EREA considerations on Horizon Europe and future European Framework Programme for Research and Innovation (i.e., FP10)

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EREA recommendations on major challenges (scientific, social, economic, technological) that should still be addressed in the second half of Horizon Europe (2025-27) and further addressed by a future FP (i.e., FP10)

- **EREA**, as an association representing members deeply involved in the complete research and innovation (R&I) value chain over 30 years of one of Europe's world leading and highly valued added industries, advocates for the relentless pursuit of a more sustainable and climate neutral aviation for the timely mobility of passengers and goods to ensure the continued economic prosperity and welfare of the EU's member states and international trade.
- **Aviation** is an **undeniable part of an advanced and integrated transport system**, indispensable for medium and long distances, for special operations such as Search and Rescue, Helicopter Emergency Medical Services, access and services in rural and maritime areas, firefighting, disaster prevention and relief, etc. with its unique capabilities provided by civil and military aircraft from drones to helicopters, general, business and commercial aviation.

Therefore, EREA brings the attention to the following **challenges impacting society that aviation is still faced with**:

- **Climate neutrality by 2050** enabled by new propulsion systems and energy sources (Sustainable Aviation Fuels, electric, hybrid-electric, hydrogen) with new aircraft concepts, requiring new technologies, testing, validation, upscaling and certification;
- **Seamless extra capacity in air space, airports and integration into the entire transport system** with new technologies, including noise reduction, particularly close to airports, to ensure societal acceptance and minimum negative impact,
- **ensuring continued exemplary levels of safety and improvement for all existing and new products and processes;**
- **Increased security of citizens** in all aspects, at airports, in aircraft, in airspace, from pandemics, terrorism, conflict etc.

So, for **new critical technologies with appropriate regulation and market deployment to be successful**, EREA advocates for a **broad *Strategic Research and Innovation Agenda*** (SRIA) with a **Roadmap for the entire aviation sector in Europe**, to ensure a coherent strategy, that the EU and national ministries can use as a guideline for the next FP.

- In order to have the required systemic and broad lasting impact, the **SRIA for the entire aviation sector** needs **to be produced by a body with the necessary overall expertise, bringing together all aeronautics and aviation stakeholders in Europe** (academia, Research and Technology Organisations (RTOs), industry, airlines, airports and ATM providers, other service providers, along with institutional players, policy makers, Eurocontrol, EASA and Member State representatives) such as the *Advisory Council for Aeronautics Research and Innovation in Europe (ACARE)*.
- EREA provides a **portfolio of topics** (**cf. Annex no.1**) **for the second half of Horizon Europe and in FP10** and remains available to explain further. It is worth to be noted the interconnectedness of the topics as part of a **continuous (and unbroken) cycle of R&I development to achieve *Fly the Green Deal's (FtGD)* goals,** a common ACARE vision for Europe. A portfolio of topics as pieces of the same puzzle that, together with Partnerships, provides **impact with actors from the whole innovation value chain.**

Major successes of the current Horizon Europe (2021-23) and major "roadblock"/threats for the success on next Framework Programme

Major successes of the current Horizon Europe can be summarized as follows:

- **Pillar 2 collaborative projects and public-private partnerships (PPP) as facilitators for real cross-border and cross-sectoral European cooperation in R&I,** bringing together the best European stakeholders from industry, RTOs, academia, operators, and SMEs **to create critical mass and achieve goals not possible with national programs alone**;
- **The basis for a European Research Area (ERA) via build-up of trustful cooperation between European R&I actors;**
- In aviation, **projects benefiting society** such as PULSAR and IMPACT MONITOR, next generation aircraft with MATISSE and NEXTAIR, and **supporting synergies between EU, national and regional programmes** with AREANA.

Major roadblocks or threats for a successful implementation of next Framework Programme are:

- **An unbalanced system and dominance of any single stakeholder group** is undesirable and creating the risk of not preparing Europe for the long-term. **EREA advocates for a strong and well-balanced system, funded and managed appropriately, where all stakeholders should find their right place to ensure uninterrupted multi-annual R&I cycles;**
- **The lack of an overall strategy for FP10** that would translate in a lack of coherence in the funding of the most important and promising developments making use of systemic synergies and force multipliers;
- **Lack of funding or insignificant funding** will put at risk relevant topics designed to achieve the FtGD by ACARE and years of progress to date since the last version of the SRIA by the aviation sector.

EREA recommendations on to which extend the structure of Horizon Europe should be to be preserved and strengthened in a future FP (i.e., FP10) and which should be altered.

The current three-pillar set-up could be maintained but Pillar 2 should be strengthened budget and content wise as:

- The added value of the EU R&I framework programs compared to national R&I programs is the **cross-border and cross sectoral cooperation of all stakeholders** (i.e. industry, RTOs, universities, SMEs, operators) **mainly ensured in Pillar 2.**
- **The cross-border and sectorial cooperation share has reduced in Horizon Europe** compared to previous FPs (**cf. Annex no.2**).
- **To improve and increase European wide competitiveness on new ideas and ensure that the entire R&I chain from low to high TRLs is covered appropriately** using different instruments and different governance (**cf. Annex no.3**)

The set-up of FP7 aviation (cf. Annex no.4) is a good example on how the entire R&I chain can be handled with:

- A large number of **bottom-up prepared small projects to develop new ideas & technologies (former L(Level) 0 & L1)**;
- A small number of **bottom-up & top-down defined large projects** for technology demonstration and integration into subsystems (**former L2 Projects**);
- A **few large, focused demonstration projects with top-down definition, led by industry (current JUs & former L3).**

A tailored governance for the specific instruments is needed, due to the difference in bottom-up & top-down defined topics.

- For the more open small technology development projects, the **control by the public side (European Commission)** is needed to ensure transparency and openness for all stakeholders.
- For the System demonstration part, the current approach of industry lead partnerships seems to be appropriate.
- As outlined in the 1st chapter on the EREA's recommendations on the major challenges still be addressed by a future FP, **the European wide prepared and approved SRIAs involving all stakeholders are essential to give the overall guidelines for the set-up of work programmes.**

Depending on implementation, a common umbrella of various instruments might be formed by a new type of missions:

- **EREA strongly urges that the part of such missions funded under FP10 should only concern R&I activities as such**, and not activities for the deployment or implementation of missions as has been the case under HE.
- **EREA agrees that to be carried out, the missions must not be limited to R&I but extended to the entire EU**, and not limited to FP10 alone but implemented also through other instruments at the EU level through dedicated tools such as the European Fund for Strategic Investments (EFSI), Structural and Investment Funds (ESIF), Connecting Europe Facility (CEF), Digital Europe and others.

EREA recommendations on catalyst to overcome current roadblocks of Horizon Europe and important innovations to be considered in a future FP (i.e., FP10)

- **Strengthening pillar 2 budget and content wise based on European R&I strategies with appropriate instruments and their strong balanced governance to cover the entire R&I chain for the green deal and improving EU competitiveness**.
- **Preserve Pillar 2's unique capacity for supporting cross-border and cross-sectoral cooperation of all stakeholders** from industry, RTOs, academia, operators and SMEs, and synergies between EU, national and regional programmes.
- **Shield Pillar 2 from consistent annual pressure from other budgetary priorities of the moment which detrimentally affects long-term planning and R&I development cycles for long-term focused industries like aviation**.

- **Implementing a European coordinated support to Research and Technology Infrastructures** with a stronger Pillar 2 or open Pillar 1 to ensure European leadership and sovereignty in key technology developments. **Maintaining and upgrading existing strategic technology and test infrastructures** like wind tunnels, research and test aircraft, simulators and propulsion test beds in Europe will **help support European industries and the development of innovative products**.
- **A European Flying Technology Demonstrator of the new technologies for next generation aircraft to enable radical steps to accelerate development cycles and de-risk for industry**, complementary to current PPPs governance ideas. Testing and validating at this scale has only been achieved by the USA with the NASA X-Plane programmes since the 1950s. Ambition is needed for strong cooperation to step change European R&I and industry competitiveness.
- **Maintain civil (Horizon Europe/FP10) and military (EDF1/2) R&I FPs separate but promote better transfer of knowledge and technologies** between the two and thus increasing synergies.
- **Better simplification is necessary in FP10, that actually benefits applicants** with very clear and simple rules to radically reduce money wasted on bureaucracy and non-value-added management support not related to R&I activities. This would also help improve time to grant and payments that are crucial for smaller entities. Lump-sum rules must improve to help avoid cases where Work Packages are increasingly segregated due to the risk of non-payment of complying partners due to the shortfall of other partners' activities. Less resources wasted on non-R&I is more time for R&I.

Annex no.1: portfolio of topics that are at risk if no funding is allocated to Cluster 5 for aviation

- Recently, DG RTD took the initiative for a pilot action for Technology Infrastructures (TIs). Studies have exposed we lack the test and validation facilities to bring the technologies that we are currently developing to the market. As such, European action on TIs is needed to take away a significant bottleneck for climate neutral and digital air mobility. A list of areas for intervention has been drafted, but the pilot is at risk of failing due to the budget depletion. We want to stress that this pilot is much more than investing in necessary test and validation capabilities; it is about the success or failure of European action on TIs and maintaining competences to continue to lead in the future of aviation and other industries also impacted. Success in this pilot will create the much-needed support for EU action on TIs in general, going far beyond aviation. The Commission's own ERA Action 12 asks for it, the Green Deal demands it.
- Europe is currently exploring a number of innovative concepts for aircraft such as the open-fan, the hydrogen propulsion or the hybridization of the power chain. Demonstration activities are pursued within the Clean Aviation partnership. However, today there is little room for the basic research required to provide the tools and physical understanding needed by industry to address the challenges raised by these innovations.
- As demonstrated in H2020 by the IMOTHEP project[1], an EREA Future Sky project looking into hybrid-electric propulsion (HEP), collaborative research also plays an important role in shedding light on research orientations and roadmap for new technologies.
- A topic EREA only recently explored together with the European Commission is the concept of circularity in aviation[2], addressing also the lifecycle emissions and production processes of aircraft and components. We have managed to address the issue, we have brought together different stakeholders, now is the time to start. Without it, we will miss a significant piece of the Green Deal puzzle we all are trying to build.
- Another topic in which we are very proud to be deeply involved is the in-depth collaboration with the Commission on the overall evaluation of the aviation sector capability to meet the EU environmental objectives. Through projects such as PULSAR[3] or Impact Monitor[4], both led by EREA members and partaking to our Future Sky programme, we support the objective to provide a fair assessment of the various aviation technology pathways. We believe that such collaboration, free of any market considerations bias, should absolutely continue to be pursued.
- European citizens, flying or not, are affected by aircraft noise. The possible integration of UAVs in our airspace is at risk of making this nuisance worse. EREA Future Sky projects, such as ANIMA[5] and ARTEM[6], have made significant steps in proposing ways to alleviate noise impact and annoyance on neighbouring communities or in studying advanced low noise aircraft design, but much more work needs to be done. European airports are often close to urban areas and without significant noise reduction, the public acceptance of air travel will erode. Noise reduction is therefore an existential issue to tackle. Airframes can be made more silent, as do engines. Manned or unmanned rotorcraft, which seem having no place in any EU programme for the time being, are bound to be a more frequent sight in our skies in the future, must be made significantly more silent, especially if we are to unlock the full potential of drones.
- The cost of flight will increase, there is no doubt about it. However, as the Sustainable and Smart Mobility Strategy dictates, we must do everything in our power to keep means of mobility accessible and affordable to EU citizens. One major cost reduction should come from Maintenance, Repair and Overhaul, responsible of part of the cost of an intra-European flight. Self-healing materials, innovative health monitoring systems and predictive maintenance and new inspection and repair solutions have the potential to reduce costs. As such, they have the potential to mitigate the increased costs due to more expensive sustainable fuels and low-emission new aircraft.
- Finally, but certainly not least, EREA has answered to the call for a European Flying Test Bed (EFTB). We are happy that the Commission shares our strong belief that it is time to take a radical step in aircraft development. Testing and validating technologies at this scale is something only the Americans have been able to do with the NASA X-Plane programme. Such ambition can be the pinnacle of European cooperation and has the potential to give European R&I and industry competitiveness, the leading edge for decades to come. The EFTB itself represents a portfolio of developments joined in one, towards research led flying demonstrator. Additional funding is needed, from public R&D programmes in the earlier stages, to other appropriate sources, as the project progresses.

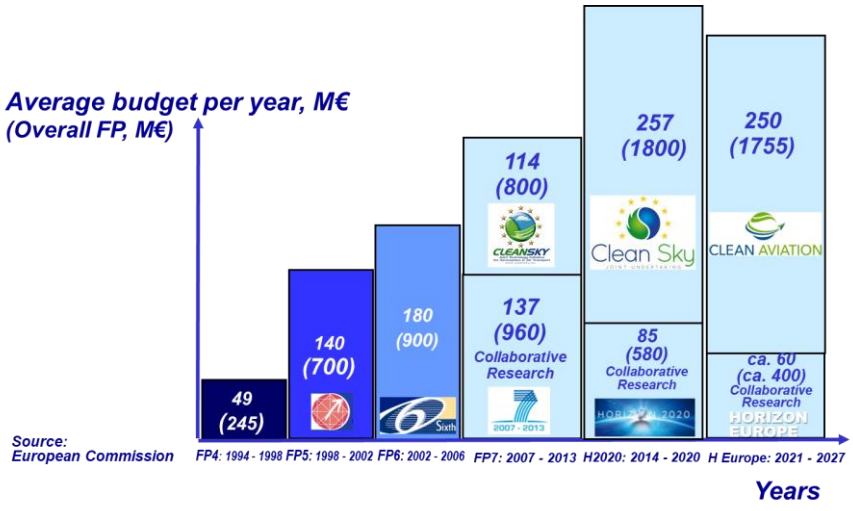
[1] Investigation and Maturation of Technologies for Hybrid Electric Propulsion (IMOTHEP): https://cordis.europa.eu/project/id/875006
[2] DG RTD Factsheet: RESEARCH & INNOVATION FOR CIRCULARITY IN AVIATION: https://op.europa.eu/en/publication-detail/-/publication/9038eeaa-0b30-11ee-b12e-01aa75ed71a1
[3] Propelling eUropean Leadership through Synergizing Aviation Research (PULSAR): https://cordis.europa.eu/project/id/101095395
[4] Assessing European aviation research and innovation impact (Impact Monitor): https://cordis.europa.eu/project/id/101097011
[5] Aviation Noise Impact Management through Novel Approaches (ANIMA): https://cordis.europa.eu/project/id/769627
[6] Aircraft noise Reduction Technologies and related Environmental iMpact (ARTEM): https://cordis.europa.eu/project/id/769350

Annex no.2:

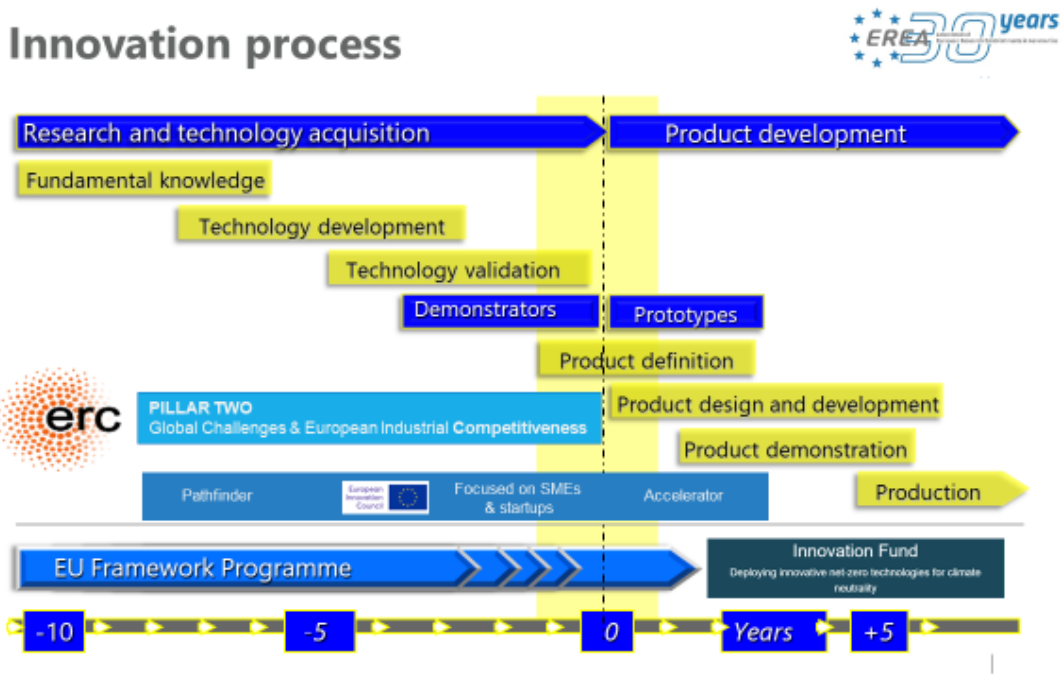
Comparison H2020 & Horizon Europe

	Horizon Europe		H2020	
Excellent Science	25,0 Bill. €	26,2%	22,2 Bill. €	34,6%
Global Challenges	53,5 Bill. €	**56,0%**	27,0 Bill. €	42,0%
Industrial Competitiveness			12,4 Bill. €	19,3% **= 61,3%**
Innovative Europe	13,6 Bill. €	14,3%	2,6 Bill. €	4,1%
Widening / ERA	3,4 Bill. €	3,5%		

From FP4 to Horizon Europe – Aviation budget



Annex no.3



Annex no.4