PhD proposal 2023-2026

Experimental and numerical study of the physical damage induced by the electrical arcing phenomenon.

Context

The introduction of new high voltage networks on future more electric aircraft, from the propulsion network to the distribution electrical networks, raises questions about the physical damage potentially induced by the electrical arcing phenomenon.

Objectives :

The objective of the PhD work is to understand and model through an approach combining experimentation and numerical simulation the physical degradation modes induced on surrounding structures by an established short electric arc (short circuit/ parallel arc). This involves the identification of key arc parameters affecting the physical damage in question and the description of these threats by equivalent simplified models as well as their effects on targets of different types.

The investigations carried out on electric arcs must make it possible to identify and characterize the effects of the main sources of threats towards the surrounding environment, which are essentially the thermal effect, the pressure and shock wave effects, and the projection of molten metal particles, see Fig.1.

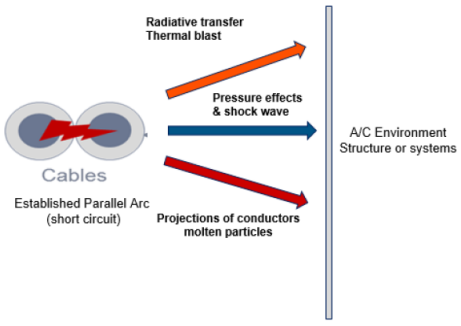

Figure 1 : Effects induced by electrical arcs

The understanding of the degradation modes and the associated models should make it possible to characterize the severity of the damage induced by different arcs and potentially define protective solutions with suitable materials and assemblies.

Keywords :

Electric arc, Damage, Thermomechanics, Multiphysics, Experimentation, Numerical simulation

Conditions and skills :

* EU, UK or Swiss national
* Master or equivalent
* Skills in multiphysical modelling and/or numerical simulation
* Taste for experimentation

Supervisors :

Advisor : Patrice Longère
ISAE–SUPAERO / ICA (UMR CNRS 5312)

Location :

Institut Clément Ader CNRS 5312, Toulouse.
Airbus Toulouse

Average salary (over the 3 years) :

Approximately €30k gross per year

Beginning :

October 2023

Contact

CV and cover letter to be sent to
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