilising NEA from OBIGGS and a water mist system has been shown to pass the Minimum Performance Standard FAA DOT/FAA/AR-TN05/20

Cargo Compartment Water Mist/Inerting System – Achievements resulting from Transport Canada research

- Cargo Compartment Mathematical Model
- Feasibility Assessment based on comparative weights

INTEGRATED FIRE PROTECTION SYSTEM

Cargo Compartment Water Mist/NEA System



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B767- 300ER aft Cargo Compartment 3152 ft³
6 ASMs installed for Fuel Tank Inerting

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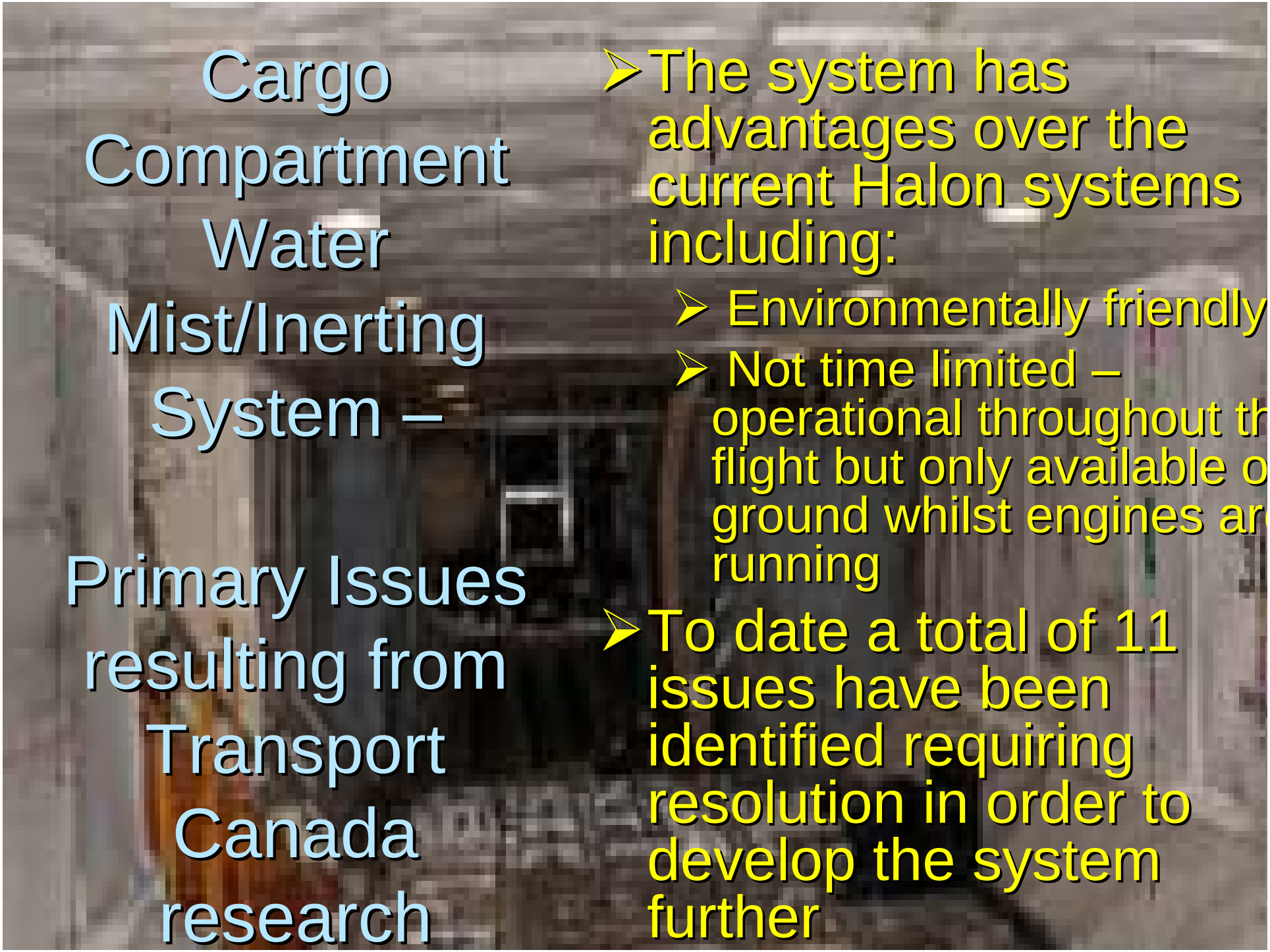
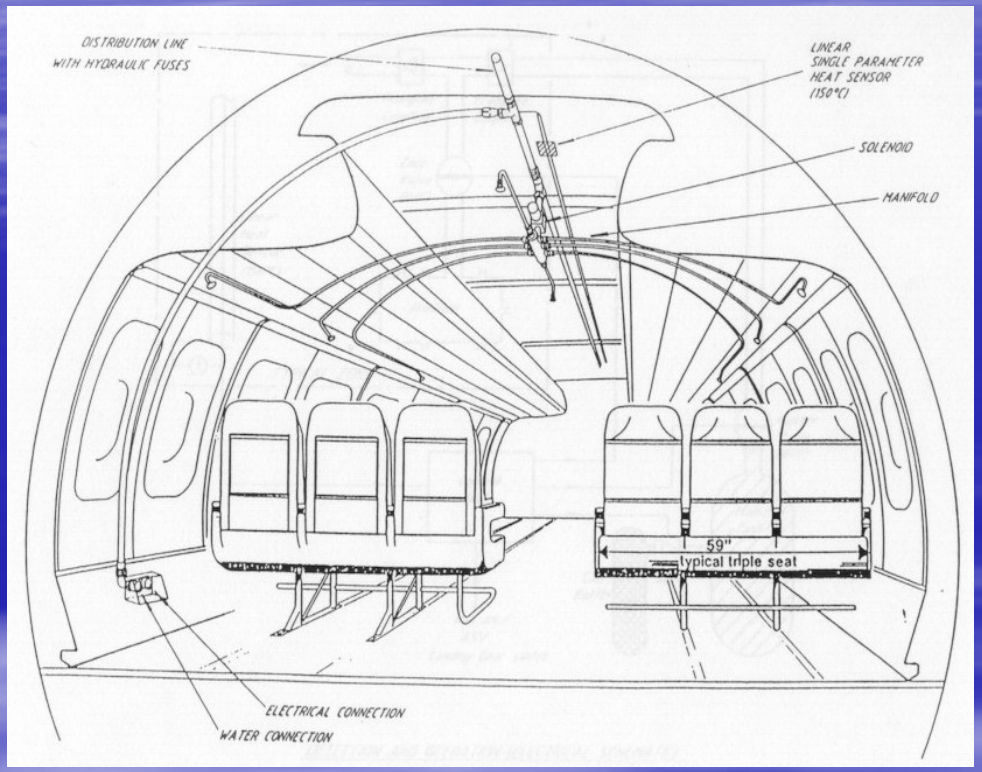
Cargo Compartment Water Mist/Inerting System –
Achievements resulting from Transport Canada research
Cargo Compartment Mathematical Model
Feasibility Assessment based on comparative weights
Compilation of a Standard addressing
Current Relevant Airworthine Requirements
Structural Integrity
Fireworthiness & Crashworthiness
System Reliability Levels
Health & Safety issues
Maintenance


Cargo Compartment Water Mist/Inerting System –
Primary Issues resulting from Transport Canada research
The system has advantages over the current Halon systems including:
Environmentally friendly
Not time limited – operational throughout th flight but only available o ground whilst engines ar running
To date a total of 11 issues have been identified requiring resolution in order to develop the system further

Integrated Fire Protection Systems

Cabin Water Mist System Concept



- Post-crash survivability
- In-flight cabin fire

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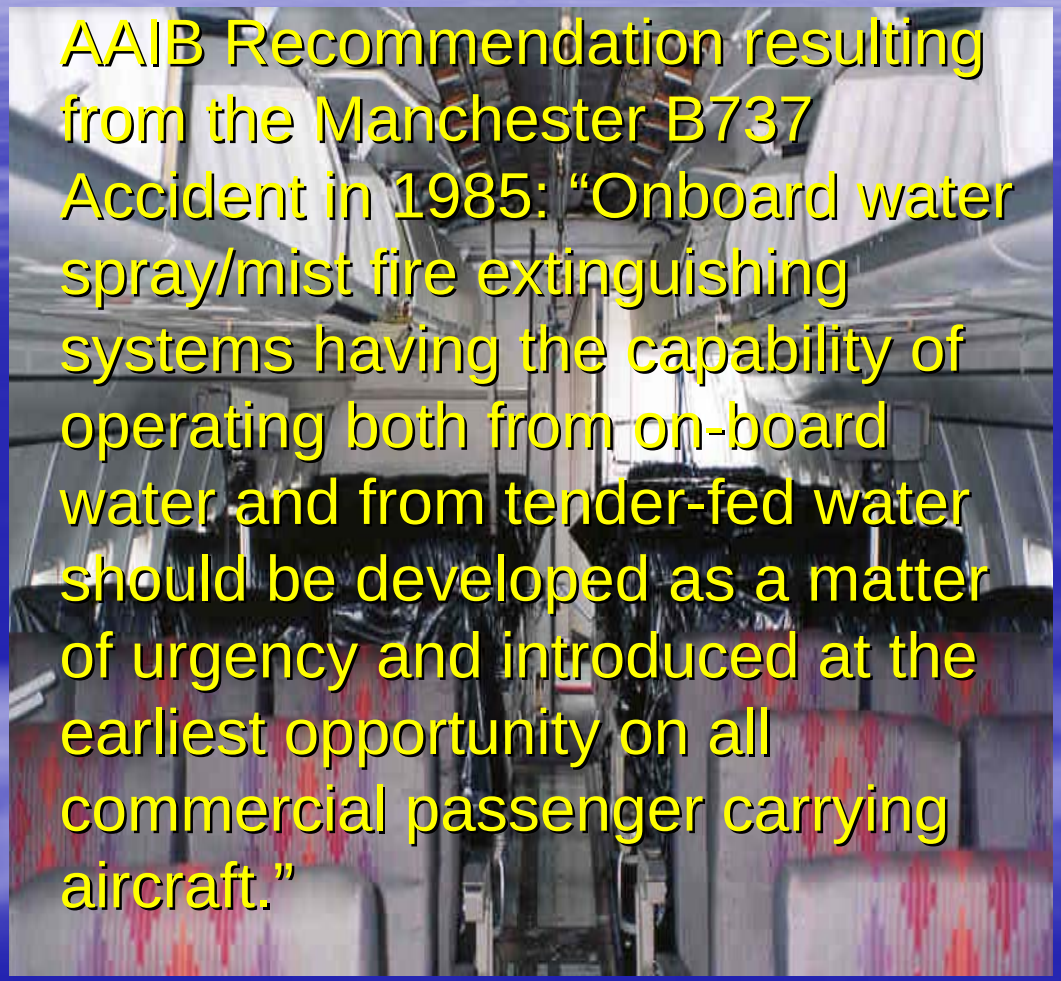
Cabin Water Mist System Concept



AAIB Recommendation resulting from the Manchester B737 Accident in 1985: “Onboard water spray/mist fire extinguishing systems having the capability of operating both from on-board water and from tender-fed water should be developed as a matter of urgency and introduced at the earliest opportunity on all commercial passenger carrying aircraft.”

Cabin Water Mist Systems may be cost beneficial as part of an Integrated Fire protection System. They will complement fuselage burnthrough protection in accidents where there are fuselage breaks

Cabin Water Mist System – Achievements resulting from Transport Canada research

- Compilation of a Standard addressing
  - Fireworthiness & Crashworthiness
  - System Reliability Levels
  - System Architecture
  - Maintenance
  - System Performance & Operation
  - Fire Fighting Issues
  - Effects on Occupants & Evacuation

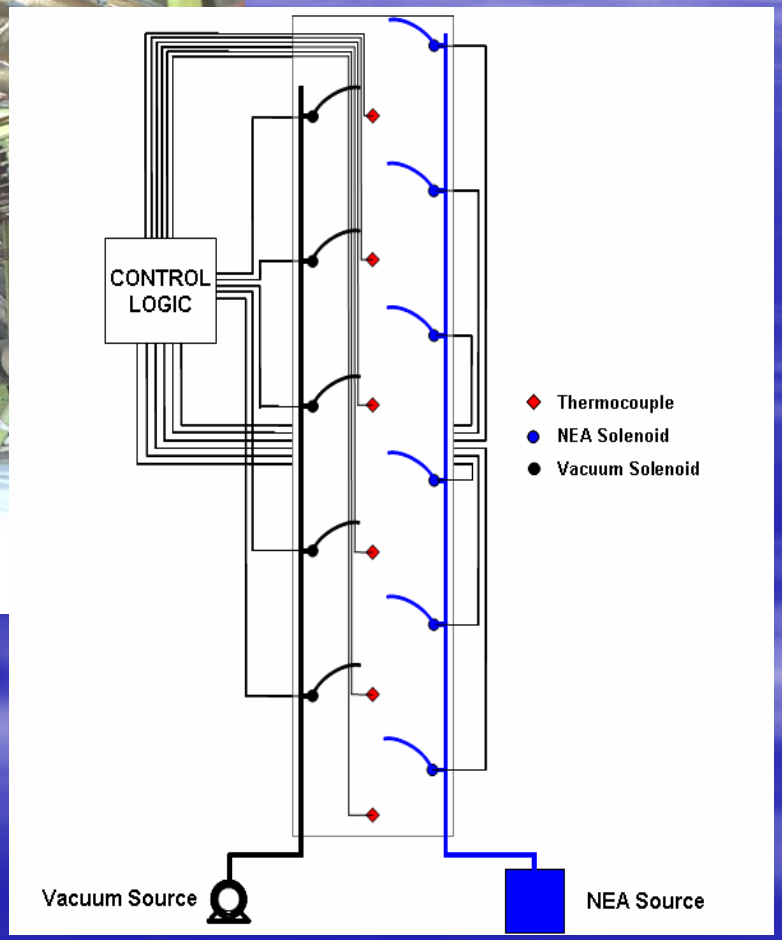
Cabin Water Mist System – Primary Issues resulting from Transport Canada research

- To date a total of 12 issues have been identified requiring resolution in order to develop the system further
- Perhaps the most important of which is the need to develop a Minimum Performance Standard for the system

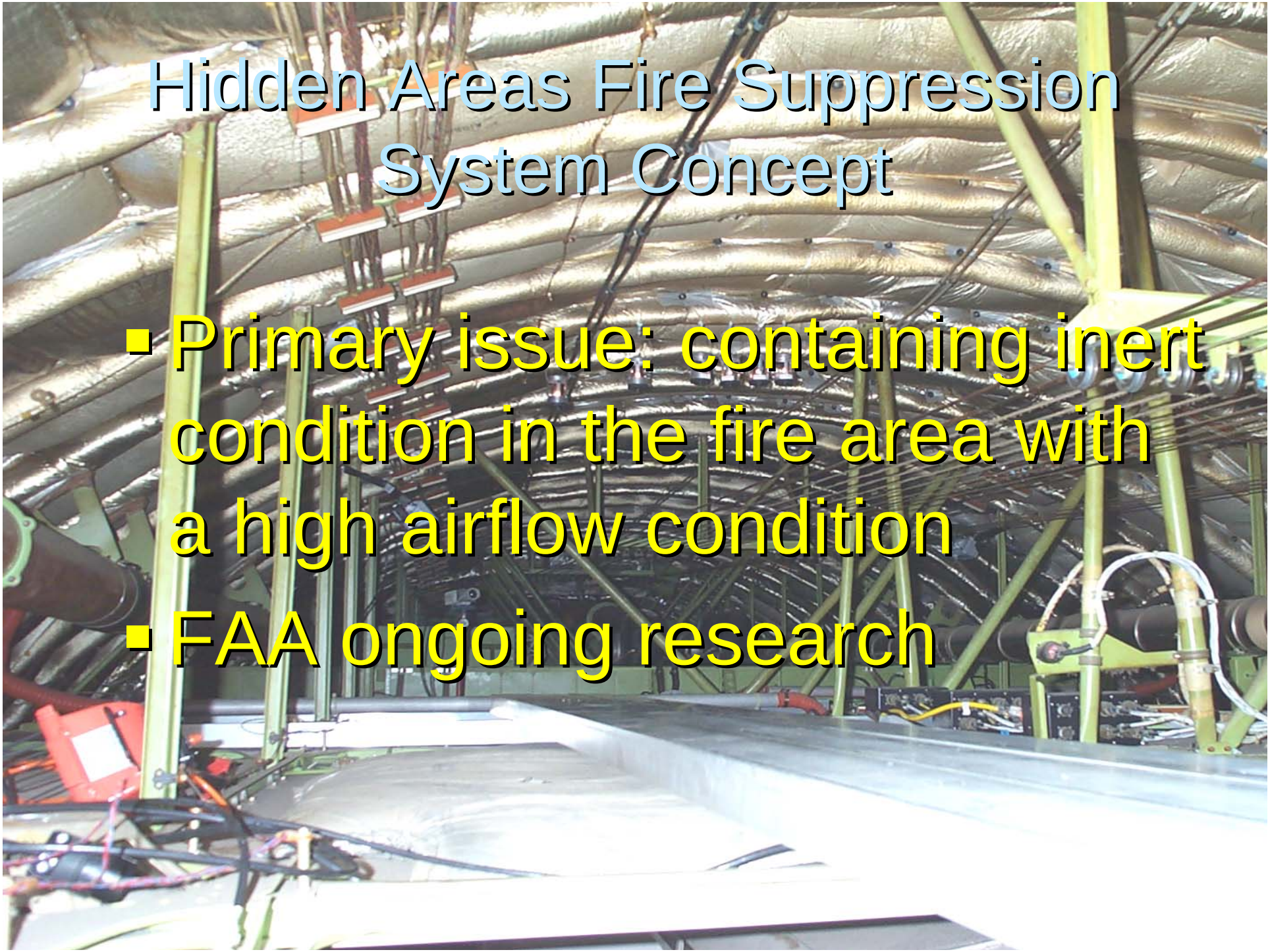
Integrated Fire Protection Systems

Hidden Areas Fire Suppression System Concept

- Distributing NEA from OBIGGS to extinguish fires in hidden areas



Hidden Areas Fire Suppression System Concept

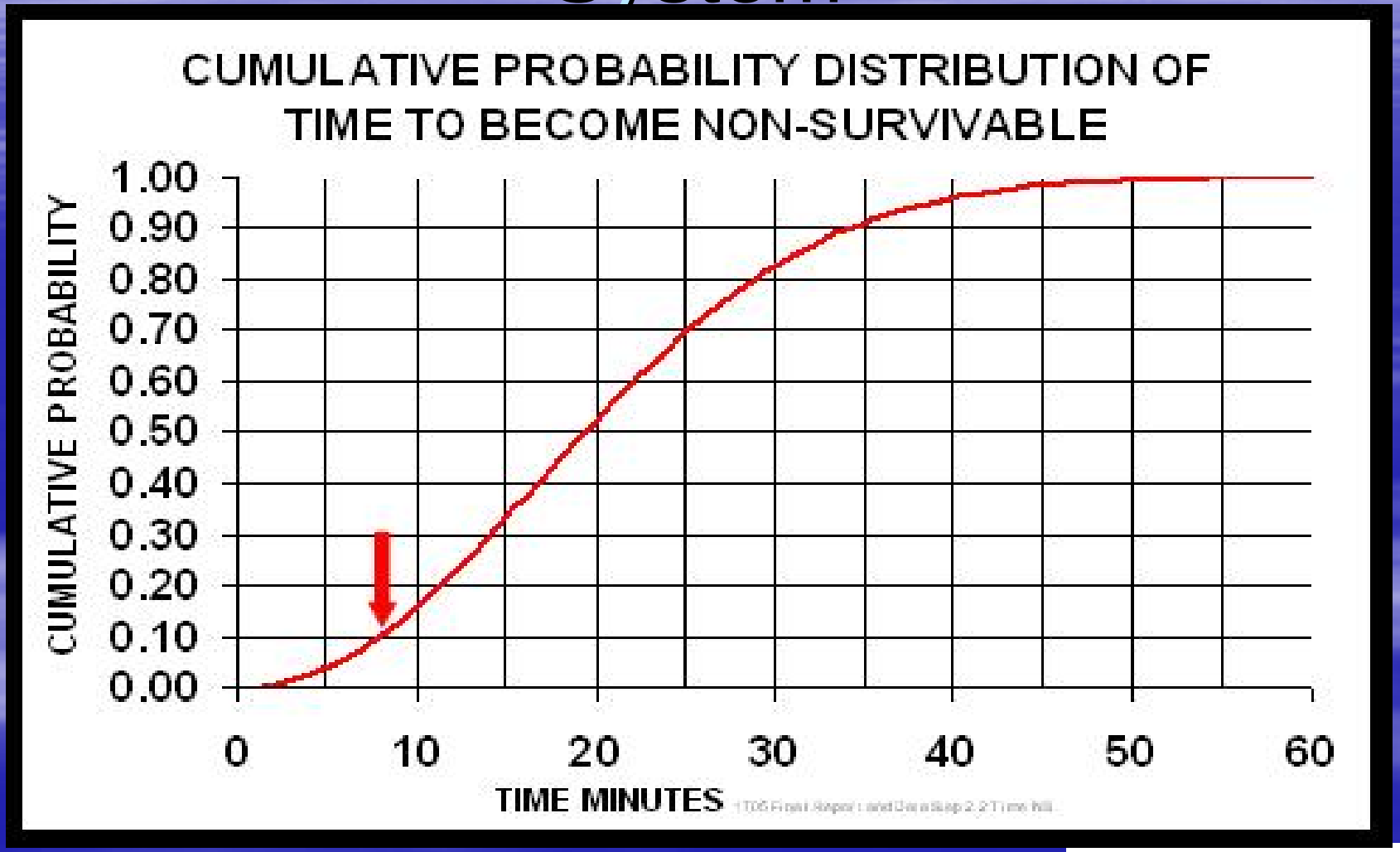


- Primary issue: containing inert condition in the fire area with a high airflow condition
- FAA ongoing research

Hidden Areas Fire Suppression System
Project Achievements

1. Theoretical assessment of system performance
2. System reliability requirements
3. Identification of issues requiring resolution

Hidden Areas Fire Suppression System



Hidden Areas Fire Suppression System Performance

Aircraft Type	Percentage of Hidden Area Free Air Space Volume Inerted within 8 Minutes
B737-800	32%
B757-300	22%
B767-300	14%

EQUIPMENT BAY FIRE SUPPRESION SYSTEM

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IFP TASK GROUP & COMPENDIUM

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Integrated Fire Protection Task Group & Compendium

- An *Integrated Fire Protection System Task Group* has been formed comprising of members from:
  - Transport Canada
  - FAA
  - Boeing
  - Airbus
  - Embraer
  - UK CAA
  - Kidde Aerospace
  - Eaton Aerospace
  - Pacific Scientific
  - Life Mist Technologies
  - Meggitt Aerospace
  - AALPA

Integrated Fire Protection Task Group & Compendium

- A Compendium prepared for Transport Canada summarises :
  - *–Relevant Airworthiness Requirements*
  - *– Proposed Reliability Targets*
  - *– Proposed Standard Requirements*
  - *– Other Issues – MPS, Crashworthiness, Fireworthiness, Health & Safety, etc*

Integrated Fire Protection

- Thank you for your time