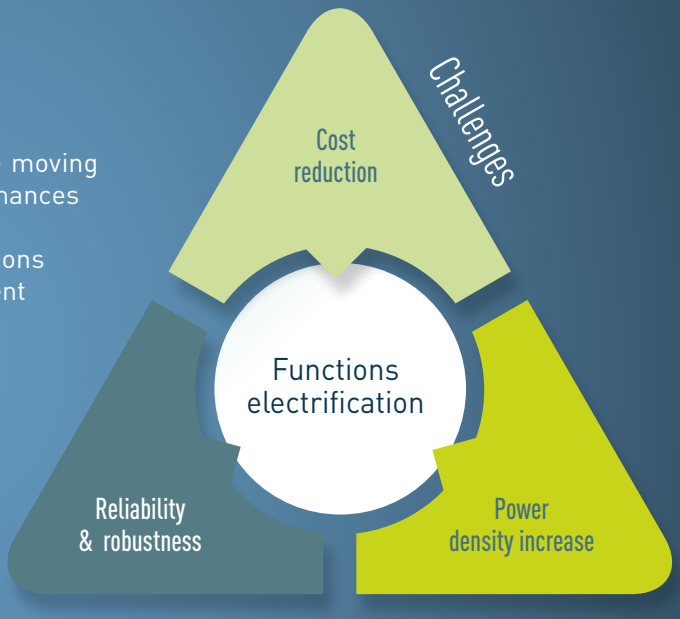
Key technological domain

# More Electrical Aircraft

## Market and needs

Aerospace, space, automotive or trains embedded systems are moving towards improved electrical technologies with higher performances and more green friendly impacts.
That will only be possible with more competitive and efficient solutions than the existing ones with mainly hydraulic and pneumatic current systems.
The More Electrical Aircraft domain will therefore work on mass, volume and costs reduction of the electrical system equipment with a better control and mitigation of the risks so as to guarantee robustness and reliability.




## Technological axes

**COMPONENTS & DEVICES**

- → Technologies and processes
- → Robustness and failure mecanism
- → Cost reduction
- → Understanding and losses reduction
- → Characterization
- → Modelling
- → Environmental constraints (radiations, EMC, pressure,...)

**TECHNOLOGIES & EQUIPMENT**

- → 3D integration (mass and volume optimization/ volume, parasitic capacitance and inductance)
- → Mecatronic
- → Multi physics
- → Cooling solutions
- → Components interaction
- → Modelling

**PHYSICAL PHENOMENA UNDERSTANDING**

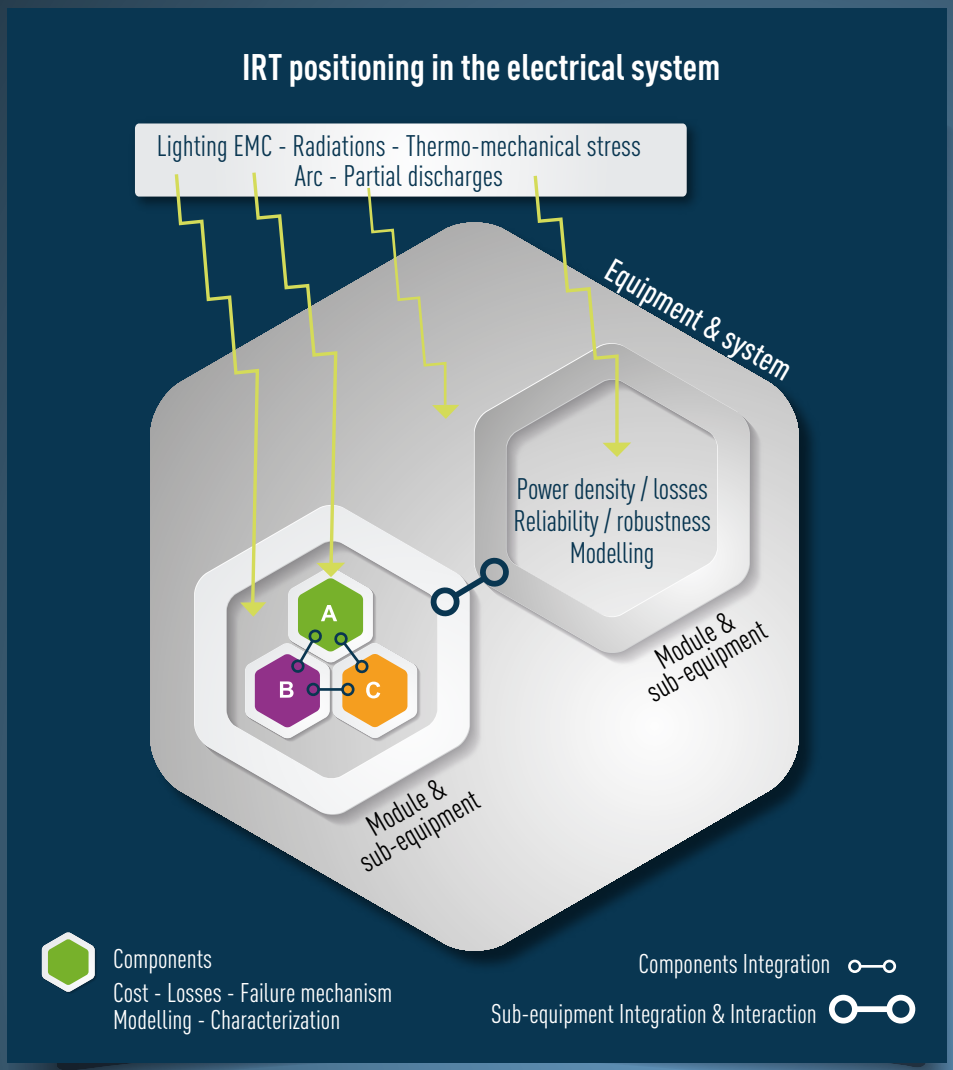
- → Arcs
- → Partial discharges
- → Arc tracking
- → EMC
- → Modelling
- → Characterization

MATERIALS DOMAIN

**TRANSVERSE AXIS WITH MATERIALS DOMAIN**
Materials for electronics

# Positioning & IRT Resources

## IRT positioning in the electrical system




## Competences

→ EMC - Thermal - Radiations - Electromagnetic - Electro technical - Electrochemical - Physics of arcs & partial discharges.

→ Materials - Semiconductors - 3D integration - Mechatronic - Converters topology - Mechanical.

→ Characterization - Modelling - Failure mechanism - Reliability.

## Technology platforms

→ Characterization: physical phenomena understanding (arcs, partial discharges, Eddy current) and failure or ageing mechanisms of every electrical component, sub-equipment and equipment.

→ Electromechanical Chain Integration: innovative basic technology building blocks.

## Projects in progress

### INTEGRATION

Optimization of the electromechanical chain (convertor, cable and motor).

### RELIABILITY

Reliability of the electrical equipment under electrical arcs and partial discharges stresses.

### ELECTRONIC ROBUSTNESS

Components Off The Shelves technologies (COTS) reliability study under operational environmental conditions for transports domain.

### DOUBLE & BUMP

Double-side cooling 3D miniaturized power module with reduced self-inductance.

### CELIA

Characterization and modelling of aeronautical mature cells towards other applications (ground and automotive). Evaluation of new electrochemical solutions.

### FUCHYA

Characterization and modelling of aeronautical fuel cells towards other applications (ground and automotive).

### SOCOOL

Cooling solutions for any environment.


@irtSaintEx
www.irt-saintexupery.com

**IRT Antoine de Saint Exupéry**

118 route de Narbonne - CS 44248 - 31432 Toulouse cedex 4 (France)
Tel. +33 (0) 5 61 00 67 50 - Email: contact@irt-saintexupery.com

Arts et Métiers ParisTech – Campus de Bordeaux-Talence
Esplanande des Arts et Métiers, 33405 Talence cedex (France)

**Régine SUTRA-ORUS**

Head of More Electrical Aircraft Domain
Email: regine.sutra-orus@irt-saintexupery.com
Tel. : +33 (0)5 61 00 67 76