

The EREA “7-Point Plan” for Sustainable Civil Aviation in Europe

A research establishment’s view of aviation, not just of aviation research

General Remarks

EREA, the Association of Research Establishments in Aviation, has produced this paper on the future of aviation, with an emphasis on a research agenda derived from EREA work (Vision study, Future Sky Roadmaps, 12 High-Level Projects proposed to the European Commission).

The higher-order goal of this plan is undoubtedly the ‘Green Deal’ as demanded by the EC, aiming for sustainability. EREA has taken the ‘Green Deal’ as an overarching idea, not merely as the technical realization of “decarbonization”. The goals are treating the environment respectfully, minimizing the human environmental footprint and adopting a green approach throughout the lifecycle of products, processes and operations, taking any environmental and social consequences into account.

In 2001, when aviation was the first sector in Europe to develop a vision (“Vision 2020”), EREA played a part and we are ready once again to provide ideas for a new vision working towards the Green Deal implementation. Aviation as a sector has adopted the Green Deal and is again ready to be the pacemaker for achieving the goals by 2050.

Concerning the general public, the ‘Green Deal in aviation’ means turning away from “faster and cheaper” and pure growth, as we have seen in the past, and becoming a responsible part of a complete mobility process. For example, we expect travellers to accept longer travel times because of climate-optimized routing. At the same time, we will make travelling more convenient: seamless in terms of processes, with a minimum of actions required by the traveller, and more accessible and comfortable in a way that allows passengers’ needs to be met, for example working or relaxation during the journey.

EREA’s vision anticipates all aviation products being designed to be sustainable throughout the lifecycle, with their operation organized for minimum impact. To that end, EREA has formulated a 7-point plan addressing future aviation products, operations and processes. This should be the basis for future activities and the research community is firmly behind it. This paper is just an outline and it is expected that these ideas will be part of the new EC Vision for Aviation prepared by ACARE as a follow-up to ‘Flightpath2050’ and detailed in it. No concrete figures are listed as KPIs, as that should be part of the overall vision paper including industry’s and transport’s views. However, the outlines given should be seen as providing clear orientation for any aviation project or programme.

Two elements are seen as indispensable for each of the 7 points: a clear link to other transport modalities and industrial sectors (such as Energy and Mobility), and a goal-oriented link between national programmes and EC activities.

1. Climate: reducing the impact towards zero

- Start by minimizing in-flight emissions, continue to complete missions including ground, and finally go for total lifecycle assessment of products, operation and infrastructure (aircraft, airports, etc.)
- All emissions will be addressed: CO₂, NO_x, UHC, soot, H₂O, etc. All measures for products, routing and processes also need to be aligned with sustainability as the end goal

2. Quality of life: serving society by means of seamless, accessible and affordable mobility with the least impact on environment and people

- Aviation must be a key enabler for mobility and it must be safe and comfortable

- Air transport operations must not result in any burden for people on the ground: ground emissions (gases, noise) and waste need to be addressed to minimize their impact on health
- Air traffic management, including Urban Air Mobility (UAM) and U-Space, must be organized for passengers and cargo travel that is easy, safe, secure, seamless, comfortable and affordable

3. Serving society: special missions required under extraordinary circumstances

- Management of critical situations (volcanoes, pandemics, terrorist threats, emergencies, climate disasters) by appropriate products and operations
- Health and medical systems, maintenance and safety of infrastructure such as wind energy plants
- Security in infrastructure and processes, application of appropriate dual-use technologies

4. Digitalization: an enabler for making society greener and part of artificial intelligence and cloud computing (Gaia-X)

- Open new possibilities for digital product design, manufacturing and operations by using digital techniques such as artificial intelligence
- Define rules and processes for developing aviation-related digital passports from pre-design to end of life, including certification
- Allow for new business models using IT, e.g. digital airlines, route planning etc.
- Use data as part of the European cloud, provide data needed for other uses

5. Competitiveness: be most innovative on the worldwide scale

- Promote and embody the “power to compete”, the core of “made in Europe”
- Foster new markets and start-ups, e.g. in the “drone economy”
- With sustainability as the goal for all European activities in research, industry and transport, Europe should be the first in the world market and must become one of the leaders

6. Prosperity: guaranteeing the workforce, research and infrastructures through European industrial and operational leadership

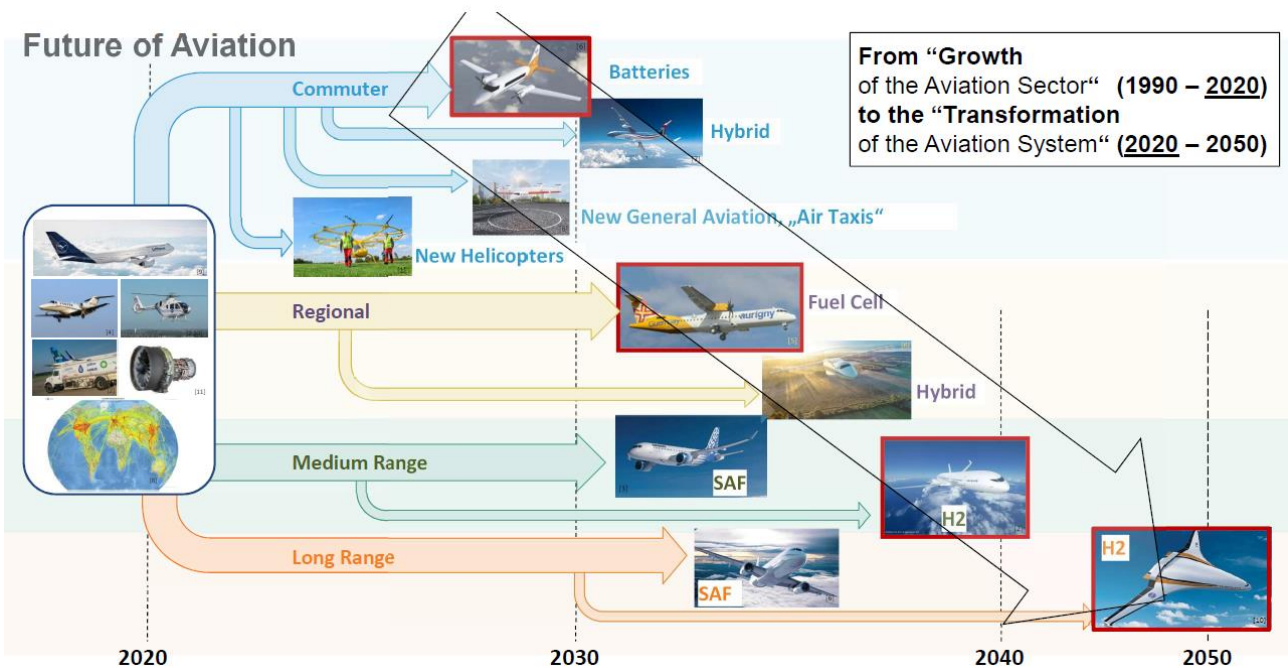
- Incorporating sustainability in product design will result in new jobs
- Attractiveness for junior staff, perspectives for the young generation
- Orientation of both academic and non-academic education towards a lifelong learning mindset
- A European Aviation Research Union to develop and maintain research and technological infrastructures

7. Implementation: from the 6 points stated above to a new concept for sustainable aviation in Europe

- The EC has been asked to agree to these points and accept them, using them as a reference for future support
- Aviation stakeholders have been asked to agree to these points and adapt them through ACARE into the European new vision document
- All future activities in Europe should show that they contribute to as many of the 6 points as possible
- The EC has been asked to start a process moving towards the proposed “European Aviation Research Union” on R&T and infrastructures

- Funding must be made available for the Research & Innovation chain, including bridging the 'valley of death' between public and private R&I programmes and industrialization
- EREA is already working on these topics by harmonizing its national institutional programmes under the EREA Future Sky Joint Research Initiative in close cooperation with European Aviation stakeholders

Monodisciplinary and multidisciplinary projects (including demonstrators) can be presented for each of these points, although naming all of them individually here would result in a huge list of topics. The following picture provides an example of a high-level R&TD roadmap for supporting the transformation of the aviation system. EREA is ready to provide more ideas, technologies and project outlines in discussions about the future of aviation with the EC and/or stakeholders.



High-level R&TD roadmap for supporting the transformation of the aviation system