Knowledge lies at the heart of the European Union's Lisbon Strategy

Numerous programmes, initiatives and support measures are carried out at EU level in support of knowledge.

The Seventh Framework Programme (FP7) bundles all research-related EU initiatives together under a common roof playing a crucial role in reaching the goals of growth, competitiveness and employment.

FP7 budget: over €50 billion

Additional information about FP7: http://cordis.europa.eu/fp7/understand_en.html
The FP6 IFATS project


- Objective
  - Define a fully automated Air Transport System

- Findings and conclusions
  - Definition of the ‘4D contract concept’
  - Description of the concept of operation
  - Description of the benefits compared to the current ATS
  - First analysis of the system performance
    - Through independent simulations
  - Thoughts about social acceptability

- To be complemented by an integrated simulation
  - Interactions between system actors
  - Estimation of the computational needs
IFATS outputs

- Skepticism about the 4D contract concept
  - Basic concern: is it possible to compute conflict free 4D trajectories and then to operate aircraft along those trajectories?
  - ATM wise: is it possible to manage 4D contracts?
    - Strategic level
    - Tactical level
    - Role of the controllers
    - Minimal required automation level.

- Aircraft wise
  - Will it be possible to guide and control aircraft along the contract?
  - Role of the pilots
  - Minimal required automation level
4D Contracts – Guidance and Control

- Acronym: 4DCo-GC
- 7th Framework Programme, third call
- Type of funding scheme
  - Collaborative Projects
  - Small or medium-scale focused research
- Work programme topics addressed
  - AAT.2010.6.2-2 Guidance and Control
- Budget: 5.5 M€ (3.9 M€ from the EC)
- Duration: 36 months
- Start date: 1st of November, 2010
Participants

- ONERA, France
- Alenia Aeronautica, Italy
- CIRA, Italy
- DLR, Germany
- ENAC, France
- Erdyn Consultants, France
- IAI, Israel
- Monitor Soft, Russia
- NLR, Netherlands
- Technion, Israel
- Thales Comm, France
- TsAGI, Russia
- University of Patras, Greece

13 partners
7 countries
5 RC
3 universities
3 industries
2 SME
A. Introduction + D. Trajectory Management

- Extensive use of automation support to reduce controller task load, but in which controllers remain in control as managers.
- However, it must be emphasized that this does not prevent controllers and pilots making time critical changes as required.

E. Automation Support

- Main constraint to airspace capacity: controller task load.
- Need for a substantial reduction of controller task load per flight; Controller task load is generated from two different sources:
  - (i) the routine task load associated with managing a flight through a sector
  - (ii) the tactical task load associated with separation provision
4DCo-GC project context

- Flightpath 2050 – Europe’s Vision for Aviation
  - Report of the High Level Group on Aviation Research
    Automation has changed the roles of both the pilot and the air traffic controller. Their roles are now as strategic managers and hands-off supervisors, only intervening when necessary.
Project expected outputs

- 4DCo-GC could clarify most of the questions around the term "4D contract"
  - Required precisions
  - Estimated constraints
  - Requirements for future planning systems
  - Requirements for future data links
  - Requirements for ground system computer performance needs
  - Requirements for aircraft system computer performance needs

Inputs to SESAR and aircraft manufacturers

- Demonstration / illustration of what is an 4D contract-based ATS
Project methodology

- IFATS work + other related projects and initiatives
  - SESAR, ASAS TN, SWIM, ERASMUS…
- Simulations using PC-based computer tools
- Network of experts in the ATS field: the 4DCo-GC partners
- Demonstration to a public audience in order to get feedback from ATS stakeholders

![Diagram showing connectivity and modules for Project methodology]
Workflow

- Definition & modelling
  - 4D contracts, aircraft guidance & control, communication

- Workshop 1
  - Simulation campaign (C1)
    - Advisory Board
    - Users Group

- Definition & modelling
  - update

- Workshop 2
  - Simulation campaign (C2)
    - Advisory Board
    - Users Group

- Validation

- Dissemination

- Management
Project objectives

- To address the aircraft 4D contract guidance and control principle
  - Defining and modeling 4D contracts
  - Assessing the 4D contract concept of operation viability and performance (simulations based on a distributed architecture)
    - Especially from a guidance & control of aircraft perspective
  - Deriving recommendations for future 4D trajectory system development and performance standards

- To go deeper in the definition of the "4D contract concept"
  - Recommendations for future 4D trajectories (4DT) guidance and control aircraft systems and for 4D trajectory ground system development
  - Recommendations for overall system performance standards