

ACARE – Research Strategy for Safety & Certification

ACARE Goals concerning safety research

Based on the objectives of Vision 2020 the ACARE SRA has two Goals relating to aviation safety.

- Reduction of the accident rate by 80%,
- Drastic reduction of impact of human errors and its consequences.

Additionally the Flightpath 2050 aims for:

- Less than one accident per ten million commercial aircraft flights in the overall European air transport system.
- Reduce of the number of accidents in specific operations, such as SAR by 80% compared to the year 2000 taking into account increasing traffic.
- Precise evaluation of risks and proper mitigation measures concerning weather events and other hazards from the environment.

In overseeing the Implementation of the ACARE SRA, currently ACARE does not have an overall view of the European aviation safety activities and this paper investigates whether ACARE could enhance the coordination and the common safety research agenda across the community.

Safety is the key element of aviation regulations and rests on three pillars:

- the technology, systems design and operations,
- regulations including certification and qualification, a special challenge will be presented in establishing systems of certification and qualification in the highly complex and integrated systems of the future,
- the human performance to operate the whole chain of Air Transport activities.

Hence, although ACARE focuses on research, Safety is not solely a research issue but research has the great potential to support safety improvements and to justify safety related regulatory actions.

EASA's Missions and Responsibilities

The European Aviation Safety Agency (EASA) develops common safety and environmental protection rules at European level. It monitors the implementation of standards through inspections in the Member States and provides the necessary technical expertise, and training. The Agency works hand in hand with the National Aviation Authorities (NAA), which continue to carry out many operational tasks such as the certification of individual aircraft or the licensing of pilots.

The European Aviation Safety Agency also carries out executive responsibilities in the area of type-certification: the certification of aircraft, engines or parts approved for operation in the European Union. The aviation industry benefits from common specifications, cost-efficient services and a single point of contact.

On research one of the mandates of EASA is that it may develop and finance its own research and shall coordinate these activities with the Commission and Member States so as to ensure that policies and actions are mutually consistent. Furthermore in taking any action the European Commission and the Agency shall take into consideration the latest scientific and technological progress. Research on regulatory activity is not only funded through EASA but also through SESAR and the EU Framework Programme which is supporting longer term safety-related research. Some National Aviation Authorities of the Member States also carry out some safety research but their research budget is constantly decreasing under the assumption that EASA will now launch the bulk of this type of research.

Pan-European Aviation Safety Management

In order to further improve the already high level of safety obtained in the civil aviation industry, ICAO has promoted the principles of safety management revolving around Safety Management Systems (SMS) for industry organisations and State Safety Programmes (SSP) for contracting states.

The management of safety has evolved over the years. The review of the rare accidents that occur is not enough to achieve significant improvement; incidents and occurrences must be analysed to understand the risks to aviation safety. Improving safety records has become a challenging job including research that requires collective efforts and prioritisation of scarce resources.

The sharing of roles between the European Union and the Member States yields the need for a European Aviation Safety Programme (EASP) to complement what is done by the Member States and which encompasses the power transferred to the Union. In view of this need and in order to streamline the strategic approach, a European Aviation Safety Advisory Committee (EASAC) was established with representation from industry, some Member States, EUROCONTROL, the European Commission and EASA tasked to develop an approach for European aviation safety based on three elements:

- A set of policies and objectives from political authorities (the safety strategy).
- An integrated set of regulations and activities aimed at improving safety (the safety programme).
- A high level safety issues assessment and related action plan (the safety plan).

The European Aviation Safety Programme (EASP) places the management of safety at the core of the system and establishes new processes to collectively address safety priorities by all the players, beyond just regulatory authorities.

With these three key elements Europe is pioneer in this endeavour as no other region in the world has similar documents that turn safety management into action.

Coordination of Safety Initiatives at European level

The European Strategic Safety Initiative (ESSI) is a 10-year voluntary, privately funded and non-legally binding aviation safety partnership aiming to further enhance aviation safety in Europe and for citizens worldwide. Facilitated but not owned by the European Aviation Safety Agency (EASA), it brings together aviation authorities, operators, manufacturers, associations, professional organisations, research laboratories, EUROCONTROL, and international partners like ICAO and the Federal Aviation Administration (FAA).

The ESSI fits naturally within the Global Aviation Safety Roadmap developed in 2006 for ICAO by the Industry Safety Strategy Group led by the International Air Transport Association (IATA).

Safety-oriented research activities

The main objective of research activities developed by EASA and National Aviation Authorities (NAA) is to ensure that decisions, regulations, guidance material and recommendations for safety improvements and environmental protection measures are based on sound scientific grounds. Simultaneously, the safety regulator benefits of guaranteeing its independence and impartiality in developing its approach and policy.

The European Aviation Research Partnership Group (EARPG) has been formed with representatives of EASA, National Aviation Authorities (NAA), European Commission DG MOVE and DG RTD and EUROCONTROL with the following main objectives:

- Gather information from the EASA member states on on-going and planned research programmes,
- Identify and coordinate priorities to avoid unnecessary duplication of work,

- Establish collaborative programmes where appropriate.

Recently the EARPG developed its first Thematic Programme as a guidance document. Thematic areas for research were identified particularly by analysing the top priorities of the European Aviation Safety Plan (EASP) and the European Strategic Safety Initiative (ESSI). Research needs emerge as well from changes in the aviation industry such as those applied for the new generation of commercial transport aircraft with a wide range of novel technologies. Such aspects are addressed in the Emerging Issues section of the EASP.

Since human factors are still a significant contributor to accidents recommendations from the European Human Factors Advisory Group (EHFAG) are incorporated in the Thematic Programme.

To provide advice on the technical content and priorities of a helicopter safety research programme in 1993 A Helicopter Safety Research Management Committee (HSRMC), chaired by the UK CAA, and comprising of NAAs mainly of States neighbouring the North Sea, EASA, helicopter manufacturer and operator, and UK DOT was founded to provide advice on the technical content and priorities of a helicopter safety research programmes.

In the definition of their own research plans EASA and the Member States are encouraged, in a coordinated manner, to take into consideration as much as possible this Thematic Programme. Furthermore it is highly recommended that the European Commission and its advisory bodies for research programming such as ACARE also refer to this Thematic Programme when defining the future Aeronautics and Air Transport R&D work programmes.

ACARE and Safety Research Network

The following three fields of action could provide a significant contribution to reaching the ACARE safety and human factor goals as well as the Flightpath 2050 objectives:

- Large research programmes which are aimed for the development on new aviation products, technologies, processes, procedures or operation should already at an early stage take into consideration (be part of the project) the safety aspects and the implications this novel technology might have on the overall safety of the air transport system, particular attention should be addressed to investigate the potential necessity to adapt and amend existing regulations including the new product. The involvement of NAAs' and EASA experts as partner in a project or as member of a project stakeholder board / advisory committee.
Benefit: everybody kept up-to-date with new / novel technology, early initiation of regulatory action, shorten time-to-market
- Specific thematic programmes and research projects dedicated to safety and originating from pan-European initiatives like EASP and ESSI and others are defined for instance in the EARPG Thematic Programme. These projects should be included in NAA's, EASA's research plans as well as in the national and European research work programmes.
Benefit: Assurance that priority safety research projects are realised through various possible instruments and simultaneous maximum use of synergies.
- Identification of specific areas for research which will assist to improve safety and contribute to reach the ACARE safety goals. Safety topics relevant for future programmes should take into consideration: reported safety issues, accidents, incidents, occurrences, safety recommendation, in-service experience, and others.
Benefit: The research community developing project proposal are well informed about hot-spot and safety concerns where research could play a significant role contributing to safety improvement.

A network of relevant stakeholders, those who have the knowledge of safety issues and those who have a leading role in providing advice to defining research programmes such as ACARE, should be created to exchange information which will lead to a visible safety

research programme. Existing infrastructure should be used, not a new group or organisation created. Key players of such a network could be ACARE, EASA safety analysis, EARPG, ANSPs/EUROCONTROL, ASD-IMG4, EREA-ARG, AirTN, and others.

However, measurable results in the sense of the ACARE safety goal might be difficult to be seen in a 20-30 year timeframe due to lifetime of aircraft generation, application of grandfather rules in certification etc.

Main References

EASA safety management and EASP: <http://easa.europa.eu/sms>

ESSI: <http://easa.europa.eu/essi>

EARPG: <http://easa.europa.eu/earpg>

EHFAG: <http://easa.europa.eu/ehfag>