



Strengthening European Transport Research & Innovation Strategies

SETRIS PROJECT

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EXECUTIVE SUMMARY

The ambitious goals addressed by Flightpath 2050 continue to challenge all ACARE stakeholders. Progress towards the integrated transportation system is slow. More research is needed and very little progress has been made with regards to basic key areas of the integrated transport system laid out in the White Paper on Transport and the Strategic Research and Innovation Agenda (SRIA), e.g. the architecture of an integrated door-to door transport system, its interoperability standards, regulatory framework and business cases. The biggest challenge lies in getting a critical number of stakeholders in different transport modes, business environments and geographical regions involved to develop, agree upon and implement new systems, procedures and business models.

The ACARE Strategic Research and Innovation Agenda (SRIA) provides a phased roadmap to achieve the goals set out in Flightpath 2050. However, as the global economic, transport and environmental baseline changes, this Research Agenda must be updated to reflect such developments. A number of new factors including the following now prompt a further review:

- Results of FP7, Clean Sky and SESAR delivering new technologies, common concepts and opportunities such as electrical flying.
- The emergence of new manufacturing processes which are vital for competitiveness.
- Impacts on EU Airline competitiveness resulting from rising operators from the Gulf.
- Recent accidents including MH370 and the Germanwings flights showing that additional issues need to be addressed.
- The development in more remotely piloted aircraft systems (RPAS) is delivering new ideas and concepts which need to be taken into account.
- Application of IT including cyber security.

Some of the above developments and changes could not have been foreseen five years ago. Thus on 20 October 2015, the ACARE General Assembly approved to review and update the content where necessary from the SRIA published in 2012.

This update shall include amendments that will reflect the progress of Research and Innovation in Aviation since the publication of the SRIA as well as the changing European and Global environment in which the sector is now operating so as to identify essential research avenues in the years to come. The scope of the update comprises both the SRIA Volume 1 and the SRIA Volume 2: For SRIA Volume 1, a second edition with updated content and improved readability will be drafted. For SRIA Volume 2, the content will be updated; the research waypoints for the time horizons 2020, 2035 and 2050 will be improved; the accessibility to content and information will be improved; and the format will be changed to an electronic version only. The target date for the publication of the ACARE SRIA 2017 is 30 June 2017.

INTRODUCTION

Objectives of SETRIS

The aim of the Coordination and Support Action (CSA) SETRIS is to deliver a cohesive and coordinated approach to research and innovation strategies for all transport modes in Europe. To achieve this aim, five objectives are defined:

1. To identify synergies between the transport European Technology Platforms' (ETPs') strategic research and innovation agendas (SRIAs) themselves and also between these and relevant national platforms in Member States and associated countries;
2. To review and update the existing SRIAs for each of the transport ETPs within a multi-modal and integrated transport system framework;
3. To benchmark past and present research initiatives affecting the achievement of integrated transport SRIAs and market uptake;
4. To define comprehensive, credible and realistic implementation plans for each SRIA in a coordinated framework of running ETPs;
5. To support, shape and contribute to future Transport Research Arena (TRA) events leading to a significant increment in the prominence of transport research and innovation activities.

This document addresses objective 2: The current ACARE SRIA has to be reviewed to identify fields in need for updates or modifications including new or changing intermodal requirements. This status report gives an overview of the status quo and the way forward regarding the review and update of the SRIA.

ACARE and the SRIA

ACARE (*Advisory Council for Aviation Research and Innovation in Europe*) brings together representatives from the whole spectrum of stakeholders in the European air transport community: the aeronautics industry, airlines, airports, air traffic control service providers, the European Commission, Member States, research institutes and academia. The top level objectives are to:

- Meet society's needs for a more efficient, safer and environmentally friendly air transport.
- Maintain global leadership for European aeronautics, with a competitive supply chain, including small and medium size enterprises.

ACARE's primary mission has been to establish and deliver a *Strategic Research and Innovation Agenda (SRIA)* aimed at influencing all relevant stakeholders in the planning of aviation research programmes, at national, EU and even private levels. The SRIA is not a research programme, but rather a roadmap outlining the strategic orientations which should be taken if Europe is to meet society's needs for aviation as a public mode of transport as well as environmental requirements in a sustainable way. The SRIA provides a strategic approach including policy orientations to improve European capability in Aviation together with proposed solutions to achieve the objectives outlined in *Flightpath 2050*, the vision for future aviation.

The structure of ACARE

The input for the latest SRIA in 2012 was provided by five ACARE working groups (WGs) involving more than 300 experts and aligned along the five Flightpath 2050 challenges:

- Mobility (WG1)
- Competitiveness (WG2)
- Environment & Energy (WG3)
- Safety & Security (WG4)
- Resources (WG5)

For horizontal and organisational issues, ACARE consists of four more groups:

- Strategy & Integration Board (SIB)
- Member State Group
- Implementation & Review Group
- Communication Group

Additionally, the ACARE International Cooperation (INCO) ad-hoc Working Group has been re-activated in order to draft an INCO strategy document.

THE EXISTING ACARE SRIA: STATUS QUO

The current SRIA consists of two volumes:

- Strategic Research and Innovation Agenda (SRIA) Volume 1 (September 2012)
- Strategic Research and Innovation Agenda (SRIA) Volume 2 (September 2012)

SRIA Volume 1 is based on the document Flightpath 2050 which was published in 2011. It includes an executive summary. SRIA Volume 2 resembles a print-out database, but is also available as a searchable database on the website. Further details are given below.

To address significant new challenges and longer term goals of the aviation sector, the High Level Group on aviation research published "Flightpath 2050 - Europe's Vision for Aviation" in 2011. In response to Flightpath 2050, ACARE developed and published a new Strategic Research and Innovation Agenda (SRIA) in 2012 that provides policy and technical guidance to the aviation sector and policy makers in order to achieve the ambitious goals set by Flightpath 2050.

Volume 1 of the SRIA describes the full scope of issues relevant to future research and innovation in aviation. It answers the questions "what?" and "how?". According to SRIA Volume 1 (p.35), SRIA is supposed to provide guidance for future decision making on matters of policy and strategy. Thus the main target audience of SRIA Volume 1 would be members of the European parliament and the European Commission.

In contrast, Volume 2 was prepared for a target audience of research and innovation actors. The fullest detail of the agenda is presented which breaks down and specifies the goals from Flightpath 2050. A series of specific and time-bound research and innovation objectives to guide the work of research and innovation teams across Europe is defined. Volume 2 thus addresses the questions "when?" and "with what?". Furthermore, it provides information on policies and legislation.

THE UPDATE PROCESS OF THE ACARE SRIA – THE WAY FORWARD

Overview of the recent progress

The ACARE strategy and integration board (SIB) had a workshop on the SRIA update on 25 September 2015. In this workshop the rationale for updating the SRIA was formulated. This rationale was then presented at the ACARE general assembly (GA) on 20 October 2015 during the Aerodays in London. The ACARE GA agreed on the need for a SRIA update and approved the SIB proposal on the organisation of the SRIA update (see section "ACARE SIB proposal on the organization of the SRIA update: ACARE SRIA 2017").

ACARE SIB proposal on the organization of the SRIA update: ACARE SRIA 2017

The SIB proposed to prepare a Version 2 of the SRIA Volume 1 and to update and improve access to Volume 2 (detailed lists of enablers, ...). The target date for the publication of the *ACARE SRIA 2017* (working title) is **30 June 2017**.

The scope of the update comprises both the SRIA Volume 1 and the SRIA Volume 2:

For SRIA Volume 1, a second edition with updated content and improved readability will be drafted.

For SRIA Volume 2, the content will be updated; the research waypoints for the time horizons 2020, 2035 and 2050 will be improved; the accessibility to content and information will be improved; and the format will be changed to an electronic version only.

For both volumes, no changes in the general structure are foreseen, i.e. the structure should still follow the Flightpath 2050 structure.

Rationale for updating the SRIA

The rationale for updating the SRIA comprises the following three aspects: A new research baseline, changing boundary conditions and new topics. Examples are:

New research baseline:

- The baseline has changed due to research results (FP7, Clean Sky, SESAR etc.) and industry activities which deliver new technologies, common concepts and opportunities.
- The emergence of new manufacturing processes which are vital for the manufacturing industry and competitiveness, and which need certification.
- CSAs have been delivering results and proposed additional research and innovation activities. The SETRIS CSA will propose changes due to its efforts to harmonize mode-specific SRIAs to better reflect intermodal issues.

Changing boundary conditions:

The boundary conditions have changed since the SRIA was published in 2012, e.g.

- The impacts on EU airlines' competitiveness resulting from rising operators from the Gulf are felt ever stronger. The competitiveness of all European air transport stakeholders (airlines and airports) is even more at risk. In addition, the effects of the financial crisis are still felt in many parts of Europe.
- A new European parliament and commission set new priorities, e.g. the energy union or the Strategic Transport Research and Innovation agenda.
- The sufficient availability of alternative fuels and its implications seem questionable.
- ,New' environmental issues gain importance, e.g. particulate matter.
- The international battle for talents is getting more intense.
- The use and availability of online education programs is increasing.

New topics

New topics have come up, e.g.

- Dynamic developments in the field of ICT e.g. big data, automation, digitalization, industry 4.0; cyber security.
- New manufacturing processes vital for the manufacturing industry.

- New system concepts, e.g. more electrical flying.
- The development in remotely piloted aircraft systems (RPAS) is delivering new ideas and concepts which need to be taken into account. The scope of RPAS und UAS is broader and the market take-up faster than expected.
- Recent accidents (including the flights MH370, MH17 and the Germanwings 4U 9525) show that additional issues need to be addressed. The overall focus on security has increased.

Changing boundary conditions with special regard to mobility issues

Mobility issues, including intermodality/ door-to-door mobility, are addressed within ACARE working group 1 ('WG1 Mobility').

Air transport has become a well-accepted mode of transport. However, the following major action areas have been identified to enable future growth of air transport: improved customer experience; better integration of the air segments into integrated door-to-door journeys; an ATM and airport system providing capacity according to demand levels in a regulatory framework that facilitates aviation; and more effective and better coordinated efforts to improve public perception of air transport by travelers and airport neighbours alike. While ATM-related issues including exploratory research are well addressed within SESAR, more research is required to address the basic foundation, architecture, legal framework, business enablers and properties of an integrated transport system. This is not an aviation-only specific topic, so ways have to be found with other European Technology Platforms (ETP) and the European Commission to handle this.

The following changes in boundary conditions should be addressed in an update to the SRIA:

- The need to integrate remotely piloted aircraft systems for a significantly increased number of vehicles and an enlarged scope of applications (e.g. Amazon) may become more rapid than anticipated. This will not only create new opportunities but will interfere with other air traffic.
- Recent changes in the European air transport market have been very dynamic. European hub carriers and airports, both essential for connecting Europe to the world, struggle to keep their market position. Hub airlines are challenged due to global competition (e.g. by the Gulf carriers) mainly of carriers that are based in regions with more favourable operating conditions as well as an increasing traffic share of the low-cost carriers, which reduces margins on feeder traffic. Airports suffer from limited operating hours and the immense obstacles to expand capacity, whereas new mega-airports are built in competing markets. Aircraft tend to get bigger and many regional aircraft have become uneconomic to operate and almost disappeared. There may be a major structural change in European air transport and its consequences on mobility, services for its customers and the European economy have to be analysed.
- Data availability from information sources formerly unthinkable ('big data') is increasing significantly and new approaches to data and complexity science are being developed. The usability and impact of these 'unconventional' data sources on aviation and WG1s scope of work e.g. in the context of customer (passenger, freight and other users of the system) services & data, research, data models, mobility performance and patterns have to be investigated and understood in more detail. Big data also opens opportunities for a more critical analysis of transport enablers, business enablers, intermodality shortcomings or weak points, and passenger decision chains.

Next steps – SRIA update timeline

- 25/11/2015: Next meeting of the ACARE Strategy and Integration Board (SIB), i.e. the board of the heads of the different ACARE WGs.
- Until 30/09/2016: Harmonization and preparation of the contents of the SRIA update in the respective ACARE working groups (WGs). The process on how to achieve this will be agreed on by the respective WGs. For WG1 (Mobility), bimonthly meetings (next ones on 28 January 2016 and 17 March 2016) are scheduled. Additional workshops on the SRIA update are foreseen for each WG.
- Until 31/12/2016: Finalization of the content input of the ACARE WGs.
- Until 30/06/2016: Assembly of the ACARE WG contributions and editing of the whole SRIA update draft, endorsement by the ACARE general assembly and publication of the ‘ACARE SRIA 2017’.

CONCLUSIONS

There is no SRIA equivalent for the White Paper on Transport of the European Commission. ACARE has provided some comments in the consultation process for the mid-term review of the White Paper highlighting the relevant aspects of the SRIA that are in-line or even go beyond the goals of the White Paper. This applies e.g. to the intermodal aspects covered by WG1, where ‘Flightpath 2050’ defines actual mobility performance goals and the ACARE SRIA identifies many research and innovation needs that would apply to a ‘White Paper SRIA’ or at least could be considered a very good basis for discussions with other stakeholders to develop a joint roadmap.

ACARE WG1 has many goals that require more ‘social’ than technological innovation. That means that the biggest challenge lies in getting a critical number of stakeholders in different transport modes, business environments and geographical regions involved to develop, agree upon and implement new systems, procedures and business models. Such a process usually requires regulatory support and policy framework. It has to be noted that although the associated research needs have also been addressed in the SRIA we see only very limited activity in that field. ACARE will have to find ways with regulators, both public authorities and government agencies to more successfully address these issues as well.

The SETRIS CSA is not only tasked to support the different transport ETPs in updating their mode-specific SRIAs, but also to identify synergies between the transport ETPs and between these and relevant national platforms in Member States and associated countries. ACARE WG1 is committed to co-operate with other modes and actively supports and provides input to the SETRIS project.

To achieve the SRIA goals, contributions by all stakeholders within and outside aviation are needed, in particular to address the intermodal goals like the 4-hours-door-to-door goal (4hd2d).

ANNEX

Definition of terms and acronyms

Term	Definition
4hd2d	4-hours-door-to-door
ACARE	Advisory Council for Aviation Research and Innovation in Europe
ATM	Air Traffic Management
Clean Sky	Clean Sky JTI (Joint Technology Initiative); aeronautical research programme with the mission is to develop breakthrough technologies to significantly increase the environmental performances of airplanes and air transport, resulting in less noisy and more fuel efficient aircraft.
CSA	Coordination and Support Action (type of EU-funded project)
ETP	European Technology Platform
Flightpath 2050	“Europe’s Vision for Aviation” (2011 document)
FP7	Framework Program 7 (predecessor to Horizon 2020)
GA	General Assembly
RPAS	Remotely Piloted Aircraft System
SESAR	Single European Sky Air Traffic Management Research
SRIA	Strategic Research and Innovation Agenda
TRA	Transport Research Arena
UAS	Unmanned Aerial System
UAV	Unmanned Air Vehicle
WG	Working Group (of ACARE)

REFERENCES

ACARE Activity Summary 2014-15

<http://www.acare4europe.com/sites/acare4europe.org/files/document/ACARE%20Annual%20report%202014-15vs0%207%2025Sept15.pdf>

Flightpath 2050

<http://ec.europa.eu/transport/modes/air/doc/flightpath2050.pdf>

SRIA Volume 1

<http://www.acare4europe.com/sites/acare4europe.org/files/attachment/SRIA%20Volume%201.pdf>

SRIA Volume 2

<http://www.acare4europe.com/sites/acare4europe.org/files/attachment/SRIA%20Volume%202.pdf>