



Centro Italiano Ricerche Aerospaziali

Società soggetta a direzione e coordinamento da parte del CNR

**CIRA Position Paper  
on the next  
European Framework Programme - FP10**

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## EXECUTIVE SUMMARY AND KEY MESSAGES

The European Union (EU) is poised at a defining moment for Research and Innovation as it enters the next Multiannual Financial Framework (MFF) for 2028-2034. Amid a backdrop of geopolitical shifts, demographic changes, significant and fast technological advancements, the decline in the EU's share of the global GDP, the EU's strategic autonomy and global influence are increasingly challenged and poses considerable challenges to maintaining its competitive edge.

Further complicating the landscape there is the critical dependencies on key technologies and materials, highlighted by recent global crises, that underscores the need for the EU to significantly invest in research and development, including dual-use technologies, serving both civil and defence objectives. In addition, the increasing security concerns pose both a threat and an opportunity for the European Technology and Research Sector.

In response to these challenges, the EU must strategically invest in cutting-edge technologies, foster specific public-private partnerships for research, and enhance the synergy between civil and defence activities to maintain its leadership and ensure a resilient and prosperous future.

***To address these challenges, CIRA recommends a comprehensive strategy in next FP10 that includes:***

- 1. Enhance Proper Funding for Low to Mid TRL (TRL 2-5) Research:*** To ensure funding instruments, including dedicated evaluation tools, supporting the entire R&I chain, through significant boost of the budget allocated to research initiatives focused on developing ground-breaking technologies, with the aim to establish a more balanced ratio between funding for high and low TRL research, targeting an allocation of at least 10% of the overall public funding towards low to medium TRL activities.
- 2. Consider Public-Private Partnerships for Research:*** While acknowledging the Partnerships as a valuable tool to support strategic topics, the EU should explore new avenues for collaboration between the European Commission and the European research sector, such as dedicated partnerships focussing on research and technology development, knowledge exchange, and infrastructure sharing, to ensure a better transfer of research.
- 3. Support Technology and Research Infrastructures:*** The next FP should prioritize support and funding for the upgrade of existing test facilities, including their digitalization, as well as to the support to the development of new infrastructures where gaps exist. It is recommended the promotion of a collaborative use of Test Infrastructures and their inclusion in flagship projects.
- 4. Develop and Integrate Dual-Use Technologies:*** EU should actively support the development of technologies with potential Dual-Use. This can be achieved by fostering collaboration between the next FP10 and the European Defence Fund (EDF) as separate instruments, but identifying complementarities and favouring pipelines between the two programmes and eventually easing access to funding for the development of critical Dual-Use Technologies.
- 5. Fostering synergies between EU programmes and national, regional R&I investments to make full use of research results and more efficient public spending by seeking a better alignment of funding schemes, strategies and priorities.***

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## ON THE SPACE SECTOR

The space sector, a vital component of the EU's strategic capabilities, is at a crossroads. Traditional European space launch platforms face increasing competition from innovative and cost-effective reusable launch technology, which has set new standards in the industry, to be considered in the EU approach for accelerating the pace of technology development and validation.

The rise of new low-cost players in the market, along with the growing popularity of small satellites and the congestion, particularly in Low Earth Orbit (LEO), add layers of complexity to the EU's strategic planning. With the expected surge rate in satellite deployments, the EU faces critical challenges in managing space traffic and ensuring the long-term sustainability of space operations.

The intersection of space technology with defence capabilities is increasingly prominent, reflecting the strategic importance of space in both European and international security frameworks. Recent crises have exposed the EU's critical dependencies on key technologies and raw materials. In this context, the European Commission might favour the exploitation of fundamental research (low TRL) that is not downstream-driven into high-TRL technologies with significant defence potential, with the goal to achieve a European non-dependence on critical space technologies, a fundamental step to safeguard European assets and key for Europe security.

Finally, there is a urgent need to reconsider Space Exploration as a pillar in the EU Space agenda. While offering the opportunity to advance technological frontiers in several domains (miniature instruments, in-situ resource utilisation (ISRU), innovative materials operating in harsh environment and radiation shielding, Space Exploration may serve as a powerful tool to support space science and as strong incentive for youngsters to engage in the European space sector, thus acting as a crucial educational tool that inspires future generations of scientists and engineers.

### **Recommendations:**

- 1. Consider Dedicated Research and Technology IOD/IOV Missions, to enable rapid testing and validation of emerging technologies, accelerating their integration into operational systems.**
- 2. Boost the development of technologies for new launch solutions:** The urgent need to have new European space access solution requires a rapid development of reusable launch related technologies, such as Thermal Protection Systems, new materials for re-entry, and landing solutions.
- 3. Develop research for Innovate Debris Management Solutions (including debris removal and mitigation technologies, development of satellites equipped with end-of-life disposal capabilities, design for demise) and SST and SSA Systems.**
- 4. Support research and development of technologies with potential Dual-Use:** Consider the implementation of collaborative projects that bring together stakeholders from both sectors on selected topics (such as hypersonic technologies and solutions, technologies for satellites in VLEO, High Altitude Platform Systems), also drawing inspiration from initiatives like the Joint Task Force on Critical Space Technologies.
- 5. Foster Space Exploration and integrate Space Science for Education:** Enhance support for space exploration programmes that can serve as booster for space science and a catalyst for educational and career opportunities in the space industry.

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## ON THE AVIATION DOMAIN

With a growing awareness of its environmental impact, Aviation has launched a transformative journey to achieve net zero emissions by 2050 as set out by the Green Deal. Such an innovation process, driven by design and demonstration steps and paced by maturity assessments, remains complex and uncertain. It requires new specific research, test, and development activities, including scaling-up, that go well beyond the boundaries typically established by incremental innovation or improvements of existing products with limited new knowledge.

To make innovative net-zero emission aviation a reality, and guarantee the required maturity and safety, EU Research Institutions play an important role. Through collective support from the EU funding programmes, RTOs are highly committed on collaborative research in assets enabling science-based innovation (from TRL 2 to TRL 5) and maturation of new aircraft concepts, propulsion, on board and ground equipment, systems and air traffic operations, able to guarantee a long-term, safe and reliable exploitation of impactful technologies to decarbonize aviation. However, despite the significant efforts made so far, the transition towards new propulsive systems/energy resources (SAF, electric, hybrid-electric, H<sub>2</sub>), combined with the linked new aircraft architectures, still requires joint and decisive EU investments to scale-up into new solutions entering into service by 2035. In this regard, to accelerate the pace of technology maturation, ground and large-scale demonstrations are crucial to meet the high standards of safety, security and operability.

In the shaping of the next European Framework Programme for Research and Innovation (FP10), CIRA, the Italian Aerospace Research Centre, calls on the EU Institutions to strongly invest in pan-European collaborative research to support the current challenges of Aviation on the route to decarbonization. In times of economic pressure and budget cuts (e.g. due to external factors), collective EU investments in RD&I assets, including technology and research infrastructures, impactful technologies and operations, need to be reinforced to enable an efficient transfer of the research benefits to commercially viable innovations. In this regard, CIRA takes the opportunity to emphasize that FP10 shall continue to support, through the entire value chain, basic and applied research, on a scale from breakthrough to intermediate (TRL 2-5), while accounting for the Aviation sector specificities that are not fully addressed by other European instruments. An adapted EU Innovation Fund (IF) framework, including specific terms and flexible conditions for Aviation, could be a viable option to implement innovations more rapidly and with less regulatory constraints at component, equipment and system level, and support the transition from large-scale demonstrator projects (TRL6) to actual market uptake, crossing the “valley of death” and progressing technologies through the innovation funnel.

To accelerate a successful deployment of a climate-neutral aviation system in Europe by 2050, CIRA addresses also the importance of unlocking synergies with national and regional RD&I funding instruments, to tackle the complex challenges collectively and secure the uptake and use of project results. This includes also a better alignment of national and regional strategies with EU priorities, facilitated access to and sharing of research data for the benefit of both the scientific community and the general public, and strengthened networking with industrial ecosystems to close the gap between research and practice.

**Recommendations:**

1. **Leverage an adequate budget on new impact-oriented research on cross-cutting topics that are pivotal to the green transition in aviation** including, amongst others, advanced materials even for electrical and/or hybrid propulsion, adaptive structures, H2 tank crashworthiness, hybrid electric power train systems simulation, integrated air traffic management, wind tunnel demonstration of cooling systems, thermal management, smart sensing, etc.
2. **Step up performance and upgrade existing Large Research and Technology infrastructures** (both physical and digital) to develop and validate future clean aviation technologies (e.g. European flying test bed infrastructure, ground testing facilities for hydrogen-powered engines, etc) and address the new challenges related to the European Green Deal.
3. **Focus on excellent cross-border collaborative research and support the driving role of Research Centres** in the process of accelerating disruptive aircraft technological innovations through virtual simulation tools, ground large-scale demonstrations and associated digital twins, and de-risk the development for industry in key technological domains.
4. **Enhance complementarity and synergies with other key European funding instruments (e.g. EU Innovation Fund)** to accelerate the trajectory towards climate-neutral aviation by implementing a joint and coordinated effort to support the market uptake of innovative net-zero emission technologies with less regulatory constraints.
5. **Promote successful transfer of research results into the aviation industry** by focusing on clearly identified industrial needs triggered by strategic EU priorities. Synergies with national and regional initiatives shall be strengthened to support the uptake and use of project results and generate new impulses for innovation and growth of the European Research and Innovation (R&I) ecosystem while fostering its competitiveness.