A more Electric Innovation Chain in Europe

Eric Dautriat
Executive Director – Clean Sky Joint Undertaking

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Clean Sky, Innovation Takes Off

www.cleansky.eu
Clean Sky: Innovation takes off

Europe’s largest Aeronautics Research Programme ever

- CS1 started in 2008 within FP7, up to 2017; continuation decision in 2014 with CS2 in H2020
- Environmental objectives for CS1: CO2 and noise
- Environment, competitiveness and mobility for CS2
- CS1: 1.6 B€ value; CS2: 4 B€
- Integrated breakthrough technologies, up to full scale demos
- 600 participants in CS1
A wide « innovation chain »

- 65 Associates
- 6x2 Leaders
- >500 Partners

~230 participations in Systems for Green Operations

- 24% Industry
- 36% Research
- 20% Universities
- 20% SMEs
Clean Sky 2: a big step forward

1.8b€ Total EU Funding Proposed

Vehicle IADPs
Integr. Aircraft Demonstr Platforms

Fast Rotorcraft
Agusta Westland Eurocopter

Large Passenger Aircraft
Airbus

Regional Aircraft
Alenia Aermacchi

Eco-Design
Fraunhofer Gesellschaft

Airframe ITD
Dassault – EADS-CASA – Saab

Engines ITD
Safran – Rolls-Royce – MTU

Systems ITD
Thales – Liebherr

Small Air Transport
Evektor – Piaggio

Clean Sky is now about 85% of the EU-funded aeronautical research

Clean Sky - More Electric Aircraft - 3-5 Feb 15
**SGO - Management of Aircraft Energy**

**Member and Partner Know-How from previous R&T projects**

**SGO Technology Development & Validation of Electrical Aircraft Systems**

- **Electrical Equipment**
- **Thermal Management Equipment**
- **Load Management Functions**

**Stakeholders in the WP**

- Airbus
- AleniaAermacchi
- DLR
- EADS
- Deichler Aerospace
- GSAF
- Liebherr
- Rolls-Royce
- Saab
- Safran
- The University of Nottingham
- Thales
- ZODIAC AEROSPACE
- Fraunhofer
MAE developments for Large Aircraft

- Electrical ECS
- Electrical WIPS
- Engine Nacelle Sys
- Electrical Power Center
- Wiring System
- Skin HX
- Load Management
- Vapour Cycle cooling system
- Generators
- Ice Detection
- Clean Sky Joint Undertaking
One example of flight tests: ATR-72 testbed

270 HVDC network demo channel

New Alternator

E-ECS pack

Electrical Energy Management logics validation

Flight Demo on ATR-72

MEA Modifications:

- **EPGS Mod**: Electrical Power – Modification of ACWF generation and distribution
- **E-EMS Mod**: Electrical Power – Installation of 270V DC Generation distribution including Electrical Power Center (EPC) and Simulated Resistive Electrical Load (SREL)
- **E-ECS Mod**: Air Conditioning – Installation of an Experimental electrical environmental control sys. – E-ECS (one pack)
- **EMAs Mod**: Installation of two electrical actuator EMAs – FCS/LG (each mounted on a dedicated test bench, both located in Cabin)

and:

- New AC Primary Electrical Distribution
- Cabin Electrical & E-ECS power racks
- 270VDC Electrical Energy Management Power Center (E-EM EPC)
- Simulated Resistive Load (SREL)
- EMAs electrical loads (in cabin)
- FTI/Flight Test Station (FTES)

EMA/Bench test on A/C Demo
MEA in Clean Sky 2 / ITD Systems

- Avionics / cockpit
- Cabin & cargo systems
- Electrical wing
- Major loads
- Electrical Chain
- Landing gear systems
- Small Air Transport Systems

+ MEA-related activities in other Platforms, e.g. Airframe and Large Aircraft
Clean Sky framework intended to bring:
- An optimized, balanced funding for airframer and equipments manufacturers (and engine manufacturers)
- A close collaboration between systems suppliers and airframers
- The involvement of bottom-up innovation processes from SMEs and Universities to integrators
- A novel, integrated system design environment with appropriate tools
Hosting a unique blend of high tech companies throughout Europe, and a set of advanced test-benches, Clean Sky is the ideal house for highly contributing to the development of “more electric” widespread innovation.

First Call for Proposals for Clean Sky 2 launched in December – will close end of March: We need your talents