

Take-off with Aviation Safety and Certification



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PROJECT BACKGROUND

Many innovative technologies and operational concepts are not developed for reasons of implementation risk or too much time to reach implementation. ASCOS is necessary to remove undue certification obstacles and enable implementation of technologies to reach the European Union ACARE Vision 2020 and Flight Path 2050 goals.

To ease the efficient and safe introduction of safety enhancement systems and operations, a innovative approach towards certification is required that:

- Is more flexible with regard to the introduction of new products and operations;
- Is more efficient, in terms of cost, time and safety, than the current certification processes;
- Considers the impact on safety of all elements of the aviation system and the entire system life-cycle in a complete and integrated way.

Moving towards performance based regulation, based upon agreed safety performance in combination with a risk based approach to standardization, is expected to lead to improvements in the way that safety risks are controlled.

Anticipating on future risks and hazards by using a “proactive approach” helps to make the certification process robust to new developments.

Introducing ‘continuous safety monitoring’ will ensure that new essential safety data is effectively used immediately after it will be available.

The main impact and benefits of the proposed project are:

- Efficient and affordable certification of new safety enhancement systems and operations, with special characteristics that are not yet covered in existing Certification Specifications;
- Increase in safety: 80% reduction of accident rate is the safety performance target set by ACARE. ASCOS will contribute significantly to this target by focusing on innovative changes for priority areas to significantly reduce risk.



PROJECT SUMMARY

Fundamental changes in the institutional arrangements for aviation regulation in Europe, the introduction of new technologies and operations, and demands for higher levels of safety performance call for the adaptation of existing certification processes.

The objective of ASCOS is to develop innovative certification process adaptations and supporting safety driven design methods and tools to ease the certification of safety enhancement systems and operations while, at the same time, increasing safety.

The project will follow a total system approach, dealing with all aviation system elements in an integrated way over the complete life-cycle.

To investigate how dealing with all safety and certification aspects in an integrated manner may be made possible using a new process, new methods and new tools, ASCOS contains work packages on Certification processes, Continuous Safety Monitoring, and Safety Risk Management.

Four case studies will be conducted to validate the processes, methods and tools proposed. The case studies include the certification of aircraft failure management systems, a future ATM/CNS system for improved surveillance, aircraft systems for improved controllability in flight, and aircraft ground handling operations.

A very strong User Group will keep the project focused and facilitate the uptake of project results. ASCOS will provide efficient and affordable certification process adaptations for new aeronautical systems and operations. ASCOS provides safety based design systems and tools that better account for the human element, already from the early stages of the certification process, thereby reducing consequences of human error and increasing safety.

The ASCOS project is based on the following work packages:

- WP1 Certification process (lead Thales Air Systems SA)
- WP2 Continuous safety monitoring (lead Avanssa)
- WP3 Safety risk management (lead EADS APSYS)
- WP4 Certification case studies (lead NLR)
- WP5 Validation (lead ISDEFE)
- WP6 Dissemination and exploitation (lead CertiFlyer)
- WP7 Management (lead NLR)

SPECIFIC OBJECTIVES OF THE RESEARCH

The main aim is to develop certification process adaptations, with supporting tools for safety based design and safety monitoring, so as to ease the introduction and certification of safety enhancement systems and operations.

To achieve this, the six work packages address six specific research objectives:

- To analyse the existing European certification and rulemaking process and propose potential adaptations to ease certification of safety enhancement systems and operations;
- To develop a methodology and supporting tools for multi-stakeholder Continuous Safety Monitoring, using a baseline risk picture for all the parts of the total aviation system;
- To develop a total aviation system safety assessment method and supporting tools that can be used for safety based design of new systems, products and/or operations;
- To apply proposed certification process adaptations and the design systems and tools in case studies, so as to show how they can be used by operators and manufacturers.
- To validate key results: a) new certification approach, b) method and tools for Continuous Safety Monitoring, and c) all the supporting safety based design systems and tools.
- To inform air transport stakeholders on the proposed certification approach through promotion workshops, supported by exercises and an e-learning web-site environment.

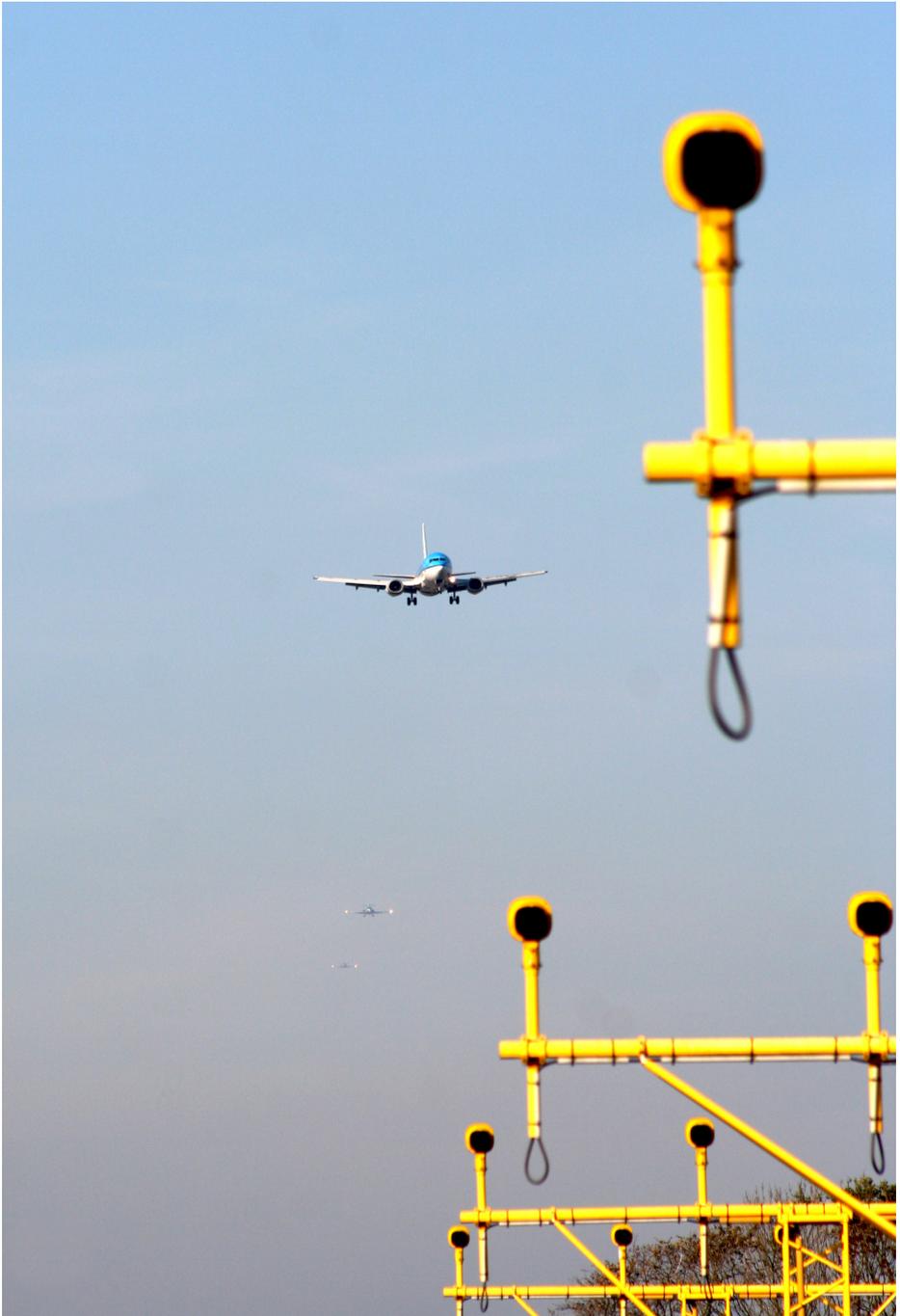


METHODOLOGY AND APPROACH

The project is divided in five phases

- I. The first phase will analyse existing European certification and rulemaking processes and identify potential shortcomings and bottlenecks in view of the foreseen regulatory changes and technological developments. Following this analysis, innovative approaches to certification will be defined and evaluated. The results of this evaluation will be used to select and further develop affordable innovative certification processes so as to ease certification while maintaining (or even increasing) aviation safety.
- II. The second phase will set up a baseline for the current risk level of the various parts of the total aviation system during its complete life cycle. Aviation safety data will be used to establish a baseline risk picture for the main operational issues identified in the European Aviation Safety Plan (EASP) using Safety Performance Indicators (SPIs). This risk picture will be used as baseline to set up a process for continuous safety monitoring.
- III. The third phase aims to establish a good view on potential emergent and future risks not present in today's aviation system. A total aviation system safety assessment method with supporting safety based design systems and tools will be developed. A proactive approach will be taken to ensure that potential future hazards and risks can be mitigated and safety will be maintained or even increased as compared to the baseline risk picture.
- IV. The newly proposed certification process adaptations, and its supporting methods and tools for continuous safety monitoring and safety based design, will be applied in a number of case studies, already selected in co-ordination with ASCOS User Group members. This will be followed by a quantification of the overall safety impact (reduction of the accident rate) of introduction of selected new operations and systems in Europe.
- V. The fifth phase deals with the validation of the scientific and technological advance that the proposed project is expected to bring:
 - New affordable certification processes to make certification easier;
 - Innovative safety based design systems and tools; and
 - New methods and tools to support continuous safety monitoring.





USER GROUP

European Aviation Safety Agency (EASA)
Federal Aviation Administration (FAA)
SESAR Joint Undertaking
European Organization for Civil Aviation Equipment (EUROCAE)
SAE S-18 Airplane Safety Assessment Committee
Safety Regulation Commission (SRC)
European Strategic Safety Initiative (ESSI)
European Organization for the Safety of Air Navigation (EUROCONTROL)
International Air Transport Association (IATA)
Future Aviation Safety Team (FAST)
European Society of Air Safety Investigators (ESASI)
Civil Aviation Authorities (The Netherlands, Poland, ...)
Aircraft manufacturers (Dassault Aviation, Rockwell Collins, ...)
TUV NORD CERT GmbH – Aviation

PROJECT DETAILS

EU Programme:	FP7 Transport - Aeronautics and Air Transport (AAT)
EU Activity	Ensuring customer satisfaction and safety (7.1.3)
EU Area/topic:	Operational Safety (7.1.3.4)
EU Sub Programme area:	Design systems and tools (AAT.2012.3.4-1)
Contract type:	Small or medium-scale focused research project
Total cost:	4702893 EURO
EU contribution:	3365884 EURO
Grant Agreement:	ACP2-GA-2012-314299-ASCOS
Starting date:	1 July 2012
Duration:	36 months

CONSORTIUM Partners:



STICHTING NATIONAAL LUCHT- EN
RUITTEVAARTLABORATORIUM
(COORDINATOR)

THALES

THALES AIR SYSTEMS & ELECTRON
DEVICES GMBH
THALES AIR SYSTEMS S.A.



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