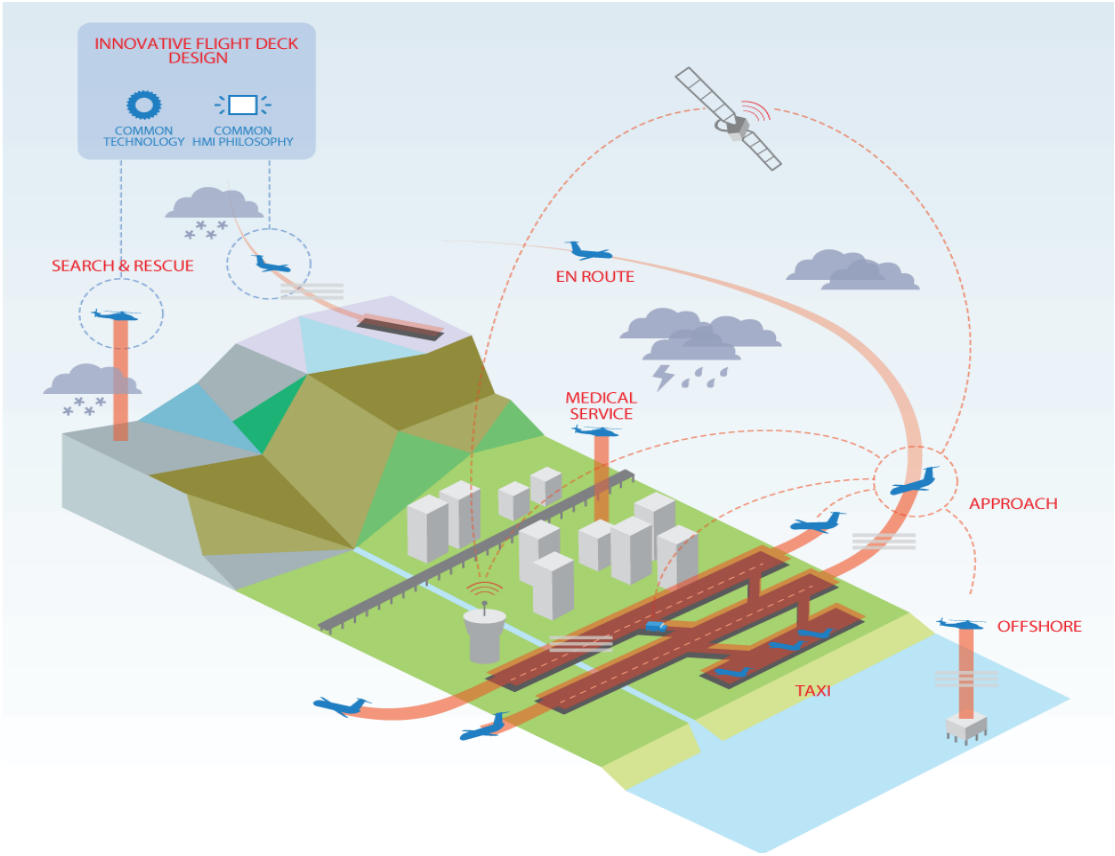
ALICIA

All Condition Operations
and Innovative Cockpit Infrastructure

Final Public Summary



Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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SEVENTH FRAMEWORK PROGRAMME

Project Context

A key challenge for the future air transport system involves the realisation of cockpit systems capable of delivering all-conditions operations to provide:

- 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.
- More autonomous aircraft operation, including anticipation and avoidance of weather disturbances and other possible perturbations in-flight and on the ground.
- Improved punctuality while simultaneously enhancing safety.

The ACARE Vision 2020 proposed a goal for an air transport system able to cope with up to three times more aircraft movements when compared to 2004, using new operational concepts and cockpit systems allowing aircraft to operate in all weather conditions, to fly closer together at lower risk and to run on schedule 99% of the time. ALICIA has performed research into a broad spectrum of technological concepts and has addressed key capabilities related to the ACARE goal. Specific emphasis has been placed on the development of aircraft cockpit system concepts and technologies considered to have potential for embodiment across multiple classes of aircraft; both fixed wing and rotorcraft.

Future Air Traffic Management (ATM) systems are set to adopt new operational processes and procedures around the Business Trajectory (BT) concept. The BT will contribute towards the Vision 2020 goals through the implementation of four dimensional (4D) trajectory management, collaborative decision making and new separation modes. Aircraft cockpits, although a small component within the larger ATM system, will be required to provide the necessary capabilities to enable the crew to operate in this future operational context.

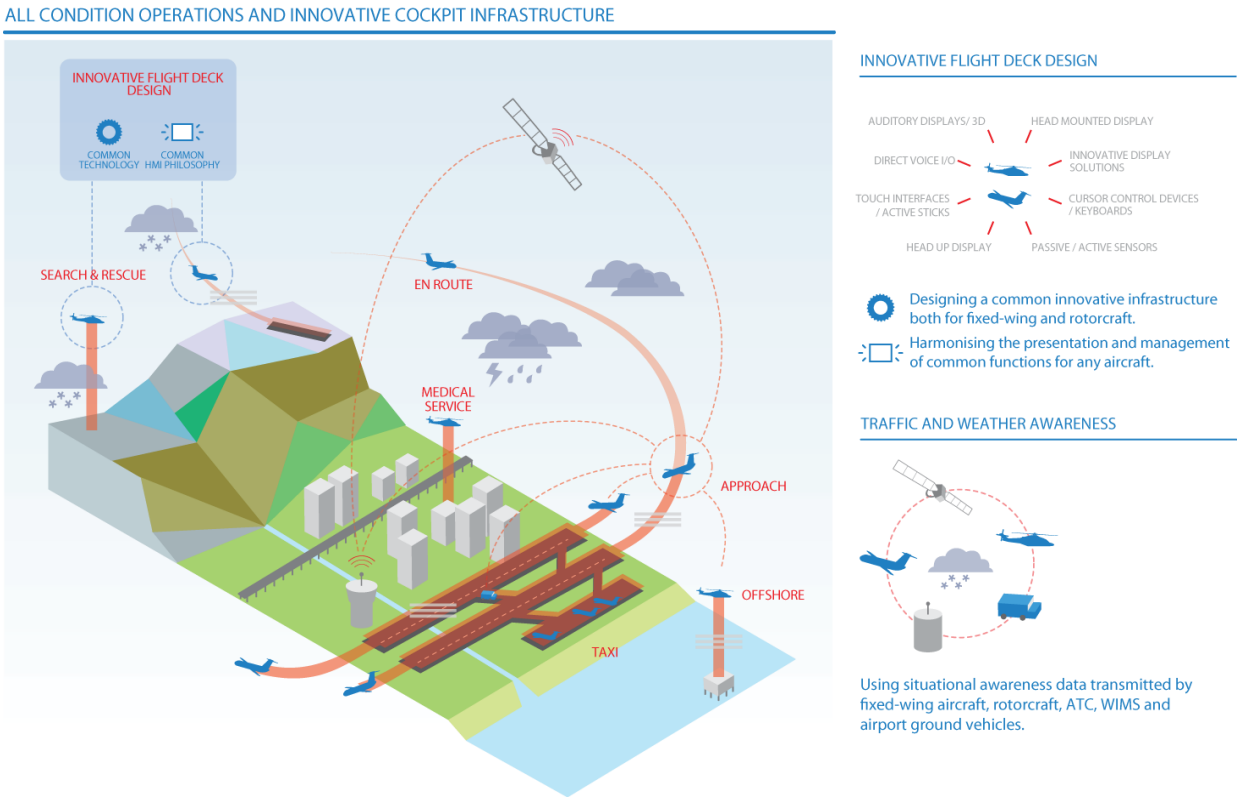


Figure 1: The ALICIA research context

ALICIA Consortium

The consortium was formed from a broad cross-section of the European aerospace manufacturing industry. The consortium mix was further enriched through the participation of leading European research agencies and universities engaged in the analysis of transport systems and related technologies. During the project 41 Partners from 14 countries participated in the technical research activities; the participation of organisations from outside of the EU also proved to be highly constructive. Partner organisations included large, medium and small enterprises. These are categorised as follows:

- Platform Integrators (8)
- System / Equipment Suppliers (8)
- Technology Specialists (8)
- Research Organisations (7)
- Universities (5)
- Experts (6)

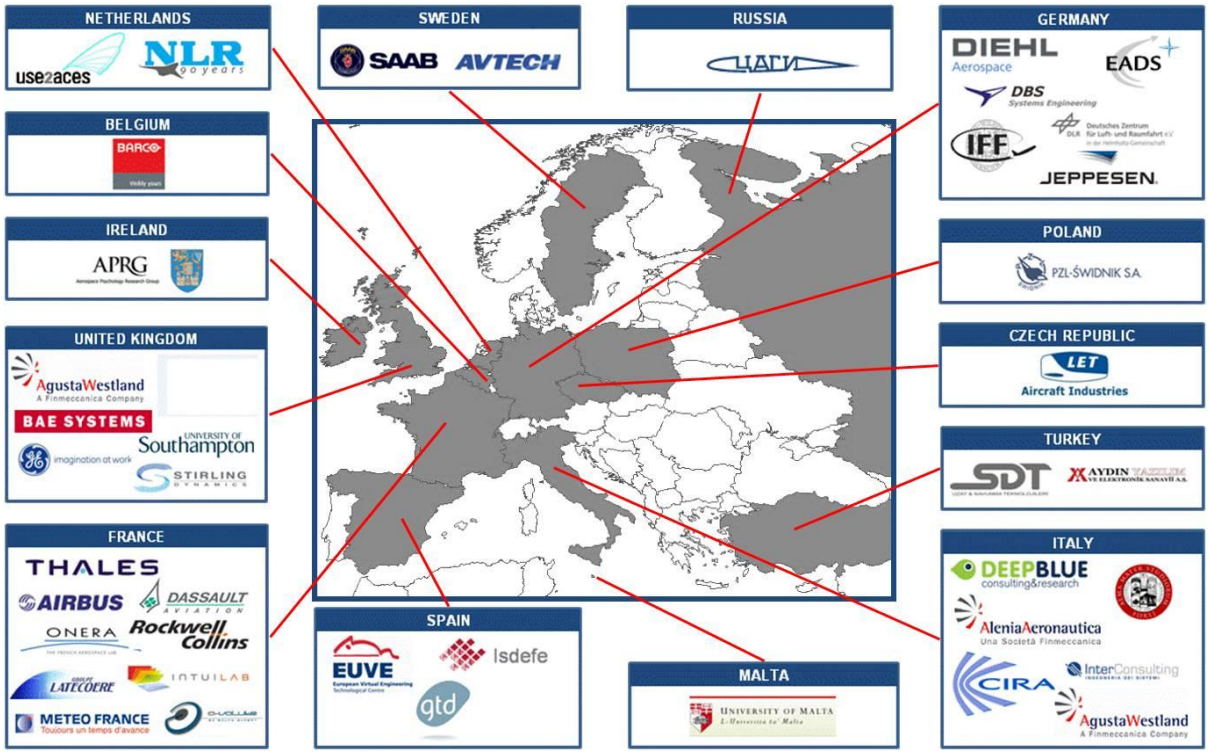
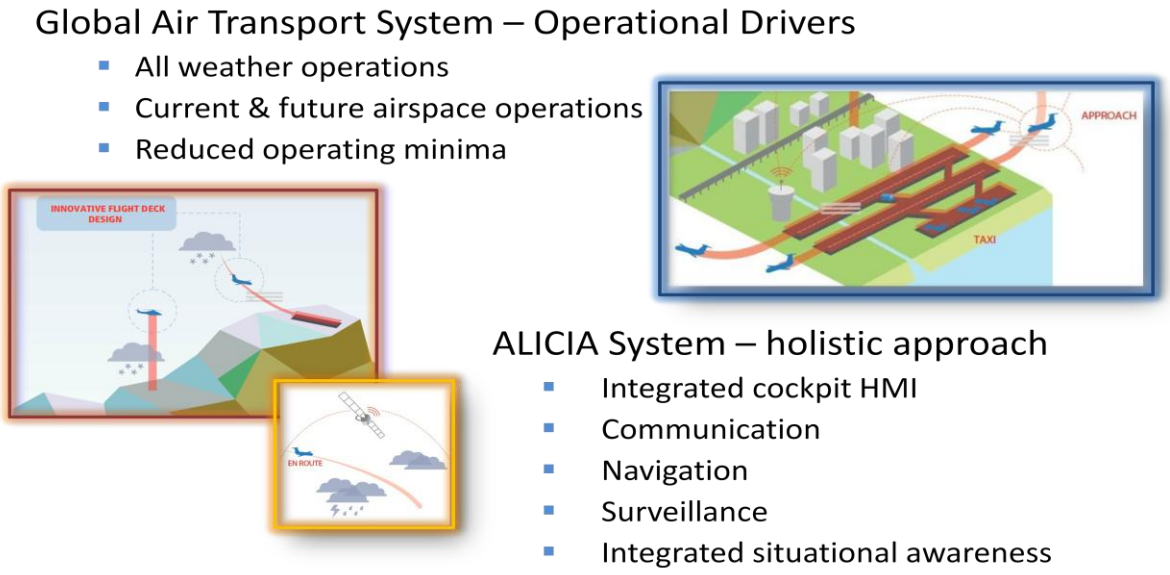


Figure 2: Regional profile of the ALICIA Partners

The ALICIA Challenge

The ALICIA project was conceived to address some key influencing factors for the future of European airspace. The application of concepts to both fixed wing and rotorcraft brought significant challenges and forged partnerships and friendships between organisations that had never worked together before.

The focus of the project was to analyse and shape solutions to a number of challenges:



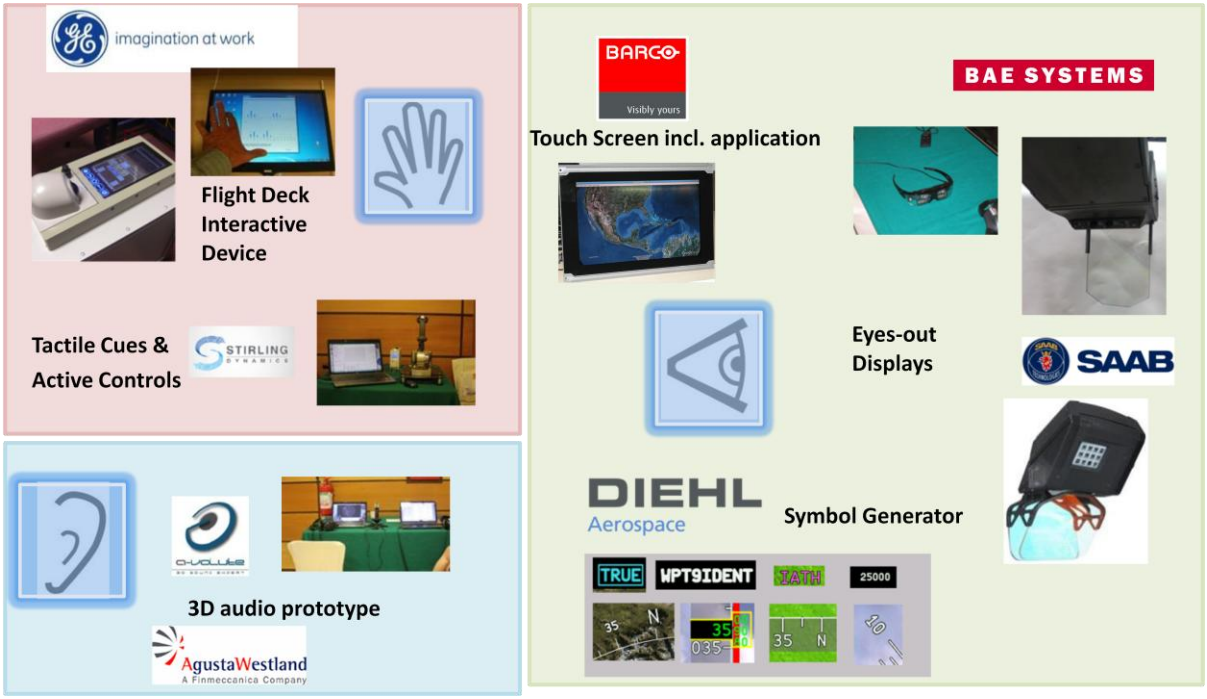
The project was broken down into four main subsystems**:**

- Navigation Technologies
- Surveillance Technologies
- Cockpit Display Technologies
- Multi-modal Input/output Technologies

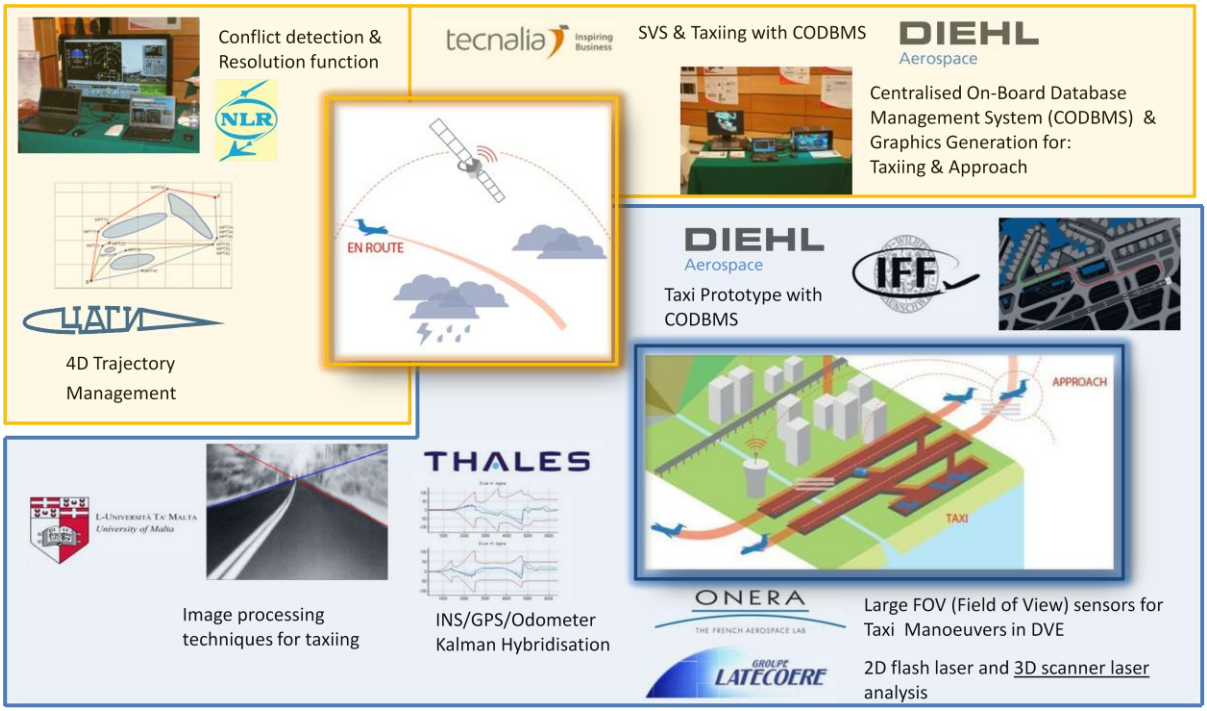
The partners then developed solutions which were reviewed and the selected solutions were forwarded to test beds for integration and testing by Aircrew.

ALICIA System Building Blocks

Components: Multi-Modal I/O and Cockpit Displays



Components: Navigation, Surveillance for En-route / Approach / Taxiing



ALICIA System concept Test beds

The principal outputs of the ALICIA work were illustrated using four separate system concept demonstrator test beds within an integrated test and evaluation activity. The individual test beds are listed below:

i). A rotorcraft full system integrated cockpit simulator test bed designed to evaluate the ALICIA output in the context of a rotorcraft implementation. This rig was developed by AgustaWestland in Yeovil, UK

ii). A fixed wing full system integrated cockpit simulator test bed designed to evaluate the ALICIA output in the context of a fixed wing aircraft implementation. This rig was developed by Thales Avionics in Bordeaux, France

iii). A taxi operation precise positioning test bed designed to evaluate the improvement of the real-time localisation on ground (both accuracy and integrity). This rig was developed by Thales Avionics in Valence, France.

iv). A taxi operation improved vision system test bed designed to evaluate specific technologies for degraded visual conditions. This rig was developed by Latecoere and ONERA in Toulouse, France.

Rotorcraft Cockpit Simulator (AgustaWestland, Yeovil, UK)

Fixed wing simulator (Thales, Bordeaux, France)

Taxi improved vision test bed (ONERA/Latecoere, Toulouse, France)

Taxi operation precise positioning test bed (Thales Avionics, Valence, France)

Exploitation timescales:

A number of potential near term (0-5 years) exploitation opportunities were identified by Partners. Those in the short term (0-3 years) are mainly for rotary wing applications. It is possible that there is greater market pressure for improvement – the major part of the total is related to ACO improvements, where rotary wing operations are currently very limited.

The exploitation candidates that are targeted for the 3-5 year period would bring some major improvements. In fixed wing applications these would include use of touch and larger displays on the flight deck. For rotary wing aircraft, there would also be further steps forward in ACO capability, including the use of 3D Conformal Symbology which proved highly successful in the rotorcraft full system integrated cockpit test bed trials.

The largest proportion of candidates is expected to be exploited in 5 – 10 years. This is not an unreasonable time period to allow for an innovation to reach a product application in the commercial aerospace sector. From the point of development reached in the ALICIA programme (typically around TRL5 or 6 for innovations demonstrated in the test beds), it will be necessary to:

- Carry out further evaluation and demonstration activities, possibly including flight evaluation, in order to increase the maturity further.
- Tailor the innovation to match the target platform application.

In addition, there will be a need to provide a framework for the eventual certification of the innovation, which may require the establishment of standards or certification regulations, which can be a lengthy process.

In summary, it can be expected that full exploitation of the concepts demonstrated in ALICIA will occur in the 5-10 year timeframe.