

Development of a Lab-Scale Test For Evaluating Toxic Gas Decomposition Products Generated Inside a Fuselage During a Postcrash Fire



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Fuselage Burnthrough Full-Scale Testing - Background

Full-scale test article built at FAATC in mid 1990's for evaluating performance of burnthrough-resistant thermal acoustic insulation materials.

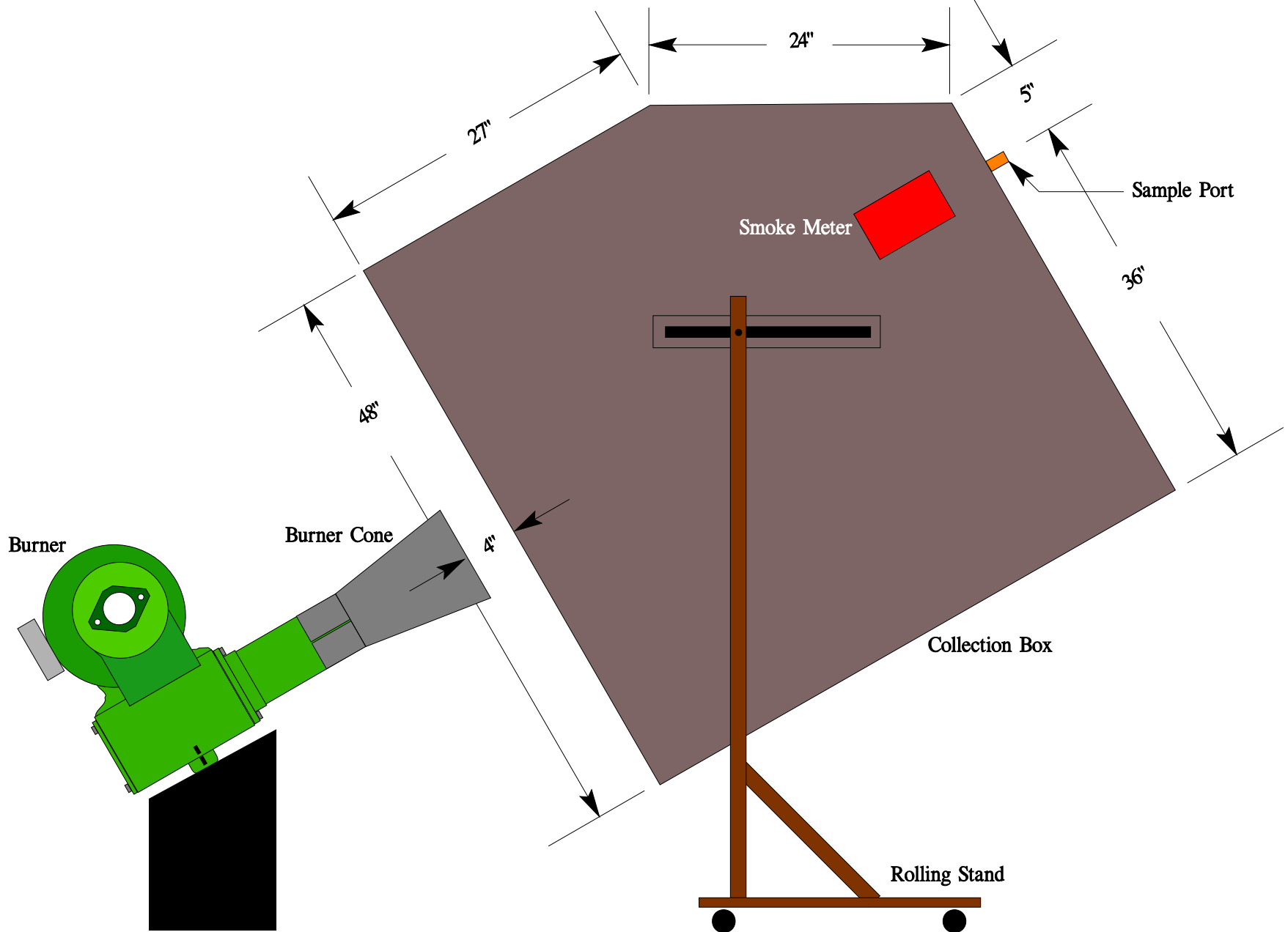
Testing indicated burnthrough-resistant insulation provided a much more survivable cabin atmosphere when compared to current insulation materials.

FAA issued NPRM, 2003 Final Rule issued, 2009 compliance

Although burnthrough resistant materials provide a benefit, the ingress of toxic gases resulting from decomposition of the insulation needs to be quantified.

2006 FAATC began development of a lab-scale test for evaluating toxic gas decomposition products that could be generated inside fuselage during postcrash fire.

Apparatus for Evaluating Toxic Gas Decomposition Products



Apparatus for Evaluating Toxic Gas Decomposition Products

Burner configuration according to 25.856(b) Appendix F, Part VII.

Steel cube box simulates intact fuselage and serves as enclosure to collect emitted gases.

Fourier Transform Infrared (FTIR)/Total Hydrocarbon Gas analysis system used to collect and measure toxic and flammable gases yielded during tests.

Additional analyzers measured the concentration of total hydrocarbons (THC) as propane, carbon monoxide, carbon dioxide, and oxygen

**Development of a Laboratory-Scale
Test for Evaluating the Decomposition
Products Generated Inside an Intact
Fuselage During a Simulated Postcrash
Fuel Fire**

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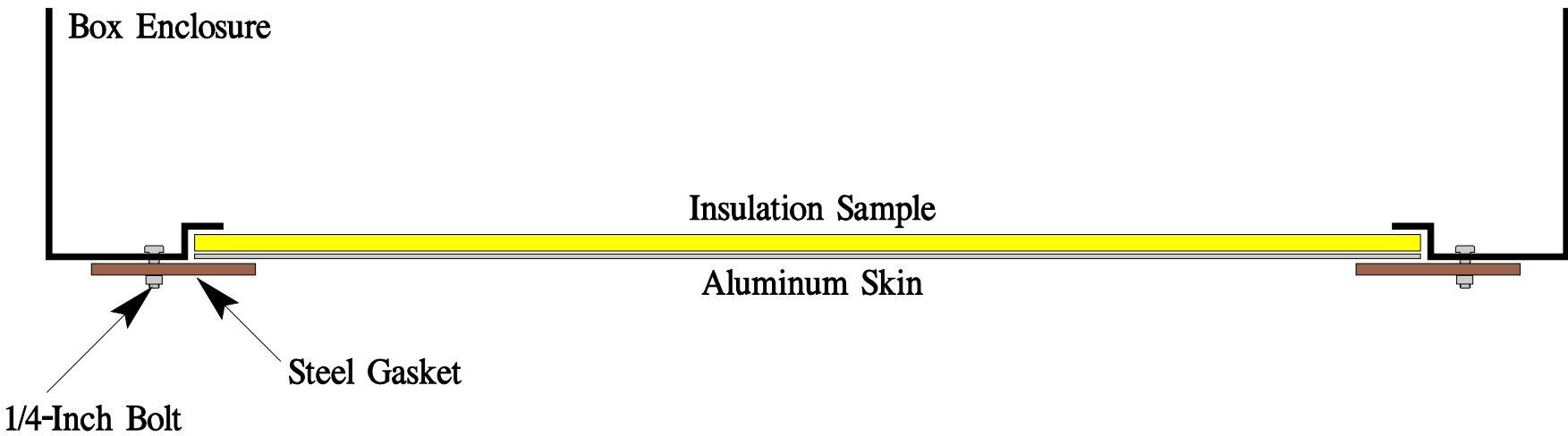


catch pan for melted aluminum skin

Apparatus for Evaluating Toxic Gas Decomposition Products



Gasket System Used for Securing Test Sample in Enclosure



Development of Lab-Scale Toxicity Test For Decomposition Products During a Postcrash Fire

It is anticipated that this test method could be used to evaluate the potential toxicity of insulation constructions and innovations meeting the new burnthrough test requirements, in order to ensure that an adverse condition will not result inside the fuselage, despite the high burnthrough performance associated with a particular system.

This test method could also be used to evaluate the toxic contribution of the basic fuselage structure, whenever a nonmetallic material is used as the primary component.

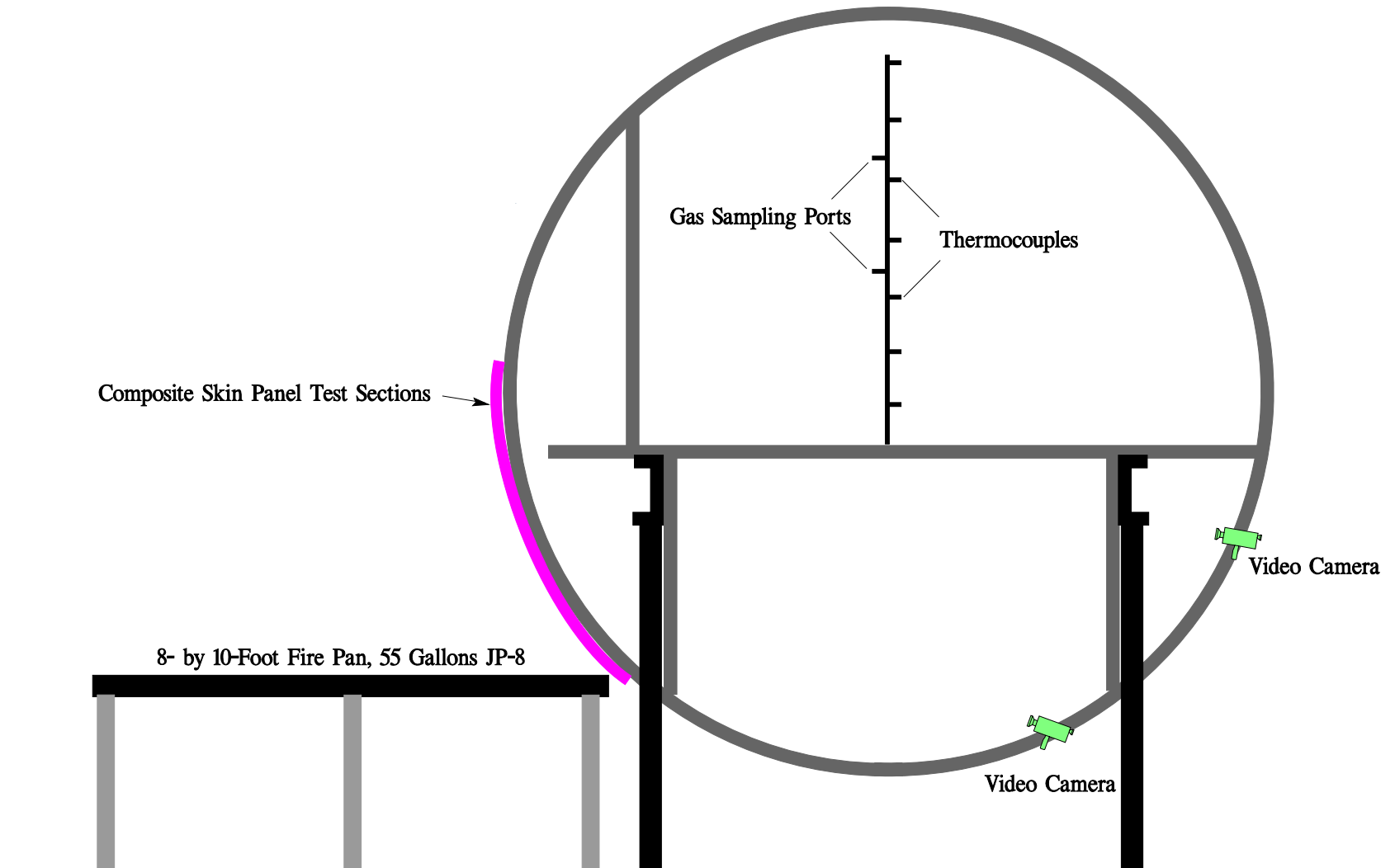
Development of Lab-Scale Toxicity Test For Decomposition Products During a Postcrash Fire

Several preliminary lab-scale tests completed using various burnthrough resistant materials.

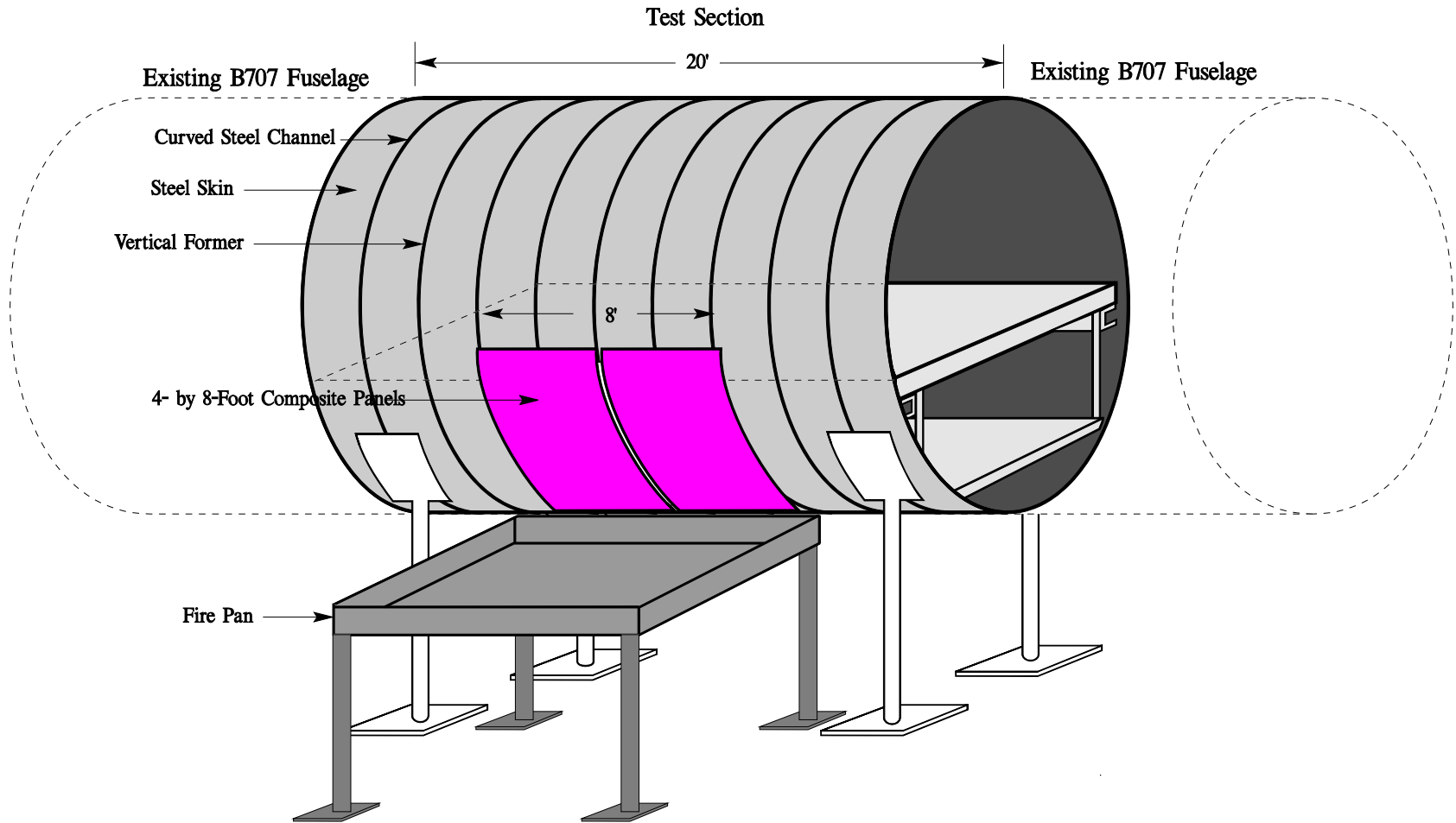
Additional full-scale tests required to determine the correlation between full- and lab-scale tests.

Full-scale tests to focus on the amount of toxic gas decomposition products entering cabin area from the non-exposed skin side.

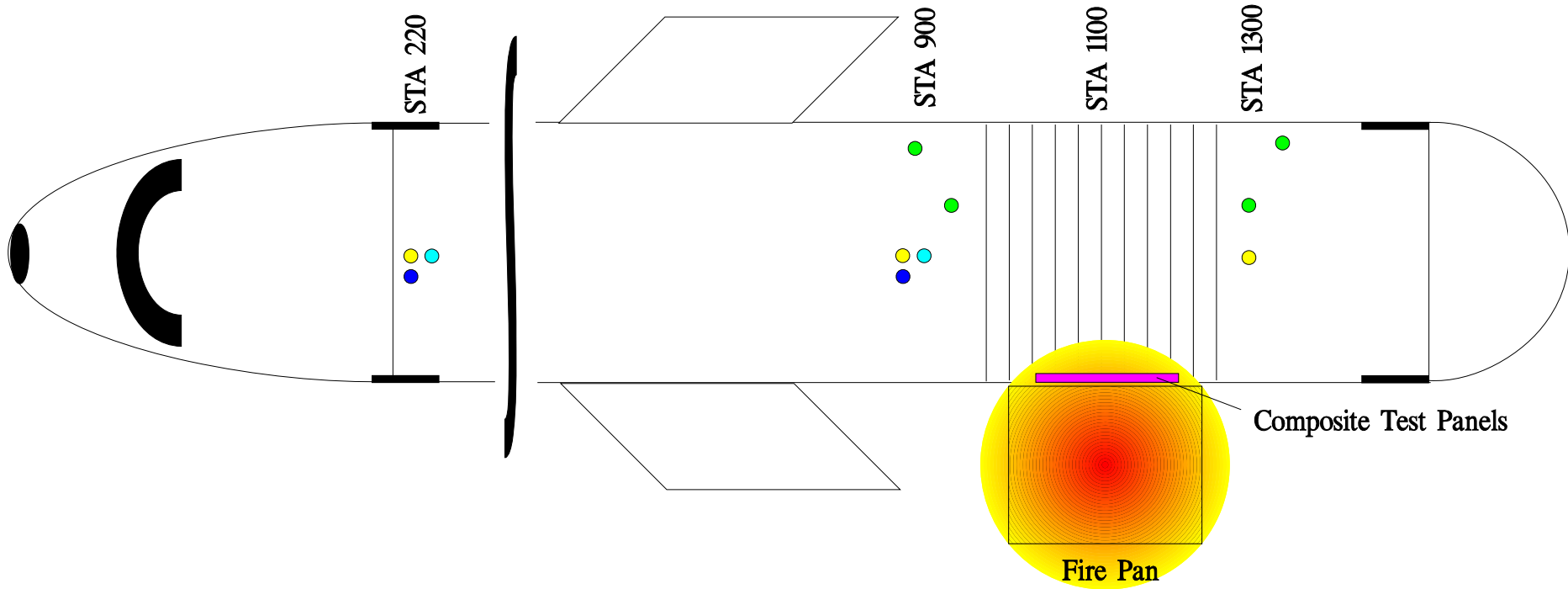
Full-Scale Test Article for Evaluating Non-Metallic Fuselage



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- Temperature
- Gas Analysis
- Smokemeter
- Video