

SME4SPACE Position Paper on the new EU strategy for space R&I

Executive summary

The main priorities of SME4SPACE for the new EU strategy for space R&I can be summarised as follows:

1. The EU should at least **double the budget for the R&I Work Programme on Space** and **increase the overall budget of the space programme by 20%** compared to the budget allocated in the current Multiannual Financial Framework (MFF) 2021-2027;
2. The call documents should contain the principle that **at least 20% of the value of the project budget shall be allocated to R&I activities done by SMEs**. This principle shall be used as a criterion in the evaluation process;
3. The future space R&I Work Programme shall foster as much as possible the **principle of open calls** giving the opportunity to the SME community to come up with a maximum number of interesting project ideas for each of the selected topics;
4. The R&I programming of the EU should prioritise the **development of new innovative end-to-end products and services**.

The other priorities of the SME community are elaborated hereunder as an answer to the key questions for stakeholders provided by DG DEFIS to SME4SPACE.

1. The level of ambition of Europe in space

The European Union together with the Member States and the European Space Agency (ESA) has the capacity to be a space power on the worldwide scene. The European space community has built up an impressive track record in the space domain.

The past successes do not mean Europe can simply continue to follow the chosen path. Under influence of political and societal evolutions, space R&I expenditure is under pressure and challenged to demonstrate its added-value. The current EU space programme including IRIS² and the overall ambition is comprehensive and covers all major space applications domains, but the following hurdles remain at European level and some have even worsened in the last years:

- R&I budgets are used to serve short term political objectives (e.g. R&I budgets that are channelled towards IRIS²);
- High entrance barriers for newcomers, start-ups and companies ready to engage into space activities remain;
- The administrative burden and red tape is abundant and is problematic for SMEs with their limited resources;
- The use of space data for the realisation of EU policy objectives could be enhanced.

In order for Europe to remain a powerful and respected player, there is a need to:

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- **mature European solutions and products** that can compete on a worldwide scale;
- **reduce dependency issues** for critical space technologies and components;
- foster the **development of end-to-end new products and services** in both upstream and downstream especially by SMEs both within the EU Flagship programmes and the dedicated R&I programmes;
- use the EU Flagship programmes **to boost the downstream market and ensure the increased uptake**, in particular by actors outside the space sector, of new applications;
- **stop the current shift towards more responsibilities for industrial consortia** (i.e. big primes) to select their own subcontractors. This does not create a level playing field for space SMEs;
- **find a solution for the so-called 'TRL 6 trap'** implying that the prime contractors only select existing devices and technologies and don't go for innovation of components. Having a dedicated SME programme and a clear objective of SME participation in consortia would allow the development of new components bottom-up;
- **take into consideration the sustainability of space activities**. The European Union should take the lead in fostering the manufacturing of recyclable, reusable and refuellable spacecrafts and technological solutions for the space debris challenge. New markets and new commercial space services will thus be created.

2. EU Space sector opportunities and threats

The EU space sector is not a uniform entity and is composed of a very diverse set of actors including prime contractors, big companies, SMEs, research institutes, academia,... each of them having specific characteristics, needs and concerns. The position in the supply chain determines the ability to implement the company strategy and hence to seize opportunities or to cope with threats. The following analysis is therefore a mix between high-level considerations concerning the EU space sector, with a specific attention to the situation in the space SME community.

➤ **Opportunities**

- European space industry as well as research centres and universities have a lot of knowledge and capability available in all European countries. European actors achieve excellence in quality and reliability and meet the expectations desired by customers and end-users;
- European space actors have the ability to cooperate on ambitious programmes and on challenging goals when supported by sufficient and long term public R&I funding;
- Increased European integration and cooperation with Eastern European countries where a skilled labour force is available could tackle, at least partially, the shortage of engineers;
- The development of a coherent, single set of user-friendly standards for use in all European space activities creates opportunities, especially for SMEs, to be successful in space markets;
- The development of an EU non-dependency policy to have an entirely European supply chain for the manufacturing of key space technologies will support the EU internal market and will enhance technological sovereignty;
- The European Union, its agencies as well as Member States can still make important steps to become anchor customers of space based services and applications in a risk sharing model between the private and the public sector.

➤ **Threats**

- The lack of cost-effectiveness, especially in the launcher domain;
- For satellite manufacturing it is necessary to reach a balance between desired quality and development costs including cost of components and their testing;

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- Abundant bureaucracy and red tape leading to long time to market. The European Union tends to lag behind for launching novel systems and is usually catching up with other space powers. Development cycles are long due to complicated administrative processes and high requirements on space qualified components;
- Member States clinging to their national interests, ignoring Europe's need to position itself among other political powers and leading to many fragmented efforts;
- Access to debt and risk funding for SMEs and start-ups, in particular compared to the US where private funding is widely used to replenish working capital and implement long-term projects in space¹;
- Low profitability of space SMEs. According to studies of SME4SPACE, the profitability of space SMEs is weak and has even decreased in recent years creating risks for the diversity of the EU space ecosystem;
- Relatively low institutional and governmental expenditure for space activities, especially in comparison with US and China;
- Difficulties to recruit and to retain qualified personnel, engineers, scientists,... and the necessity to develop the skills needed to work in the space sector. In general terms, the inflow of students following STEM-courses is a problem everywhere in Europe.

3. The future of the space sector in the next decade

We see different missions, services and technologies to be developed within Europe in the next decade. They should build further on already developed capabilities by adding innovations to respond to the new geopolitical situation and technological challenges (e.g. an increased demand for cybersecurity, resilient communication, strategic independence, Europe's ability to act in space,...).

➤ **Missions and services**

- **More IOD/IOV missions and flight opportunities** allowing SMEs, newcomers and established players to test and validate technology in space;
- **A market-driven approach for access to space developments** allowing the private sector to propose new space transportation systems. A well-thought launcher strategy should be the result of joint European collaboration involving all Member States;
- **Complex PNT systems** utilising GNSS and other signals of opportunity with dual use capabilities;
- **Secured communication systems** including high throughput optical communication and Quantum Key Distribution (QKD) communication with dual use capabilities;
- **Radio Frequency Interference (RFI) and spectrum monitoring from space** (dual use);
- **High resolution Earth observation systems** (dual use);
- **Autonomous in-orbit servicing**;
- **Solar system exploration probes and rovers**;
- **Astronomy** including continuous search for exoplanets and probing their atmosphere;
- **Monitoring of space debris** including objects atmospheric re-entry;
- The **many interdisciplinary applications** that can still be developed with other sectors such as health, biosciences, chemistry, IT, etc. Cross-sectoral collaboration, spin-off and technology transfer from space to other domains creates new business models and adds value to already existing technologies.

¹ We refer to SME4SPACE's studies and specific position papers on this topic.
See <https://www.sme4space.org/documents/>

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➤ *Technology building blocks*

- Utilisation of **small satellites** in general;
- The development of multiple (small) **satellite launch capabilities**;
- **Modular** satellite platforms, structures and mechanisms for satellites, landing modules, planetary rovers and in-orbit servicing;
- **Cutting edge** solar arrays and related **power** generation and storage applications including batteries and capacitors;
- **Radiation** protection, monitoring and early warning systems for both satellite systems and manned crews for human spaceflight and exploration;
- AI powered **on-board computers and avionics** for dual use;
- Resilient fault-proof **flight electronics and sensors**;
- **QKD communication** terminals;
- X-Ray and infrared **optics**;
- **HAPS** for space and defence missions and applications.

As a transversal technology to the missions, services and technology building blocks, a minimum level of **cybersecurity resilience** for all space-related assets will be required. Compared to the IT-sector where 'security by design' is an inherent part of the product development and life cycle, space-related systems and components are not conceived as such. Therefore, the EU Space R&I strategy should include commitments for security-by-design and foresee targeted R&I funding for this objective.

4. Coordination with ESA and international cooperation

A **good coordination between the European Union services and ESA** remains indispensable to foster the competitiveness of the EU space sector. We encourage the development of cross-sectorial systemic tools (such as the EU-ESA Framework Agreement) to enable smooth cooperation between the EU and ESA. The Framework Agreement should be comprehensive and flexible enough so that new topics for collaboration don't require each time the negotiation of a new agreement.

ESA has the technical knowhow to generate many novel and innovative ideas for future space activities for the benefit of the European Union and its citizens. As technology and system provider, especially for the upstream developments, ESA has the capabilities to go up to pre-operational stage whereas the European Union (e.g. through EUSPA) has the means to operate the system and push towards the development of downstream applications.

For what concern space exploration, **greater international cooperation is needed to develop in Europe space exploration technologies** allowing, in particular, breakthroughs for robotic missions and human exploration. Synergies with non-space sectors to provide increased societal benefits of space exploration missions should be sought. An international high-level space exploration forum, still to be established, could promote coordinated strategic guidance on space exploration and international cooperation. Europe should take the lead in such a high-level forum and in the political debate at international level.

5. Instruments and tools for the benefit of the EU space sector

Next to the already existing funding instruments we propose a certain number of new tools and concepts to reinforce space activities in Europe. Both types of instruments are highlighted hereafter:

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➤ *Evolution of the existing instruments*

- The Horizon Europe Implementation Report² shows that 7 out of 10 high quality proposals cannot be funded in the framework programme for several reasons (note that an extra 34.3 billion EUR would have been needed to fund these projects). Already in 2018, SME4SPACE proposed a **'Virtual common pot' approach**³ for financing the unfunded well-evaluated proposals, for instance using national or regional funding;
- **Increased investments in the EIC**, but with dedicated cut off dates and dedicated calls for the space sector. Indeed, as reported in the EIC Impact report⁴, only 34 space projects were funded out of a total of 1267 projects and out of 409 if we consider only the primary categories within the Digital, Industry and Space domain. It is a shortcoming for space to be in competition with the digital and industry sectors and does not take into account the specific characteristics of the space sector;
- **Easy access to funding for upscaling prototypes to series production**. This is required in the New Space context, where prototypes need to be multiplied early and quickly and where series production should happen within reasonable time to meet the time-to-market expectations;
- **A more ambitious co-programmed space partnership** in terms of budget, scope and objectives in the next MFF, as an instrument for concertation of research and innovation initiatives;
- **Accelerated space formation programmes for young researchers** since SMEs (often) don't have the resources to provide extensive on-the-job training sessions for new employees.

➤ *New actions*

- **NRC funding for space developments** similar to the aeronautics sector. Public funding schemes to cover the non-recurring costs (NRCs) associated with the construction of airplanes have allowed Europe to build a strong aeronautics sector able to compete on a worldwide scale. Support for the startup of new activities in the space domain by covering these NRCs would help to create a sustainable supply source required in the space industry. SME4SPACE proposes the introduction of a financing scheme for the investments in the production capacity of the SMEs through loans that are reimbursable at the moment of a successful commercialisation;
- The concept of **small programming** has been advocated by SME4SPACE for several years and is now successfully introduced in some of the ESA programmes (e.g. Scout, Arctic Weather, etc). For SME4SPACE it remains the most effective way of supporting providers of new technologies. It gives them the opportunity to develop an end-to-end proven solution within the same programme. Small programming also allows SMEs to take the lead in smaller consortia which are easier to manage. We ask for more budgets for such initiatives next to the EU flagship programmes;
- **Regulatory sandboxes for space innovation** as used in other sectors like fintech and AI. Regulatory sandboxes provide innovators with incentives to test their innovations in a controlled environment, allowing users to better understand the technology and fostering the broader uptake of innovative space applications and services.

² European Commission, Directorate-General for Research and Innovation, Horizon Europe implementation – Key data for 2021-2022, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2777/81203>

³ See the Paper presented at the 69th International Astronautical Congress (IAC), Bremen, Germany, 1-5 October 2018: <https://www.sme4space.org/the-european-rd-programme-horizon-2020-a-multilevel-financial-approach-for-a-sustainable-development-of-space-technologies-and-applications>.

⁴ European Commission, European Innovation Council and SMEs Executive Agency, The European Innovation Council – Impact report 2023 – Accelerating Deep Tech in Europe, Publications Office of the European Union, 2024, <https://data.europa.eu/doi/10.2826/072707>.

6. Conclusion

With this Position Paper, SME4SPACE sets the priorities of the SMEs in Europe's space industry for the future European R&I strategy. SMEs are a critical component of the space industry and their enhanced contribution is a condition for sustainable growth.

The support of the European Union for its space industry has increased considerably over the last decade, not only in terms of budget but also in the importance it is given in the overall policy setting by the Council, the Commission and the Parliament.

Space is now generally accepted as a major factor in Europe's policy whereby a space policy is seen as an essential component of the overall European security and economic policy.

SME4SPACE therefore strongly believes that in the difficult political and budgetary discussions of the second half of this year, the importance of the space policy should be considered when the priorities of the new European Commission will be defined together with the new European Parliament. Ambitious policy aims should be agreed upon and the necessary budget should be foreseen in the multi-annual financial framework.

Part of this should be a confirmation of the support for the SMEs in Europe's space policy and in the budgets. Clear commitments are necessary. SME4SPACE gives its priorities for these decisions in this Position Paper. This will allow our members to be part of a sustainable industry that will contribute to Europe's future, together with the other public and private stakeholders.