



## **ALICIA - EC Project Synopsis**

### **Background**

ALICIA directly addresses the Vision 2020 goal of improved time efficiency in the air transportation system by developing new cockpit systems that can deliver significantly more aircraft movements than is possible today. The aim within ALICIA is to develop new systems which will permit aircraft to operate in almost all weather conditions and to fly closer together at lower risk, whilst simultaneously driving down air transport delays. ALICIA will couple the latest thinking in air traffic management (SESAR) with new cockpit concepts capable of providing improved mission performance whilst also enhancing situation awareness. Thus, the two key areas of technological advance will be an All Conditions Operations (ACO) system capable of delivering robust worldwide operations capability, allowing aircraft to use airports with less capable ground based approach aids, in a wider range of degraded flight conditions. The second key area of technological advance will be a new cockpit architecture facilitating the introduction of new cockpit technologies and applications capable of driving down crew workload whilst enhancing safety and improving crew situational awareness. The rationale for the new cockpit architecture is borne of the certainty that within the next decade the cockpit design will be stressed by the introduction of a series of new concepts such as ACO and those being developed within the SESAR programme.

### **Objectives**

The two overarching project objectives are:

1. Development of an ACO capability to reduce weather-related delays by 20%.
  - Delivering a robust worldwide operations capability, allowing aircraft to use airports with less capable ground based approach aids, in a wider range of degraded flight conditions.
  - Delivering more autonomous aircraft operation, including anticipation and avoidance of weather disturbances and other possible perturbations in-flight or on the ground.
  - Delivering improved punctuality while simultaneously enhancing safety.
2. Development of a new cockpit architecture facilitating the introduction of new technologies and applications.
  - Delivering a competitive, scalable core cockpit architecture applicable to all aircraft types.
  - Delivering seamless integration of innovative avionics technologies and new applications such as All Conditions Operations to respond to the new challenges of aircraft operation.
  - Delivering the architecture to enable the next step towards single crew operation



## **Description of Work**

The ALICIA programme provides an opportunity for many key stakeholders in Europe to work together towards a new approach to cockpit design. The application focus within the project will be All Conditions Operations because the technology integration implicit in the implementation of this system will challenge the cockpit design. However, All Conditions Operations is just one element of a diverse range of new systems that will arrive in the next generation cockpit and the cockpit architecture must be flexible enough to support this. Accordingly, within ALICIA, new core concepts applicable to all new flight-decks will be defined that facilitate the efficient introduction of a broad and expanding range of operational requirements, whilst achieving the lowest through life cost.

The utility and scalability of the new concept will be demonstrated using simulation / synthetic environments and bench testing to illustrate the feasibility of highly integrated on board functions performing:

- Strategic Surveillance of the Aircraft Environment
- Enhanced Navigation
- Robust Worldwide Operations in demanding Flight Conditions

The ALICIA activities will be performed within a structure covering the following six technical areas:

- 1) Requirements Capture
- 2) Concept Generation
- 3) Technology Selection/Refinement
- 4) Application Development
- 5) Evaluation in Cockpit Simulators
- 6) Dissemination and Exploitation

## **Results and Impact**

Low visibility in the critical phases of the flight near and on the ground is one of the most disruptive factors in European aviation today. It has been estimated that 16800 airline flights were cancelled in 2007 in Europe due to low visibility conditions, and in some major airports almost 50% of arrival delays are due to low cloud and poor visibility. ALICIA aims to provide the critical building blocks necessary to reduce delays in Europe associated with poor weather by at least 20%. This will provide very significant economic advantages as well as welcome benefits to the European traveller.

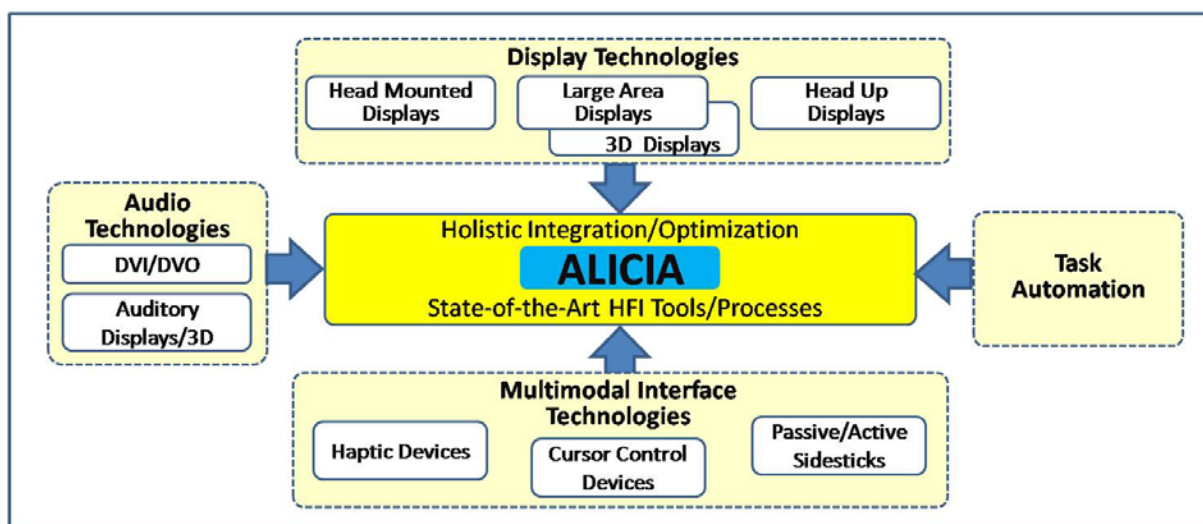
ALICIA will also make advances in the design of next generation cockpits using an approach that embraces the principles of increased standardisation and commonality across multiple aircraft types. This will contribute to an increase in re-use of European technology creating further competitive advantage whilst reducing time to market.

Some of the key innovations that will be pursued within ALICIA include:

- Robust management of flight phases near and on the ground
- Enhanced vision system and synthetic imagery
- Holistic approach to HMI design and integration

- Integration with the future airspace infrastructure
- Enhanced use of synthetic environments to support concept validation and product certification
- Novel display, control and audio concepts, e.g. head mounted displays, direct voice input, audio environment including 3D audio, large area/high resolution displays
- Improved sensor technologies supporting all environment capabilities
- High integrity architectures and databases
- Enhanced navigation techniques

### Supporting Image



### ALICIA Technology Integration