Intermediate Scale Hidden Area Wire and Sleeving Tests

Project Scope & Initial Work

Presented to: IAMFTWG Atlantic City NJ
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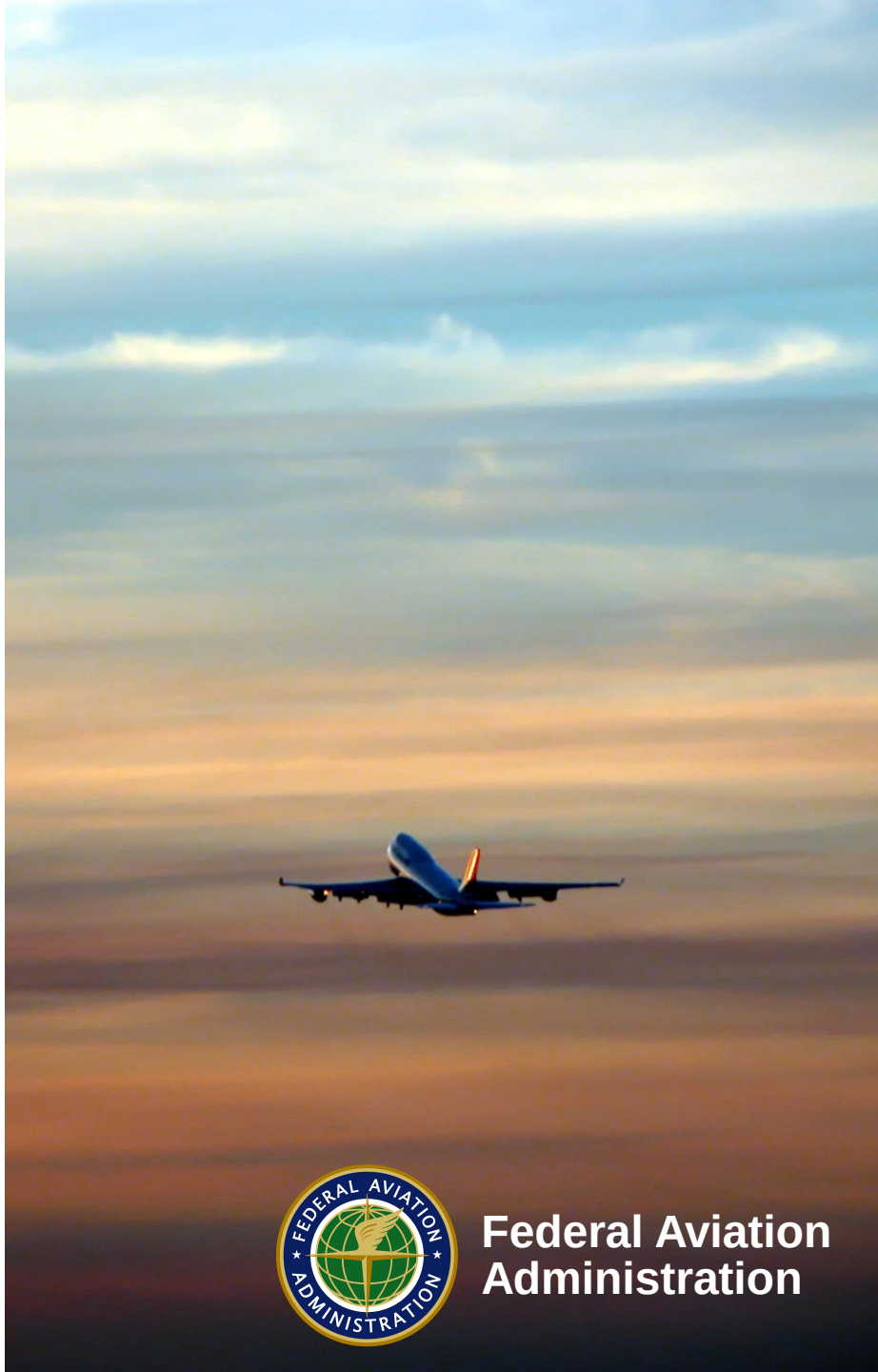
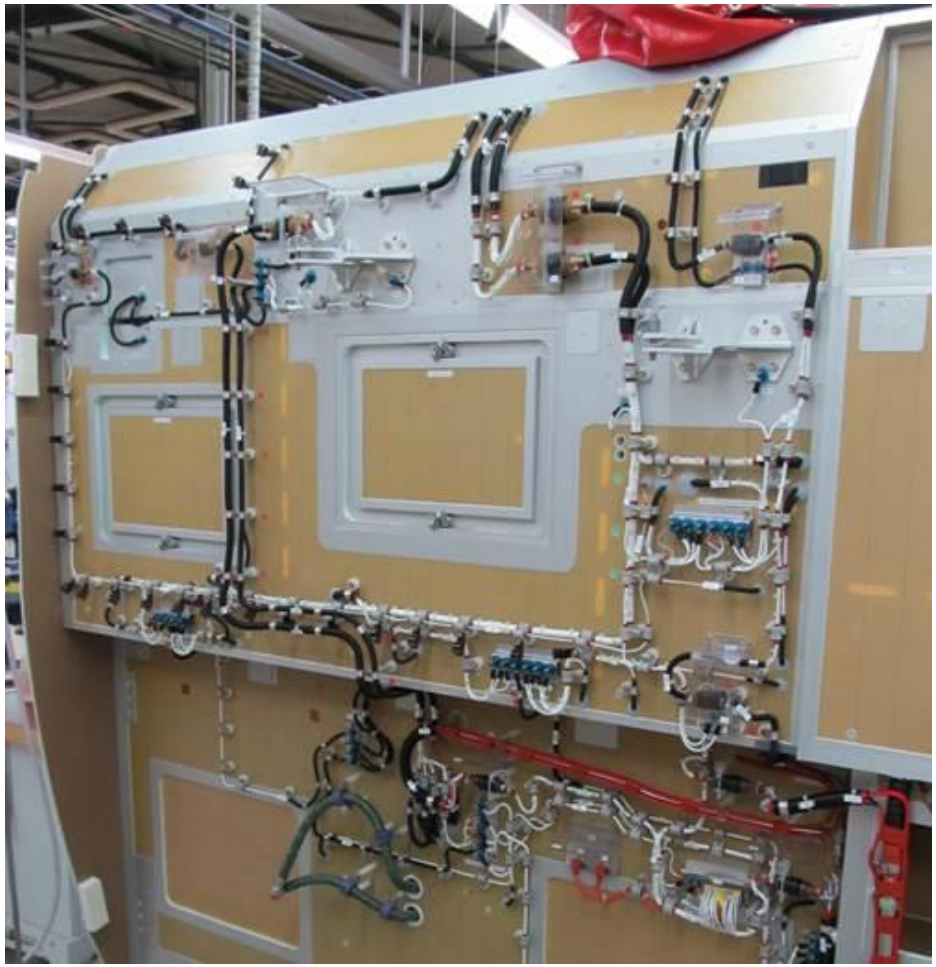


Introduction

- **Large quantity of “small” parts, wire bundles & sleeving located in hidden areas behind galleys, lavs, etc.**
- **Determine potential flame propagation hazards for these components in hidden areas**
- **Determine criteria for exclusion of “small” parts from testing**
- **Determine method for testing wire sleeving in lab scale test (VFP)**



Test Configuration

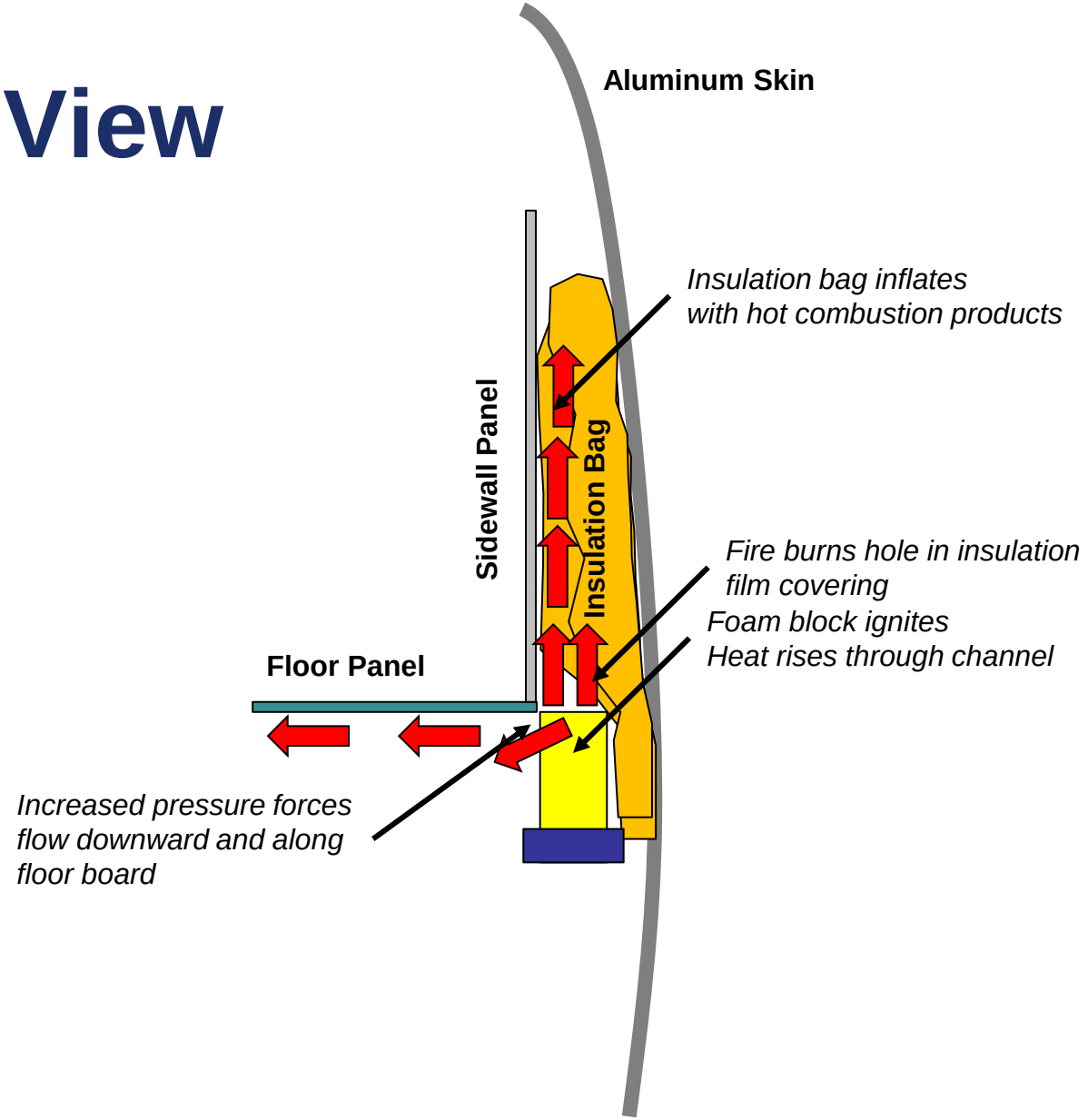
- **Quarter fuselage section**
- **Thermal/acoustic insulation installed to frame**
- **Sidewall crushed core honeycomb panels**
- **Wire bundles 3/8”-1/2” in diameter**
  - M81044/6 20 and 14 gauge wire
    - Passes 60° test, performs poorly in VFP

M81044/6-14 Initial Tests

Original Configuration

Foam Block 6” higher

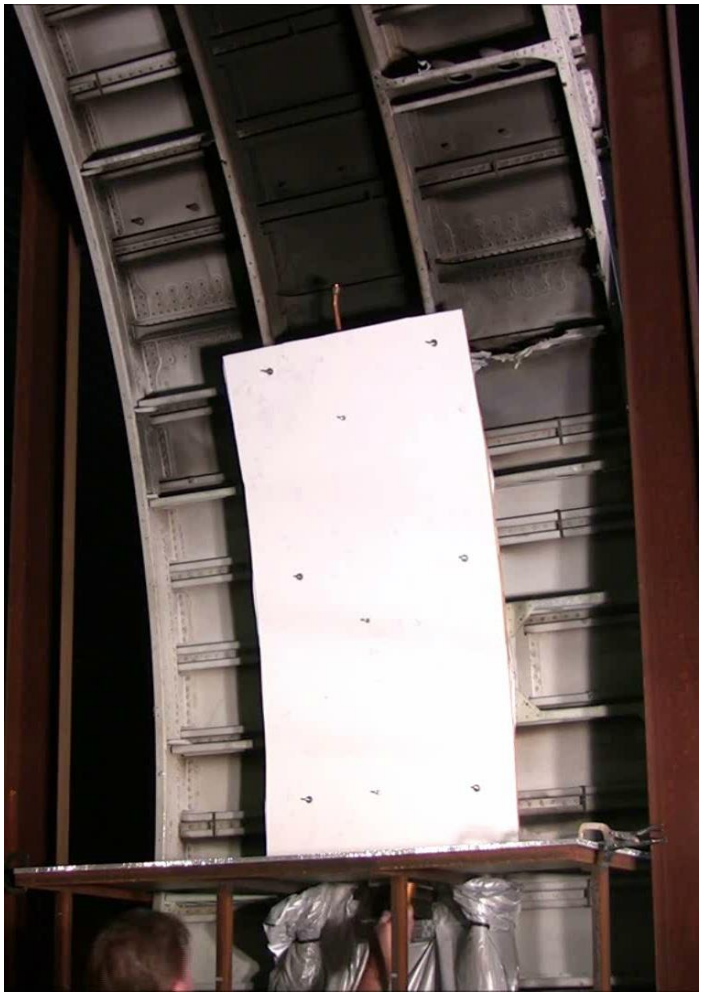
Side View


Aluminum Skin
Insulation bag inflates with hot combustion products
Sidewall Panel
Insulation Bag
Fire burns hole in insulation film covering
Foam block ignites
Heat rises through channel
Floor Panel
Increased pressure forces flow downward and along floor board

M81044/6-14 Non-sealed Insulation Bag

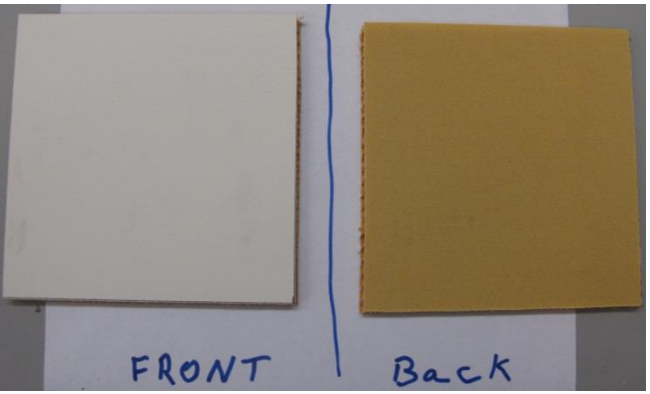
3/8” Copper Tube, non-sealed bag

M81044/6-14 Bundle



3/8” Copper Tube

OSU Data from Sidewall Panels



Front Surface (facing cabin interior)

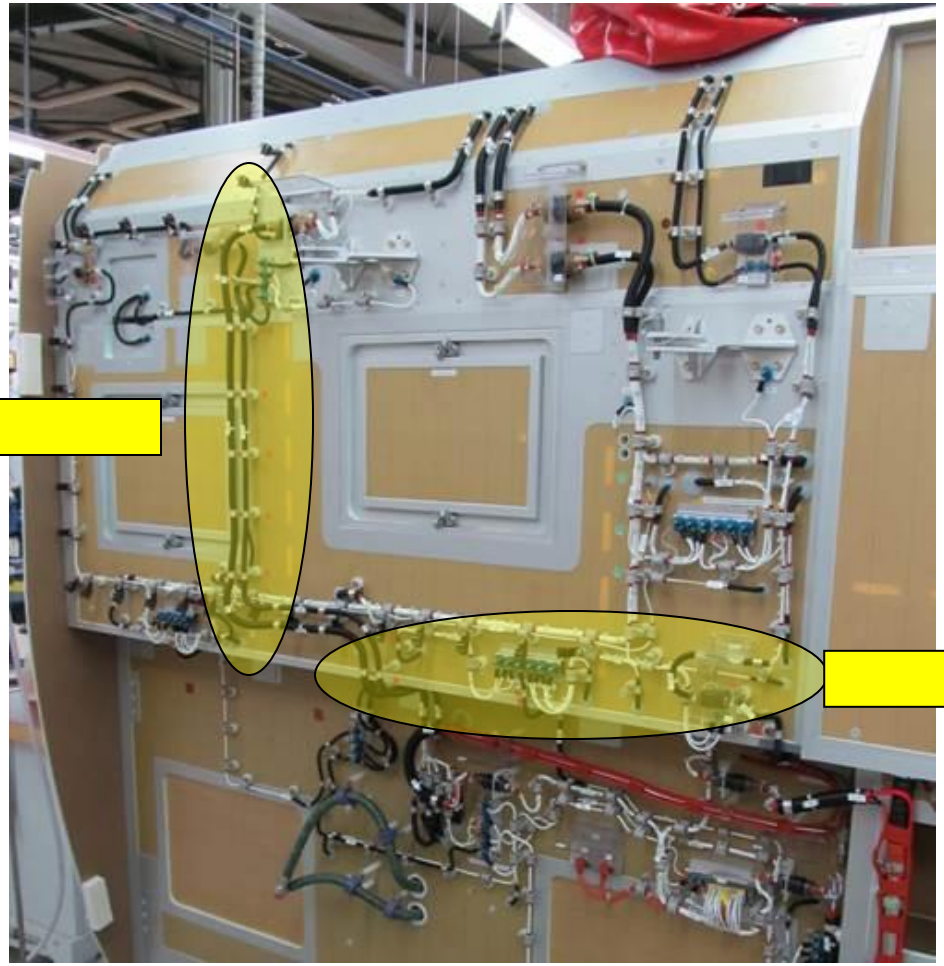
#	Peak HRR (kW/m²)	Time to peak HRR (s)	2-min THR (kW·min/m²)
1	31.9	34	36.2
2	31.0	29	34.7
3	32.7	51	39.4
Avg	**31.9**	**38.0**	**36.8**

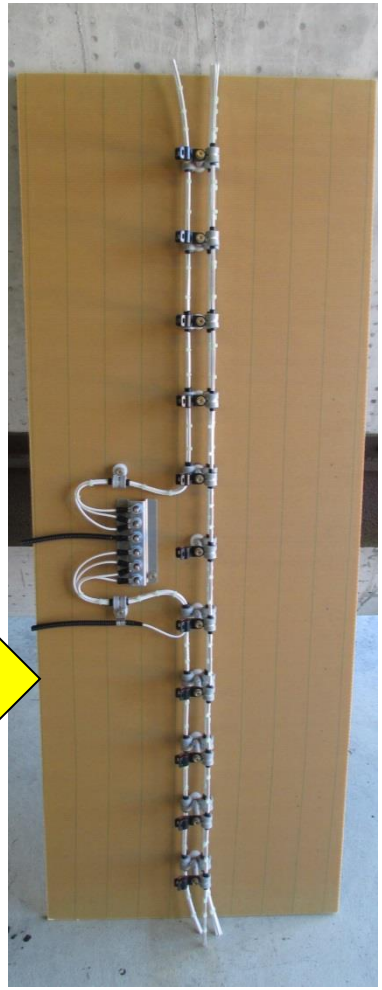
Back Surface (facing hidden area)

#	Peak HRR (kW/m²)	Time to peak HRR (s)	2-min THR (kW·min/m²)
1	18.2	72	23.1
2	18.7	82	24.5
3	19.8	84	23.0
Avg	**18.9**	**79.3**	**23.5**

Next Steps

- **Develop baseline configuration with less severe, less sensitive configuration**
- **Install insulation hangers to keep a more uniform insulation spacing**





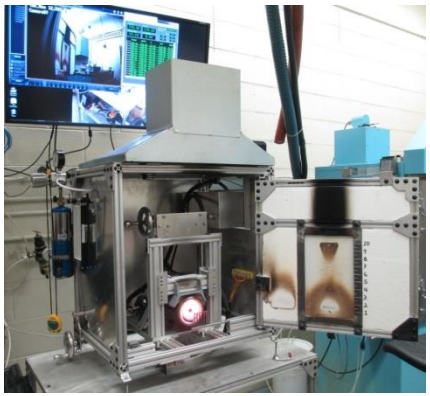
Sample Panels from Airbus

- **Panels donated for testing by Airbus**
- **Will help give a good idea how wires are routed along panels, amount and spacing of "small parts"**
- **Can test these panels in foam block rig or quarter-fuselage rig**
- **Will discuss test plan with Airbus before proceeding**

Summary

- **Test configuration was devised to evaluate flame propagation potential of wires and “small” parts attached to panel backsides in hidden areas**
- **Test outcome highly dependent upon details of test configuration**
- **A baseline configuration is yet to be determined, but it is desired to have a zero-propagation outcome**
- **Testing with Airbus panels will commence once a configuration is agreed upon**





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