



# **Aeronautics & Air Transport Research in the 7<sup>th</sup> EU Framework Programme (FP7)**



**4<sup>TH</sup> CALL FOR PROPOSALS – WP2011**

**EUROPEAN COMMISSION  
DG Research      Aeronautics**



# Cooperation and 4<sup>th</sup> Call in EU FP7 Aeronautics Research

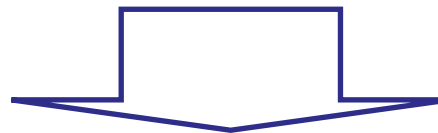
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# 4<sup>th</sup> call context

## WP2011 STRATEGY

- **Principle of annuality** of budget consumption → future calls of the Transport theme will be smaller than the first two calls
- **Balance** between *bottom-up* and *top-down* research
- **Balance** between *upstream* research and research on *technology integration*
- **Balance** between various *research areas* and *funding instruments* for the successive WPs in the period 2010-2013
- **Results** of 2007 and 2008 calls – and other initiatives



**A multi-annual perspective !**

# FP7 Aeronautics – 4th Call Synopsis

## Topics opened per Scheme \ Activity

121.3 M€	Greening	Time	Customer & Safety	Cost	Security	Pioneer
<b>107 M€</b> <b>♦♦ Level2</b> <b>max. 40 M€</b> <b>grant/project</b> <b>(6 topics)</b>	<b>Core Engine</b> thermal efficiency	Total <b>Airport</b> management	Human-centred <b>Cabin</b> environ- ment	- Smart <b>airframe</b> structures - <b>Small aircraft</b> propulsion & systems - Modular <b>actuation</b> systems	<b>CLOSED</b>	<b>CLOSED</b>
<b>11.3 M€</b> <b>♦ Level 1</b> <b>max. 4 M€</b> <b>grant/project</b>	<b>CLOSED</b>					<b>10 topics</b>  <b>OPEN</b>
<b>3 M€</b> <b>Support Actions</b> <b>max. 300k€</b> <b>EC grant</b>	<b>7 topics OPEN:</b> Canada, Japan, SMEs, Education needs, Crisis management, Air Freight; Conferences					

# FP7 Aeronautics – 4th Call

## Budget and Timing

Overall Budget:	121.3 million Euro
▶ ◆◆ Level 2:	6 topics, 107 million €
▶ ◆ Level 1:	only “Pioneering”, 11.3 million €
▶ Support Actions:	3 million €

### Time schedule

▶ Call opening date:	July 20 <sup>th</sup> 2010
▶ Call closing date:	December 2 <sup>nd</sup> 2010 17:00 h Brussels local time
▶ Evaluation phase:	January 24 <sup>th</sup> to Feb 24 <sup>th</sup>
▶ Start of first projects:	June to July 2011

# FP7 Aeronautics – 4th Call

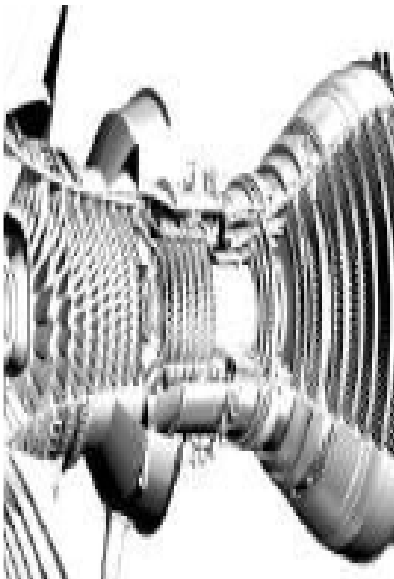
## Topics for Level 2 projects - Greening

### Systems approach to improved core engine thermal efficiency

*Objective:* Increase engine thermal efficiency above overall pressure ratio OPR 50:1 for reduced CO<sub>2</sub> emissions minimising NO<sub>x</sub> increase

*Scope:* Further development and Integration of key technologies:

- Innovative **compressor** for ultra-high pressure ratio up to 70:1
- HP-LP compressor **inter-cooling**
- Low NO<sub>x</sub> **combustion**
- Advanced **structural** components for high OPR
- **Combustor-turbine** interaction.
- Active **heat management** for further increased thermal efficiency, including aspects of
  - turbine **cooling**,
  - core engine cooling and
  - **sealing**.



Validation platforms at component, subsystem and system level, where appropriate.  
Complement research work, e.g. on-going in Clean Sky, FP6 NEWAC.

Video-presentations at Info-day:

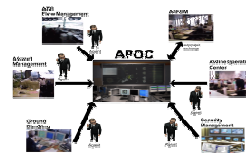
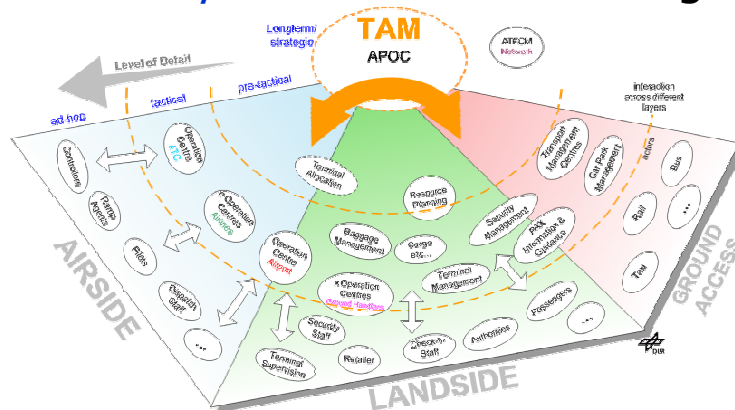
# FP7 Aeronautics – 4th Call

## Topics for Level 2 projects – Time efficiency

### Integrated approach to **total airport management** for operational efficiency

**Objective:** Overcome fragmentation of airport activities –land side and air side– aiming at improving the efficiency, capacity, punctuality, safety, security and environment sustainability.

**Scope:** Innovative integration of all airport operations (system of systems):



- Passenger flow
- Baggage flow
- Apron operation
- Fleet management
- Security monitoring
- Air quality and noise monitoring
- Single IT management system

It will also consider a **multi-airport** management concept for **shared operation** of proximity alternative airports.

Techniques, modelling tools, devices and emerging technologies; integrating existing solutions. Validation with real and representative examples with **actual data** and use key performance indicators e.g. from ATMAP and Airport Observatory initiatives. Airport operation centre **demonstrator**.

Complement research work, e.g. FP6 SPADE-2, FP7 SECURITY e.g. checking points.

Video-presentations at Info-day:

# FP7 Aeronautics – 4th Call

## Topics for Level 2 projects – Customer Satisfaction

### Integrated approach to a human-centred cabin physical environment

*Objective:* Place human needs at the centre of future cabin designs regarding **health, safety, comfort** as well **work-load** conditions for **crew**

*Scope:* Integration of technologies and concepts key to physical environment :



- **Noise** and **vibration** (active & passive)
- **Air quality** and cabin pressure
- **Low Energy** and Materials and systems
- On-board **safety** related systems and procedures incl. **fire**
- **Lighting** and **virtual** environments
- **Human factor** issue



Incl. **standardization** efforts, step-wise validation incl. full-scale test **demonstrators**, to a range of different types of aircraft, from the smaller size to large airliners.

Video-presentations at Info-day:

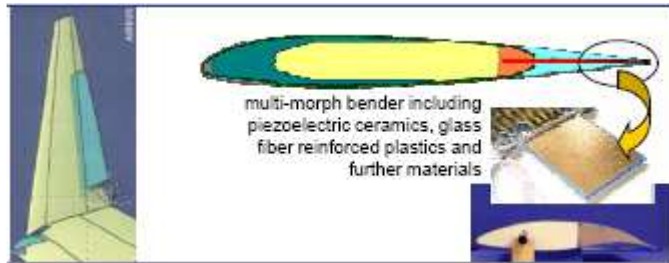
## FP7 Aeronautics – 4th Call

### Topics for Level 2 projects – Cost efficiency

#### Integrated approach to smart airframe structures

*Objective:* Step change in 'intelligent' structures regarding **self-sensing**, **multifunctional** materials and **morphing** for reduced operational costs

*Scope:* Further development and Integration of key technology developments, including supporting modelling tools, focusing on two major applications:



- Wing morphing for improved lift and reduced drag during take-off, cruise and landing
- Self-sensing and multifunctional materials for smart process control and quality assurance in **manufacturing** and for smart **in-service** self-monitoring and **self-healing** of structures.

Increased use of **nano-particles** reinforced resins.

Validation in both the wing and fuselage demonstrators should take a modular approach to integrate and test components in incremental steps, so to reduce risks:

- **wing specific iron bird** in a modular approach, testing the comprised elements at component level and in wind tunnels
- a fuselage scaled **barrel demonstrator**

Video-presentations at Info-day:

# FP7 Aeronautics – 4th Call

## Topics for Level 2 projects – Cost efficiency

Integrated approach to efficient **propulsion** and aircraft **systems** for **small-size aircraft**

*Objective:* Improve the capability to develop environmentally acceptable, safe, reliable and economic propulsion units that the small size aircraft industry (up to **19 pax.** fixed-wing and rotorcraft) needs

*Scope:* Integration of key technologies for a range of small gas turbine engines and propulsion related systems. Two fronts of action:

- Performance improvements of key engine components, including modern **engine control** technologies, **health monitoring** and integrated systems.
- **Airframe-propulsion integration** with regard to aircraft overall configuration

**Benefits of technologies already used** in larger aircraft or even outside aeronautics should also be exploited.

**Test rig validation** of the most appropriate technologies according to value/cost benefit, as well as their integration into functional complexes and evaluation on the real engine demonstrators; and, if appropriate, **on aircraft test beds** as well.

Complement research work e.g. FP6 CESAR

Video-presentations at Info-Day:

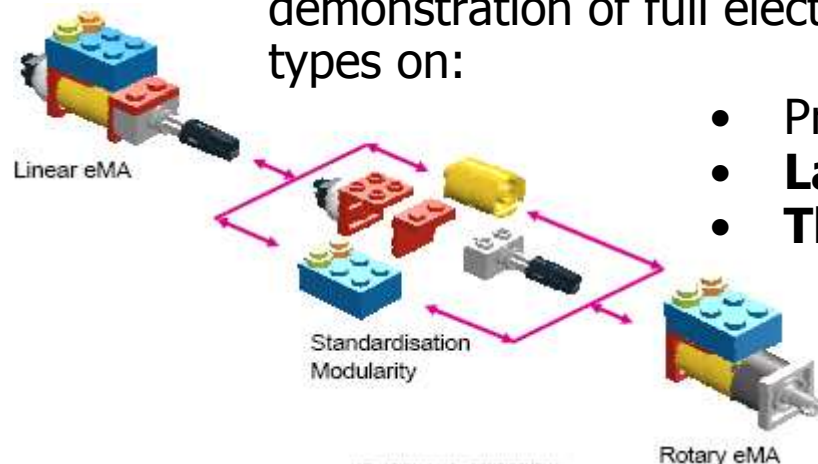
# FP7 Aeronautics – 4th Call

## Topics for Level 2 projects – Cost efficiency

### Integrated modular actuation systems for the future all-electric aircraft

*Objective:* Introduce full electric actuation in all aircraft systems as a definite step in the **elimination of on-board hydraulics** for full electric aircraft

*Scope:* **Scalable** systems approach through modular components to demonstration of full electrical actuation for a broad range of aircraft types on:



- Primary and secondary **flight controls**
- **Landing** systems
- **Thrust reversers** and **doors**

Integrate sensors, motors, controller, materials, system health, wireless data flow ...

Drive **standardization** process, address **certification** requirements.

Validation should take place at components and system level, in lab testing and in a common multi-application **ground test bed**.

Complement and coordinate research work e.g. Clean Sky, FP POA, FP MOET.

Video-presentations at Info-Day:

## FP7 Aeronautics – 4th Call

### Topics for Level 1 & CA projects: PIONEERING (up to max. 4M€ grant/project)

Beyond 2020 horizon, setting foundations of more **radical, revolutionary** technologies that might configure the **step changes** required for the **second half of this century**.

#### ◆ Breakthroughs & Emerging Technologies

Lift, Propulsion\*, Interior space, Life-cycle

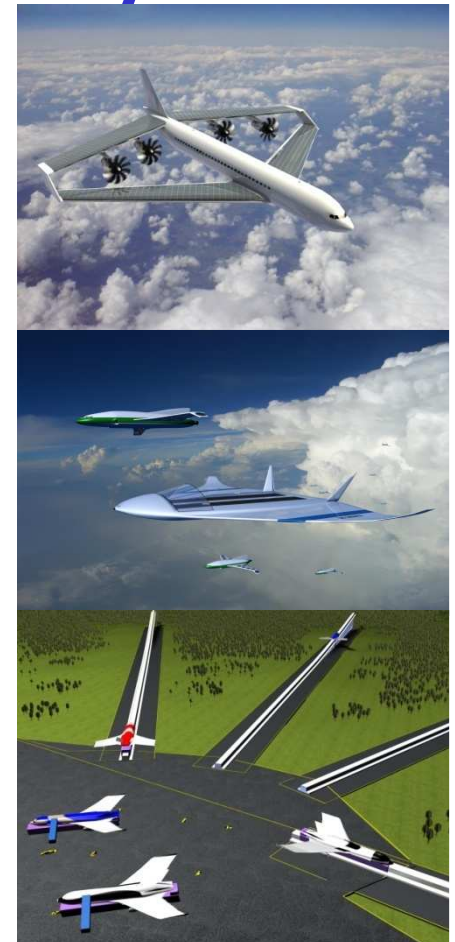
#### ◆ Step Changes in Air Transport Operation

Novel vehicles, Guidance & control, Airports

#### ◆ Step Changes in Air Transport Operation

- The cruiser/feeder concept.
- Take-off & land with ground-based power.
- New sources of main propulsive power\*

\* except H2 & Fuel Cells, covered by JTI FCH



## FP7 Aeronautics – 4th Call

### Topics for Support Actions (SA): (up to 300 k€ grant/project)

1. Supporting organisation of **conferences** / events of relevance to aeronautics & air transport **research as a whole**
2. Stimulating the participation of small and medium size enterprises (**SME**) and other small organisations for improved integration of the European Research Area
3. Assessing the role and needs of **air freight** in air transport
4. Exploring and stimulating research cooperation with **Canada**
5. Exploring and stimulating research cooperation with **Japan**
6. Assessing the **educational needs** of engineers and researchers in aeronautics and air transport
7. Technology support for **crisis coordination** for the air transport system following **major disruption events**

# FP7 Aeronautics – 4th Call

## Support Actions (SA)

( No technical research / development / demo activities...)

Activities under a Support Action can be:

- **Conferences**, seminars, **workshops**, meetings
- **Studies**, fact finding, monitoring,
- **Strategy** development,
- Awards and competitions,
- Working or **expert groups**,
- Operational support, data access and **dissemination**,
  - Information and **communication** activities
  - Cooperation with other European research schemes;

\* Or a combination of these plus management of the activities.

Max. **EU funding** : **300 k€**+ third country/party contribution

\* Typical max. 300 k€, only in well justified cases up to 500k€

\* Typically up to 2 year duration.

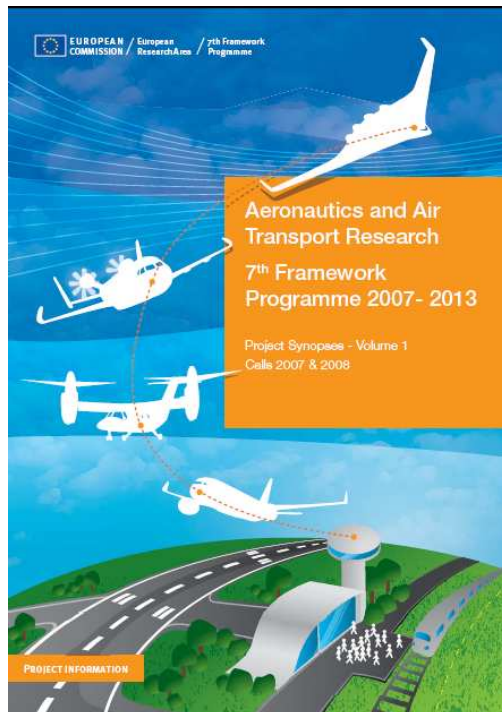
NB: Competition with proposals in same or other SA topics



# Cooperation in EU FP7 Aeronautics Research

## WHO to contact ? – Directions

European Commission – DG Research:



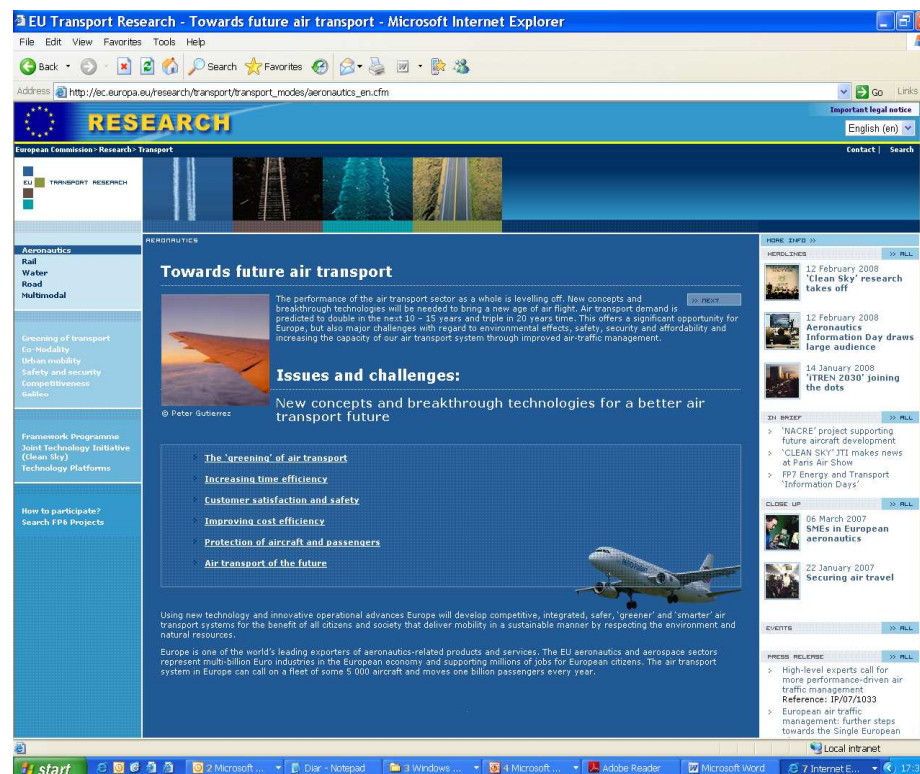
- ◆ Directorate H "Transport (incl. Aeronautics)":  
Aeronautics (H3) Head of Unit: [Liam.Breslin@ec.europa.eu](mailto:Liam.Breslin@ec.europa.eu)  
International Cooperation: [Pablo.Perez-Illana@ec.europa.eu](mailto:Pablo.Perez-Illana@ec.europa.eu)
- ➔ FP7/FP6 Aeronautics Synopses Books (Coordinators and EC):  
[http://ec.europa.eu/research/transport/more\\_info/publications\\_en.cfm](http://ec.europa.eu/research/transport/more_info/publications_en.cfm)

Networks of National Contact Points (NCPs):

- ◆ In EU Member States [to facilitate connections & activities.](#)
- ◆ In Third countries to aid participation in FP7:  
[http://cordis.europa.eu/fp7/third-countries\\_en.html](http://cordis.europa.eu/fp7/third-countries_en.html)

- ◆ Brussels 4<sup>th</sup> call Info-day video-presentations

# Muchas gracias por su atención y adelante con buenas propuestas.



Visit our web: <http://ec.europa.eu/research/aeronautics>  
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