



THE PERSONAL PLANE PROJECT

Assessment and Validation of Pioneering Concepts for Personal Air Transport Systems

Introduction to the PPLANE project

Warsaw IoA, 7/07/2009

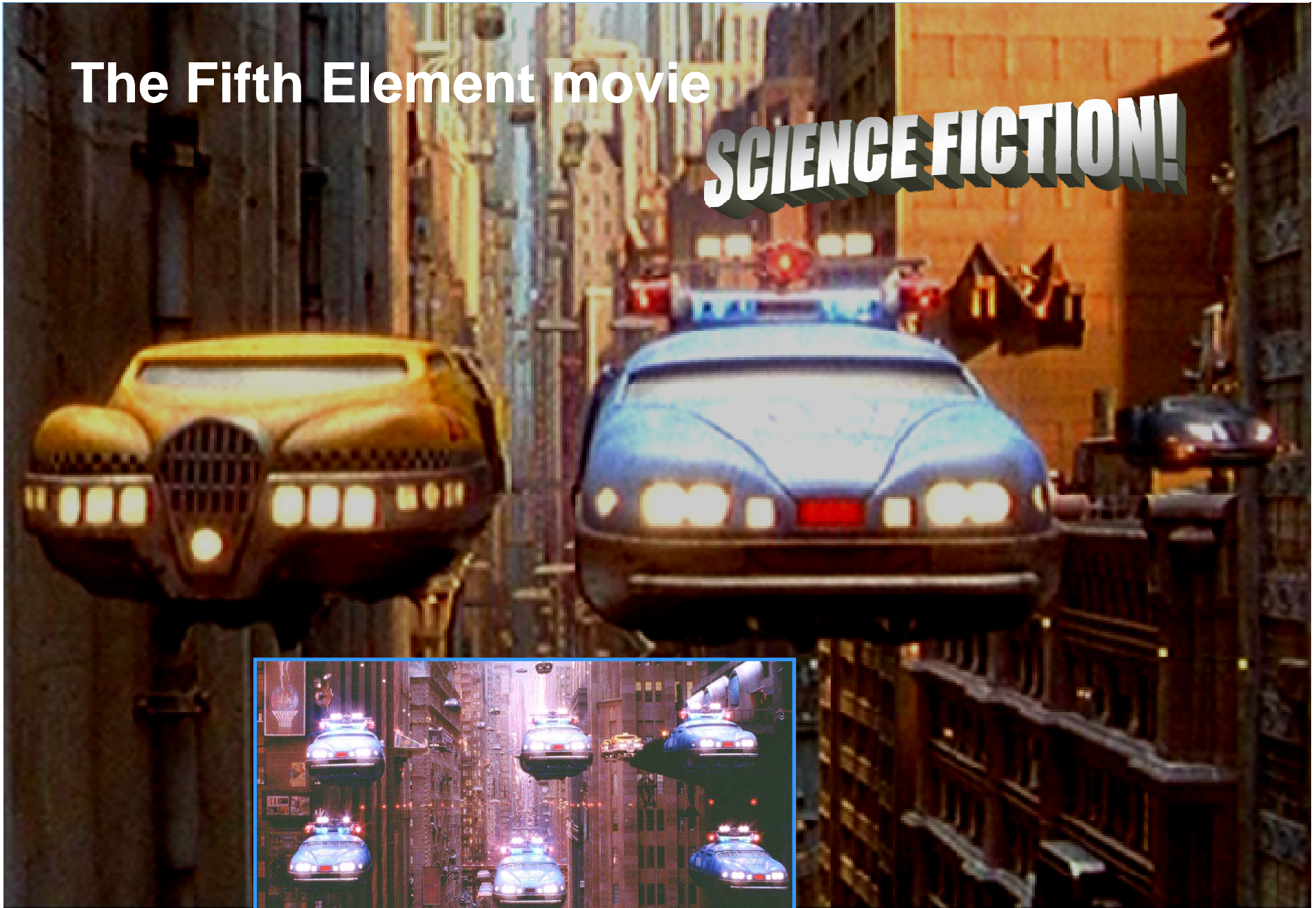
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PPLANE introduction - July 2009 - CLT



The Fifth Element movie

SCIENCE FICTION!



“Out of the Box” exercise
Project 5 - a personal air transport system (idea 12)

SCIENCE FICTION?



Project (Personal Plane)

Acronym: PPlane

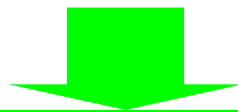
- FP7 second call
- Type of funding scheme:
 - **Collaborative Projects**
 - **Small or medium-scale focused research**
- Work programme topics addressed:
 - **AAT.2008.6.3.3. Personal air transport systems**
- Budget: 4.4 M€ (3.3 M€ from the EC)
- Duration: 30 months
- Current status: negotiation phase (from May 13th)
- Anticipated start date: Beginning of October 2009

Aims at developing system ideas to enable individual air transport

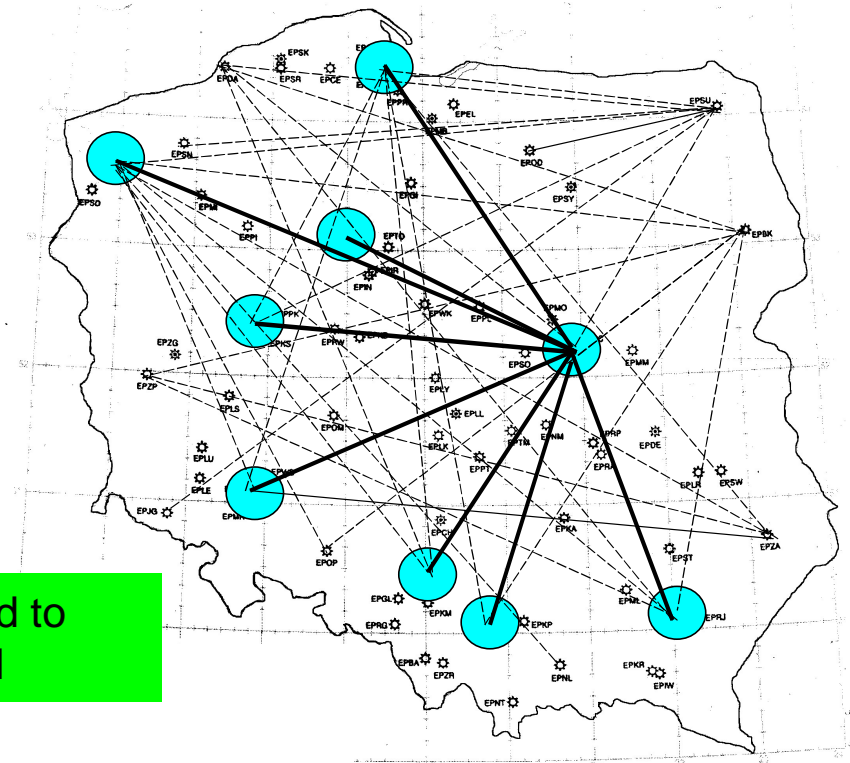
- To avoid the ever increasing congestion on European roads
- To offer an alternative for the current transport system in new European Member States

Estimated foreseen demand of personal transport from EPATS project (FP6 SSA):

- 540,000 pax.km / year / aircraft
 - block speed - 300 km/h
 - 3 persons / aircraft
 - 600 h / year / aircraft
- 210 billions pax.km/year could be performed by airplanes



388,000 personal aircraft needed to substitute long distance car travel

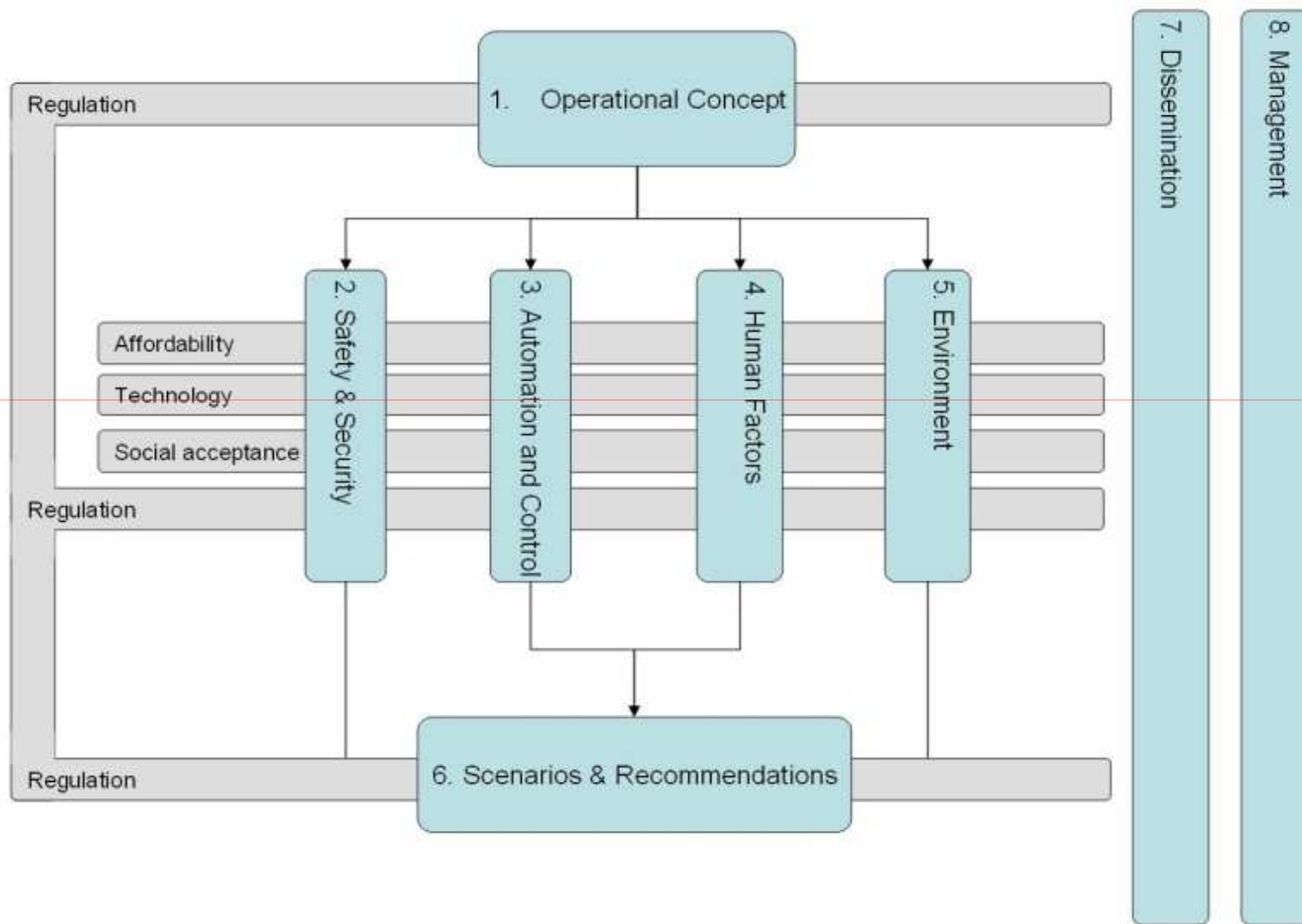


Preliminary thoughts :

- Automatism developed to allow a “regular Joe” to use his own aircraft without any difficulties
 - In various weather conditions
 - On the command and control aspects
 - Including its integration into the airspace with the other sky users
- Aircraft safe in a large flight envelope
- Aircraft is part of a “system” enabling the “pilot” to manage its flight
 - asks for a destination
 - monitors the flight until reaching that destination
 - gets help and information from the ground when needed

- Out-of-the-Box project as a starting point
- Implements a systematic approach to propose radical and novel ideas for Personal Air Transport System (PATS):
 - Definition of several operational concepts for the personal air transport system of the future
 - Implementation of an optimisation model including several selection criteria to suggest and analyse these concepts:
 - “Security and safety” (Regulatory issues)
 - “Automation and Control”
 - “Environment”
 - “Human Factors”
 - Consideration of horizontal areas such as technologies, **regulation** and affordability in each of the above criteria
- Resulting concepts are analysed and compared
- Recommendations for implementation across Europe are given

- | | | |
|--|--------------|---------------|
| 1. French Aerospace Lab | ONERA | France |
| 2. Israel Aerospace Industries | IAI | Israel |
| 3. Airnet | AIR | Slovenia |
| 4. Bologna University | UNIBO | Italy |
| 5. Brno University | BUT | Czech Rep. |
| 6. CIRA | CIRA | Italy |
| 7. Intergam Communications Ltd. | ITG | Israel |
| 8. Warsaw University of Technology | WUT | Poland |
| 9. AT-One, German Aerospace Center | DLR | Germany |
| 10. Instituto Nacional de Técnica Aeroespacial | INTA | Spain |
| 11. AT-One, National Aerospace Laboratory | NLR | Netherlands |
| 12. University of Patras | PAT | Greece |
| 13. REA-TECH Engineering and Architect Ltd. | REA | Hungary |



fields of interest

- Affordability as the economic aspect of a personal air transport system is paramount
- Technology as this is a major enabler of such a system:
 - Vehicle able to fly with a “non-pilot pilot”
 - Low noise / low consumptions power plant
 - Vehicles are part of an overall personal air transport system
- Social acceptance as any significant change in the population way of life has to be agreed and not imposed
- Regulations as the introduction of a new system into the already well-regulated air transport system has to be carefully prepared in order to follow existing rules and procedures
 - Airworthiness
 - Operations (Rules of the air, environment...)
- Connection with SESAR roadmap

Operational Concept

Define, evaluate and select the most promising Concepts of Operation for a Personal Air Transport System (PATs) through the analysis of several scenarios:

- definition of the airspace of interest
- density of aircraft in the airspace of interest
- model of take-off and landing
- model of certification
- model of training and ownership, liability issues, level of automation and other aspects, for example weather conditions

WP2. Security and safety

Characterise the selected concepts in terms of safety and security and to investigate possible solutions in order to obtain a safe and secure PPlane, and to specify the corresponding requirements

WP3. Automation and control

Evaluate the possible levels of automation and autonomy to be implemented into the PATS vehicles
This evaluation will also include the operation concept

WP4. Human factors

Evaluate the human factors for several automation levels of PPlane

The required competencies of the pilots and the man-machine interfaces will be investigated

WP5. Environment

Assess the vehicle propulsive systems and trajectories regarding environment

Environment is understood as including chemical emissions and noise

WP6. Scenarios and recommendations

Assess the PATS concepts, from a full operational concept perspective

Scenarios will be set up to verify the main assumptions of the project works

Recommendations will be derived to make such a system possible if it appears to be workable

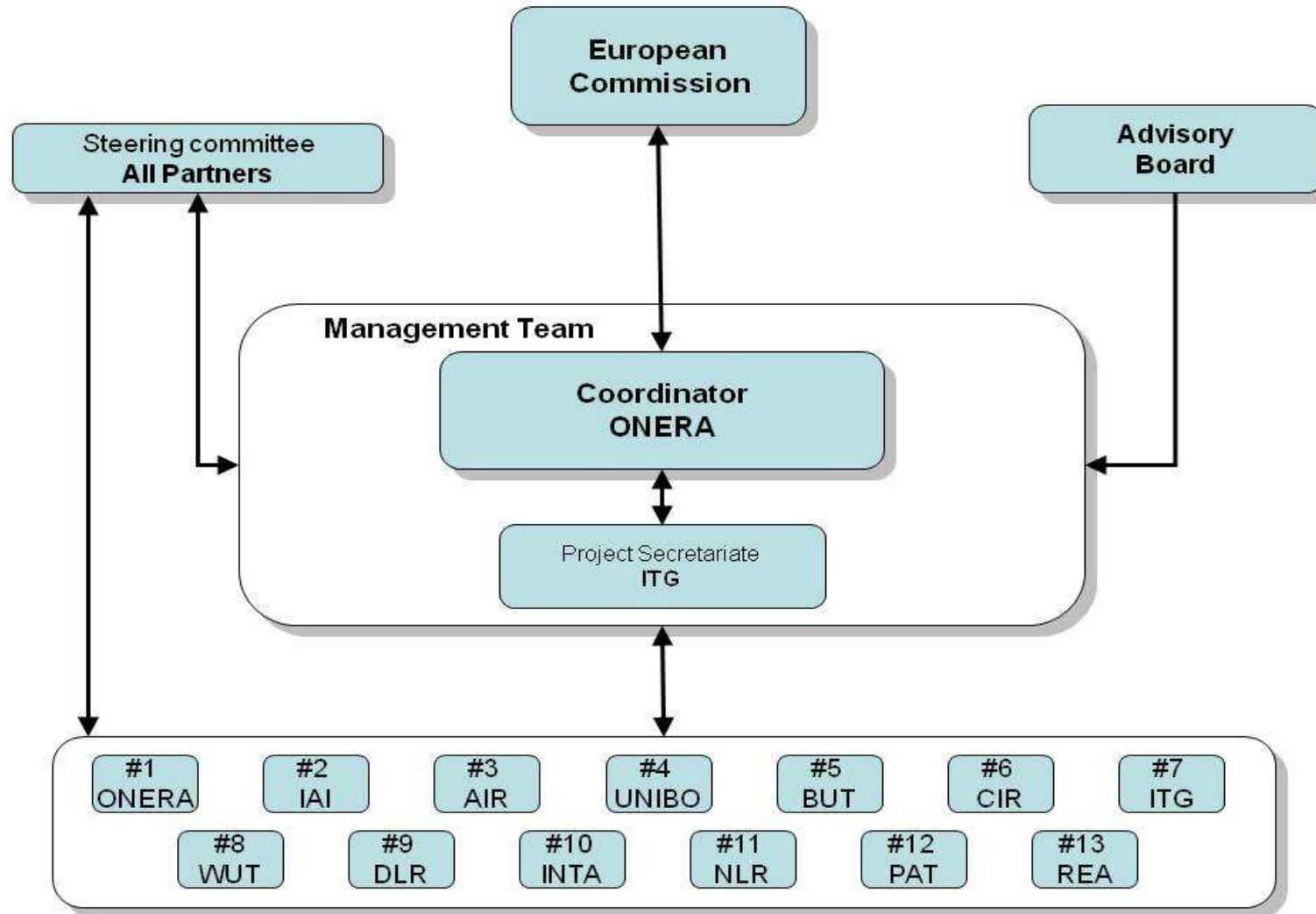
WP7. Dissemination and WP8. Management

“Conventional” work packages of any European project

Results of the project will be properly disseminated

Management in a professional way

End Management Structure



“An advisory committee will be set up, consisting of professional experts, as well as decision makers, to be consulted for the consolidation and validation of the information and conclusions that will serve as a basis in the establishment of recommendations for a future research agenda.

The Advisory board will also have a role in the dissemination of project results”

Expected outputs

PATS operational concepts for a safe and efficient operation of personal air vehicles

- Identification of few fundamentally innovative challenges
- Solutions in the difficult areas of operating systems, systems engineering, regulation and control
- Processes and procedures for a safe operation of a large number of small aircraft
 - Air vehicles
 - Non-pilot pilot
 - Ground segment / ATM
- Proposed ways toward the implementation of a PATS