Fire Testing of Thermoplastic Composite Panels

INTA Composite Materials Area and Structures and Mechanisms Area both from Materials and Structures Department, are participating in HITCOMP project. The project is H2020 granted in the scope of Clean Sky 2 Airframe Integrated Technology Demonstrator and seeks to develop a simulation scheme to predict fire test results on thermoplastic composite structures

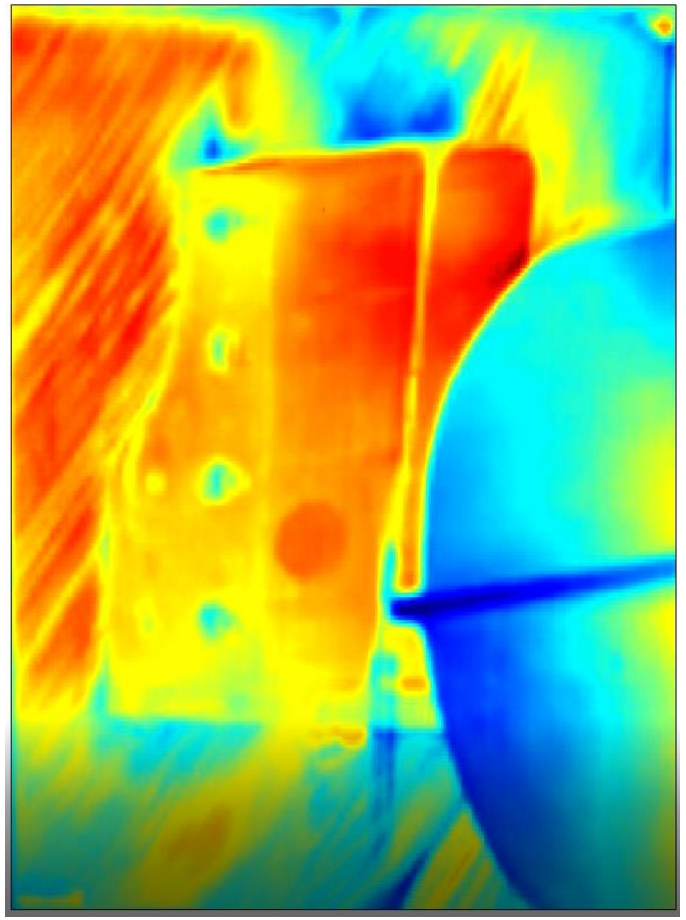
Work is been done in collaboration with UC3M University and SENSIA and is mentored by Airbus Defense and Space which will apply the project results to improve aircraft design and validation.

INTA participates in HITCOMP

- The project seeks to develop a simulation scheme to predict fire test results on thermoplastic composite structures.
- A virtual testing tool has been developed that will reduce the number and cost of fire tests required to qualify such structures on fire hazard areas.
- Simulation covers flame effects, material models, and brackets simulation to include loading of the structures. Initially the simulation focuses on the fire tests set up to easy correlation tasks.
- Work is been done in collaboration with UC3M and is mentored by Airbus Industry which will apply the project results to improve aircraft design and validation.

Pictures of fire test

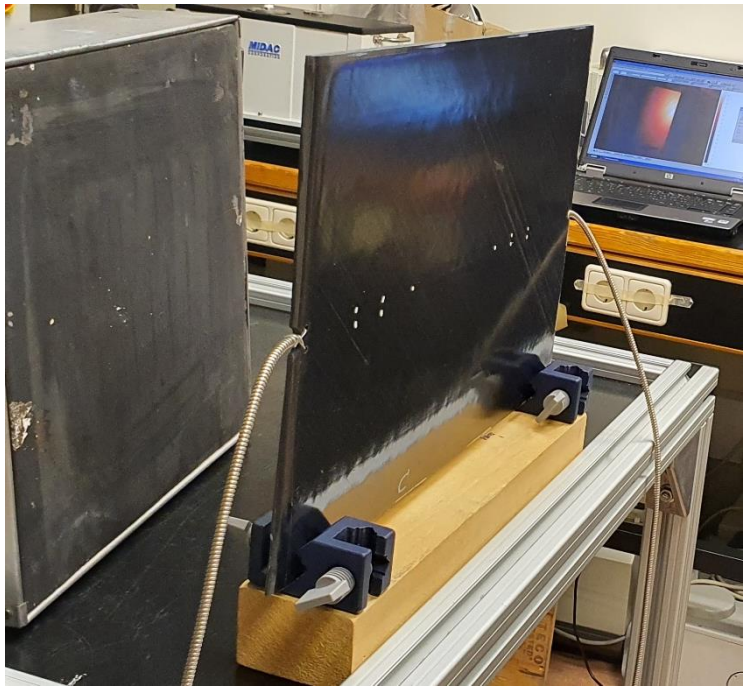
Picture shows a fire test of the 600x400mm thermoplastic composite panel and the bracket. Both the loading hook and the flame torch can be seen.



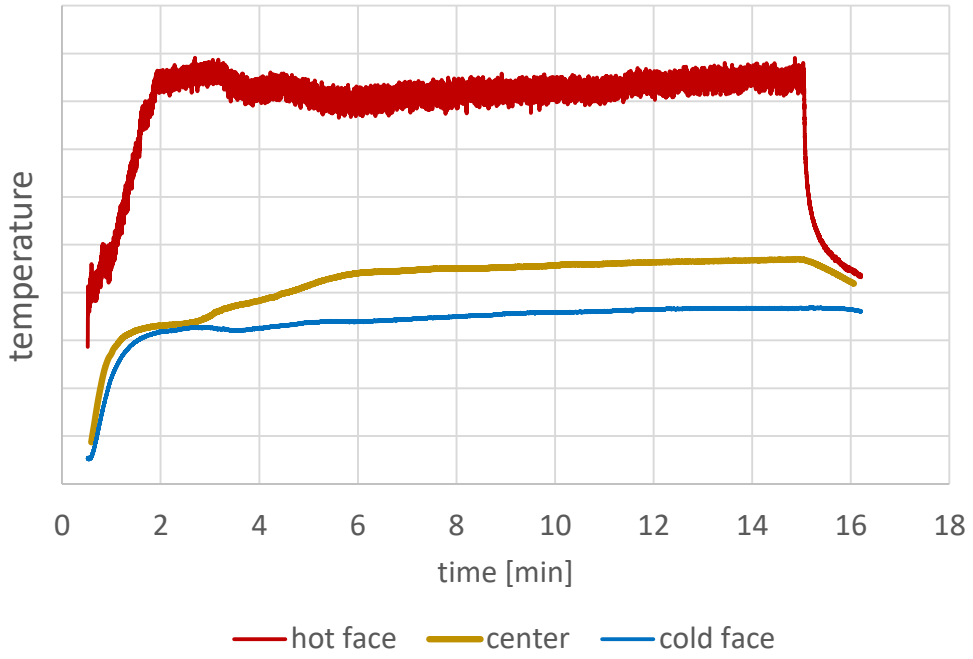
Picture shows a thermography of the flame test.

Fiber optic Sensors to monitor fire on composite panels

INTA has developed in the frame of HITCOMP a technique to integrate sensors based on fiber optic Bragg gratings, FBGS, to measure the temperature inside a thermoplastic panel during fire tests. Several sensors with their robust fiber harness were operative during the 15 minutes standardized 1000ºC flame test as shown in the picture above. The calibration of the instrumented panels has been made with black body radiators before the fire test.



Picture shows an instrumented 400x300mm panel made of PAEK thermoplastic carbon fiber composite during calibration tests. The optical fiber egress has been protected with robust stainless steel corrugated tubing.



Graph shows the temperature profile of a point close to the center of the thermoplastic panel during a 15 minute long fire test. Data are from the hot burner face, the center layer of the panel measured by FBGS and the cold back face of the panel.