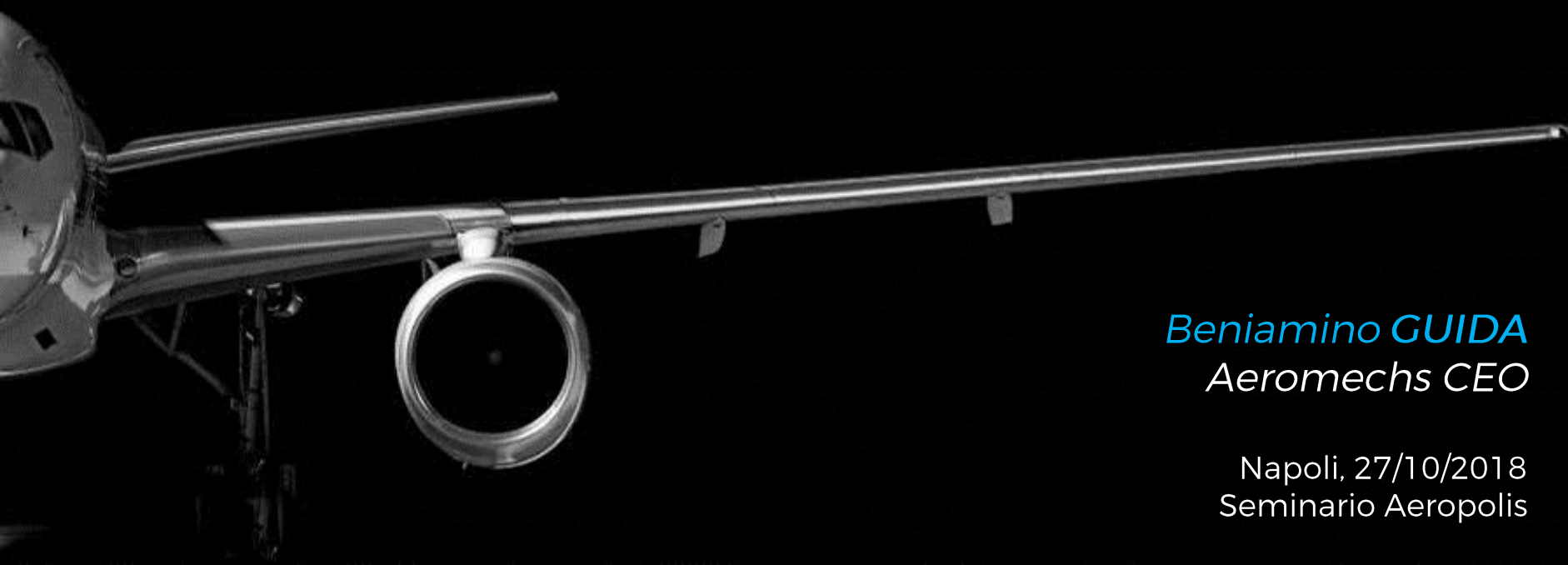




Le PMI campane nei progetti dei velivoli ibridi



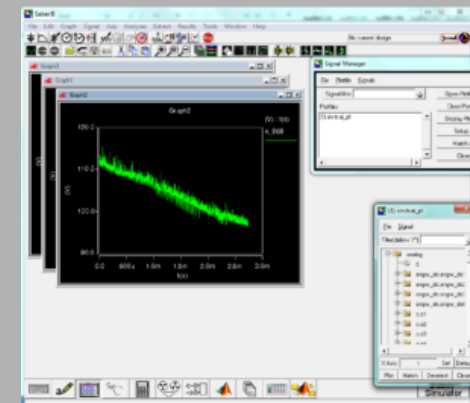
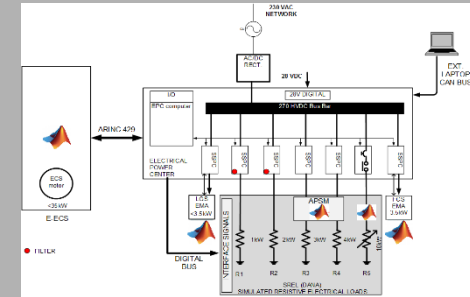
Beniamino GUIDA
Aeromechs CEO

Napoli, 27/10/2018
Seminario Aeropolis

What we do...



- Founded in 2011 as a startup of the Second University of Naples
- Its core business is represented by **Intelligent Control Units (ICU)** design and development.
- **ICUs** are conceived as a new generation of ECUs (Electronic Control Units)
- Real time enhanced capabilities, used to implement “**energy management**” and other innovative control and supervision strategies, are the most important advantage in using ICUs with respect to traditional ECUs

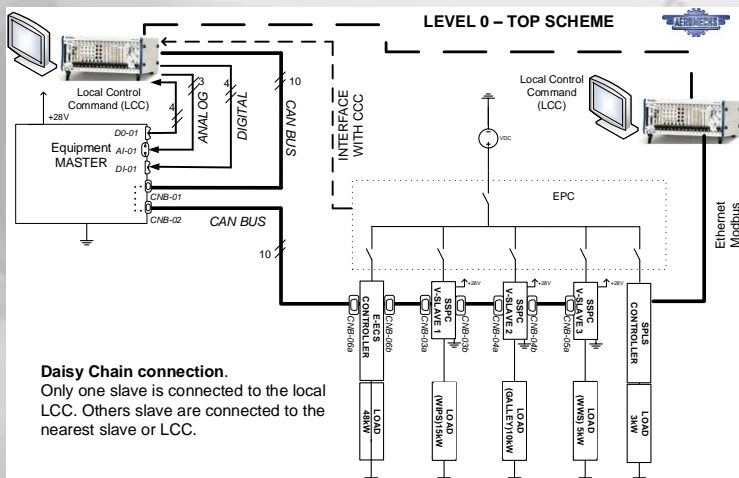


What we've done in Clean Sky 1 (1/2)

I-PRIMES

(an Intelligent Power Regulation using Innovative Modules for Energy Supervision)

I-PRIMES main objective has been the design, development and testing of three DC/DC converters, supervised by an ICU in order to implement E-EM (Enhanced Energy Management) strategies



- ❖ **MASTER** module, equipped with an ICU for Intelligent Load Power Management logics
- ❖ **SLAVE** modules, equipped with local ECUs for data and control management



Technical domain:
Eco design

Grant Agreement:
306648

Duration
24 months

Consortium:

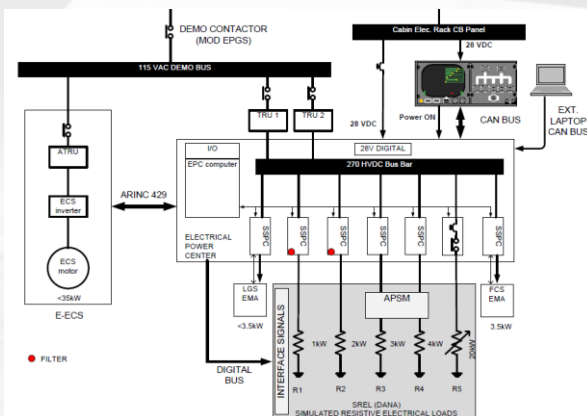
- ➔ Second University of Naples (coordinator)
- ➔ Aeromechs



What we've done in Clean Sky 1 (2/2)

EPOCAL (an Electrical Power Center for Aircraft Loads)

An ICU as part of an EPC for a modified version of an ATR-72, has been designed, manufactured, and qualified for in-flight tests



Technical domain:
Green Regional A/C

Grant Agreement:
323408

Duration:
30 months

Consortium:
→ Second University of Naples (coordinator)
→ Aeromechs

Verification of the E-EM concept (Enhanced Energy Management) **in-flight** (GRA test campaign - March 2016)



What we're doing in Clean Sky 2 (1/2)



ESTEEM

(Advanced Energy Storage and Regeneration System for Enhanced Energy Management)

Design, develop and manufacture an innovative Energy Storage and Regenerative System (ESRS) with embedded supercapacitors Energy Storage Device (ESD) for smart energy management of a regenerative Electro-Mechanical Actuator (EMA) emulator.
In ESTEEM, Aeromechs takes care of the ESRS ICU design.



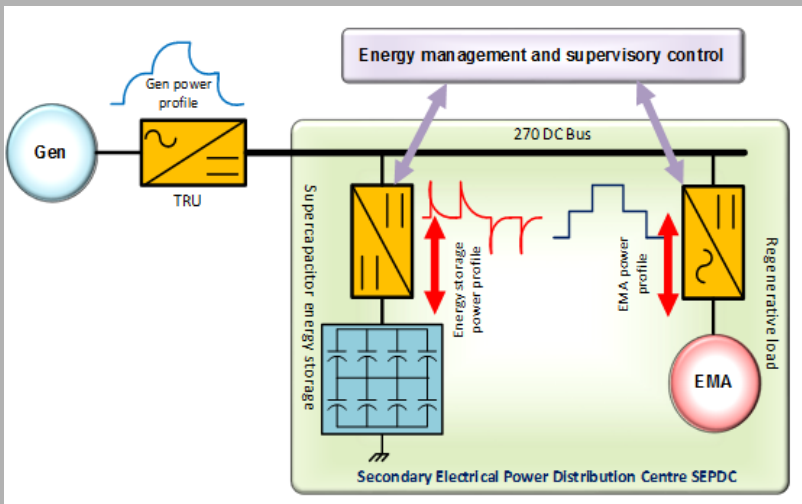
Technical domain:
Green Regional A/C

Grant Agreement:
755485

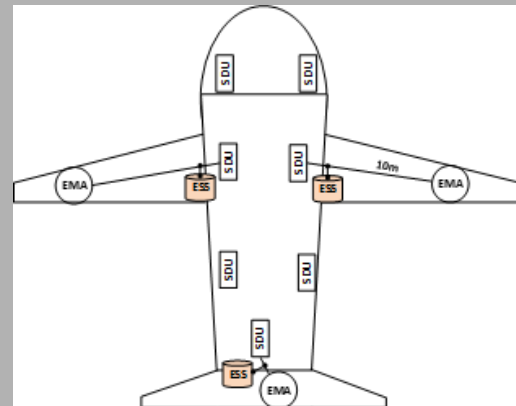
Duration
36 months

Consortium:

- University of Nottingham (coord)
- University of Campania
- Aeromechs



ESTEEM architecture



Proposed location of
ESS on a/c



What we're doing in Clean Sky 2 (2/2)



ENIGMA

(Supervisory Control for **ENhanced electrical Energy Management**)

Design, develop, manufacture, test and integrate into the Iron Bird facilities an innovative **Centralised Smart Supervisor (CSS)** embedding the **Enhanced Electrical Energy Management (E2-EM)** strategy.

In ENIGMA, Aeromechs is the main responsible for CSS ICU programming and testing.



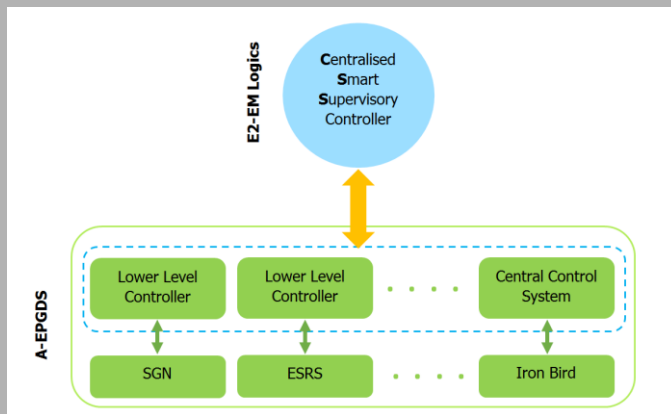
Technical domain:
Green Regional A/C

Grant Agreement:
785416

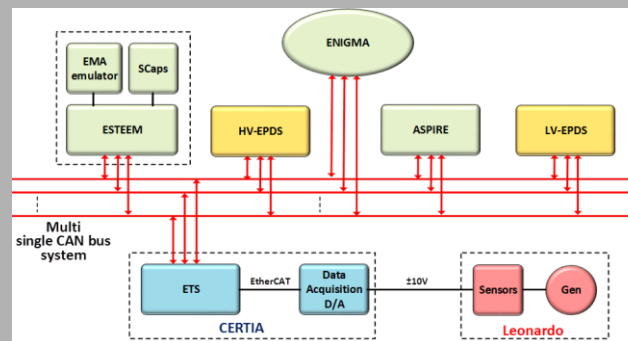
Duration:
36 months

Consortium:

- UTRC (coord)
- Univ. of Nottingham
- Univ. of Campania
- Aeromechs

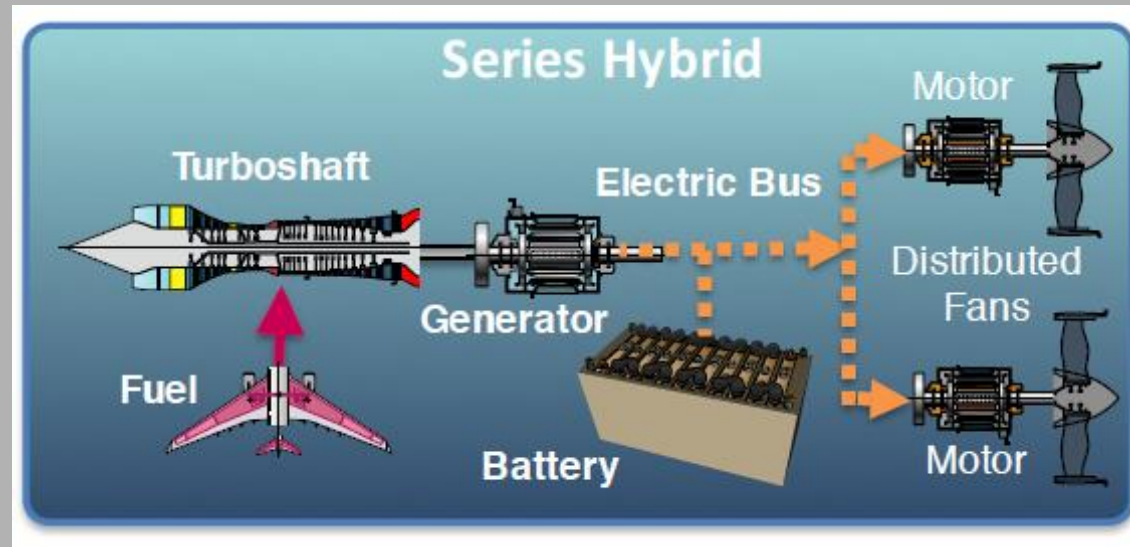


CSS architecture

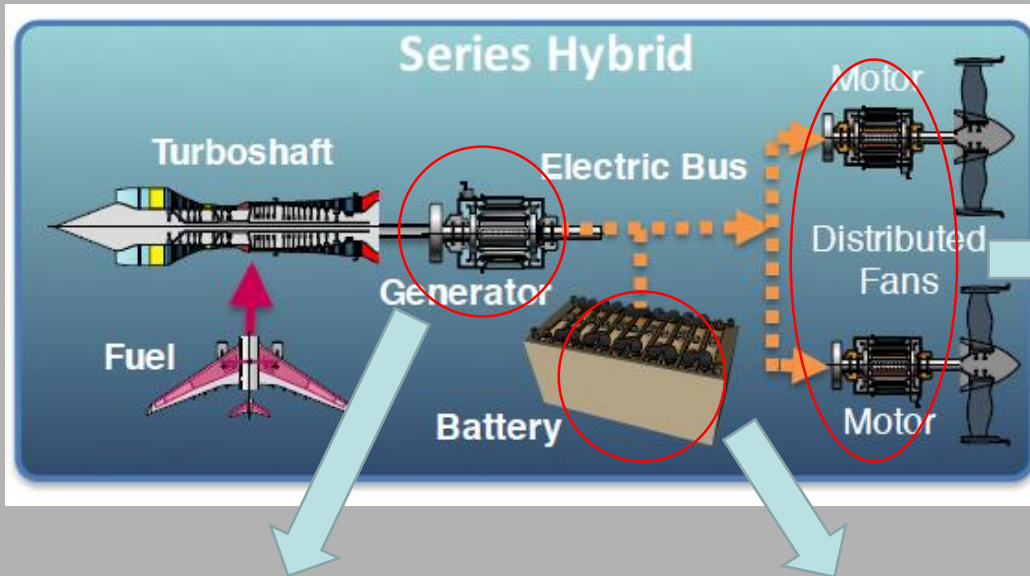


ENIGMA as part of GRA Iron Bird





- Considering the specific case of series hybrid distributed propulsion, the implementation of real-time energy management techniques is of fundamental importance
- By implementing “smart management” of the electrical power flows, benefits can be obtained in terms of consumptions and weight savings



Source Management

Generator POR can be changed in order to manage the output electrical power

Storage Management

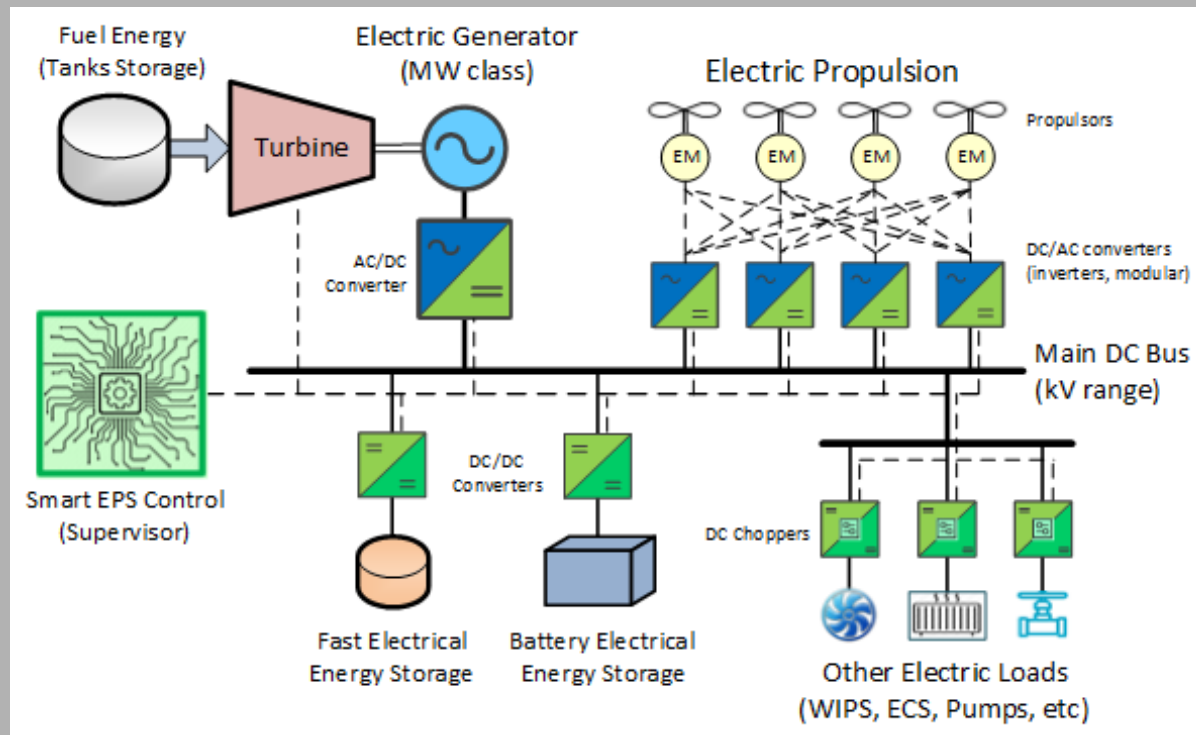
Energy stored into secondary power sources (e.g. batteries, supercaps) can be used to support the primary source in some flight phases (e.g. takeoff)

Load Management

Distributed fans can be individually controlled in order to optimize performances, especially in case of propellers failures

EM for Hybrid Propulsion (3/3)

A Supervisory structure is required in order to effectively implement the energy management strategy in real time



DC/DC converters, DC/AC inverters and AC/DC rectifiers are the key elements to implement this futuristic concept

PROSIB: first Italian PON on this topic



PROSIB

(PRopulsione e Sistemi Ibridi per velivoli ad ala rotante e fissa)

Investigation of configurations for regional aircraft and rotary wing platform (VTOL) and architecture for the propulsion systems including **distributed hybrid/electric technologies**. Configuration studies will be supported by trend analysis of the main enabling technologies, reaching their preliminary validation through wind tunnel and lab tests.

In PROSIB, Aeromechs takes care of the Supervisor ECU design, manufacturing and testing

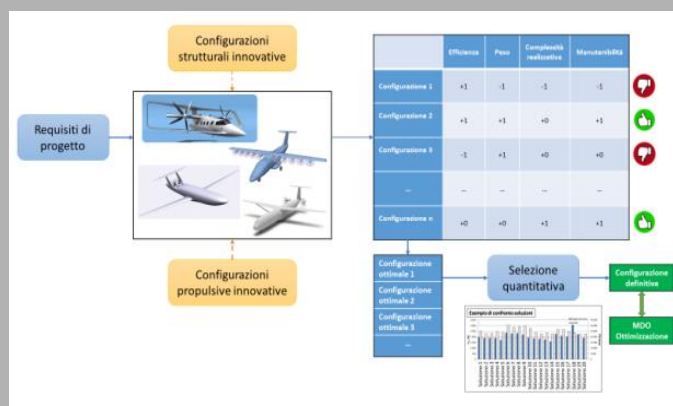


Announcement:
Progetti di ricerca industriale e sviluppo sperimentale (PNR-2015-2020)

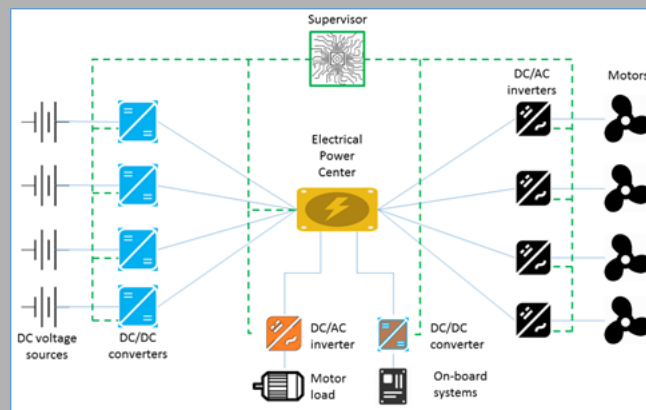
Total Cost:
about 6 million €

Starting date:
June 1st, 2018

Consortium:



PROSIB configuration analysis



PROSIB ground test rig



Aeromechs srl

Legal address

via Parente, 10

81031

Aversa (CE) – Italy

Headquarters

Corso Campano, 134

Palazzo Palumbo

80014

Giugliano in Campania (NA) – Italy

Telephone: +39 081 0093877

E-mail: info@aeromechs.eu

Web: www.aeromechs.eu