

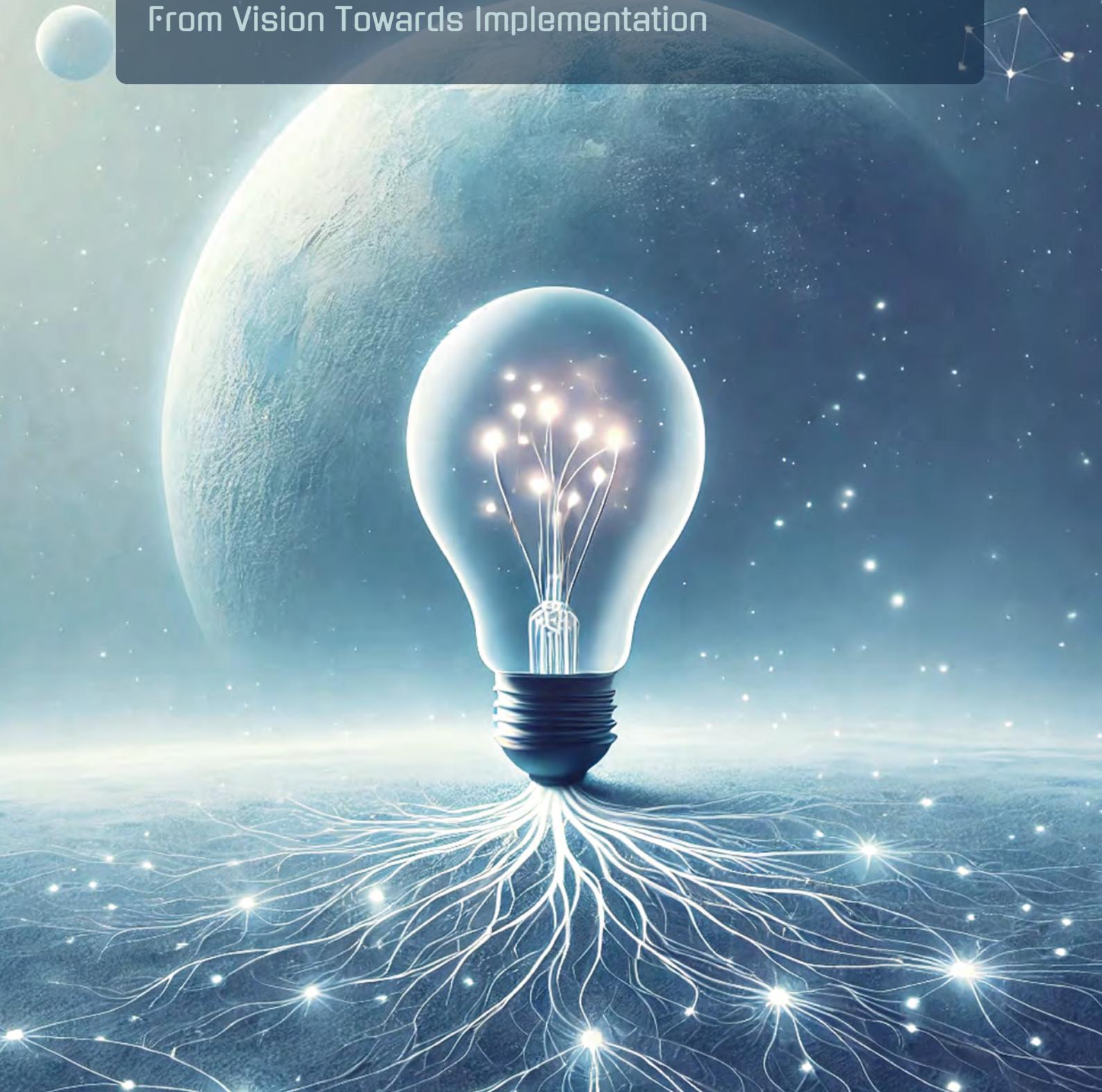


ESPI

European Space
Policy Institute

An Initial Perspective on a European Space Strategy 2040

From Vision Towards Implementation



Foreword

About

This document is not a space strategy document, nor does it represent the strategic reflections of any particular stakeholder in Europe.

The document proposes a set of initial perspectives on a European space strategy, elaborated by ESPI as part of its mandate to provide independent analysis, proposals and recommendations on strategic space issues to European decision makers and institutions.

It is informed by the 1st ESPI European Space Strategy Workshop with ESPI members, advisors and external experts in September 2024, complemented by other engagements with ESPI stakeholders such as at the 18th ESPI Autumn Conference in October 2024.

The proposal to draft such perspectives has been endorsed by the ESPI General Assembly in May 2024 and the work follows the guidance of the ESPI Advisory Council “to elaborate perspectives and guidelines for key issues and challenges a space strategy should consider when being drafted.”

The reflections are part of ESPI’s work to translate elements of the ESPI2040 vision into the first steps of a European Space Strategy.

Note: The text in the following chapters does not aim to address the presented themes comprehensively but through targeted perspectives, and major elements contributing to the overall narrative. Also, the text contains numerous references to statements in dedicated text boxes. Several of these statements were made at the 1st ESPI European Space Strategy Workshop and are provided without attribution. Please note that the opinions and ideas expressed in this report do not represent individual views of any particular participant.

Europe is home to the **highest concentration of talent**, with 7 European countries - including 3 non-EU countries - ranked in the top 10 globally, with a high output of new innovations and an education system that aligns closely with the demands of its economy (Global Talent Competitiveness Index, WEF/INSEAD; Switzerland, Denmark, The Netherlands, Finland, Norway, Sweden, the United Kingdom).

Europe in space is second to none in **space applications**: in Earth observation with EU Copernicus, essential for **climate change** monitoring, in navigation with EU Galileo and in meteorology with EUMETSAT missions, all of **dual-use** nature, all implemented by ESA and delivered by European industry.

Yet, most would agree that this alone is insufficient to develop the full benefits of space, for Europe to emerge as a space power competing in the global space race. Europe falls dramatically short in two core domains that shape global space powers, i.e. in the **use of space exploration as a catalyst** for the wider value chain of space, as demonstrated by NASA with SpaceX, and in the development of **space for security and defence**, as driven by the U.S. DoD and the Space Development Agency.

For the foreseeable future, it is unlikely that Europe will compete in all domains, and in some of them, like super heavy launchers and the race to the Moon, catching up anytime soon seems presently unrealistic, unless a Revolution Space also happens in Europe.

Europe will need to make difficult choices, define clear priorities and **pursue its own path**, to join the race on its own terms - to overtake without catching up.

A European path needs to be inclusive, and while often misunderstood as a weakness, the **diversity of the European ecosystem can be turned into a strength**. Europe, like no other world region, can fully leverage its leaders in innovation in transformative technologies, often in smaller nations, its capabilities in nations with a strong space

industry often located in bigger Member States, its readiness to act in countries with a strong posture in security & defence and in countries in urgent need to deploy security solutions, its experience in cooperating across nations and on ESA and EU level, overcoming its imperfections. Europe can leverage its reputation as a **trusted partner** and reliable international interlocutor to many parts of the world — a precious asset at a time when the world is faced with the uncertainties of an increasingly complex, competitive, multistakeholder and multipolar environment.

Europe can leverage this diversity to develop the full **benefits of space applications for all sectors of the wider economy**, e.g. in digital, green, energy, mobility, to transit towards a strategy focused on the value of data, information and services and driven and funded by demand, like the met offices, EUMETSAT and transport ministries for meteorology, also in support of security & defence,

It can do so by putting its talents and innovation at the core, by exploiting the dual-use dimension of space from the outset, to increase the competitiveness and resilience of its economy as well as to protect civil society and provide state-of-the-art space solutions to security and defence actors/stakeholders.

These can only be initial considerations. The elaboration of any inclusive European Space Strategy will be a challenging undertaking and will require a much deeper reflection and the participation of all key stakeholders. I hope that the initial perspectives as brought forward in this document, and as informed by the 1st ESPI European Space Strategy Workshop, may provide a small contribution and stimulate useful reflections towards the development of a European Space Strategy by the different actors in Europe.

Yours sincerely,



H. Ludwig Moeller
DIRECTOR OF ESPI

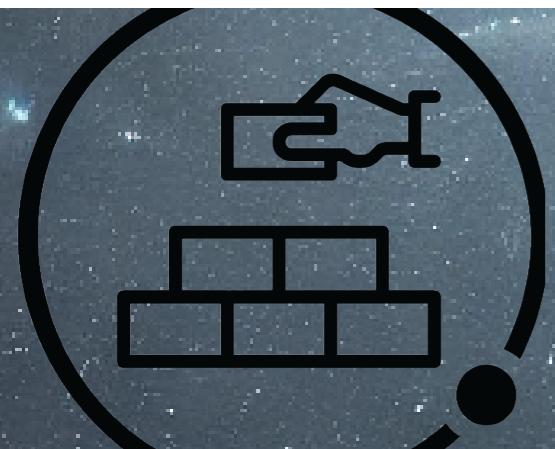
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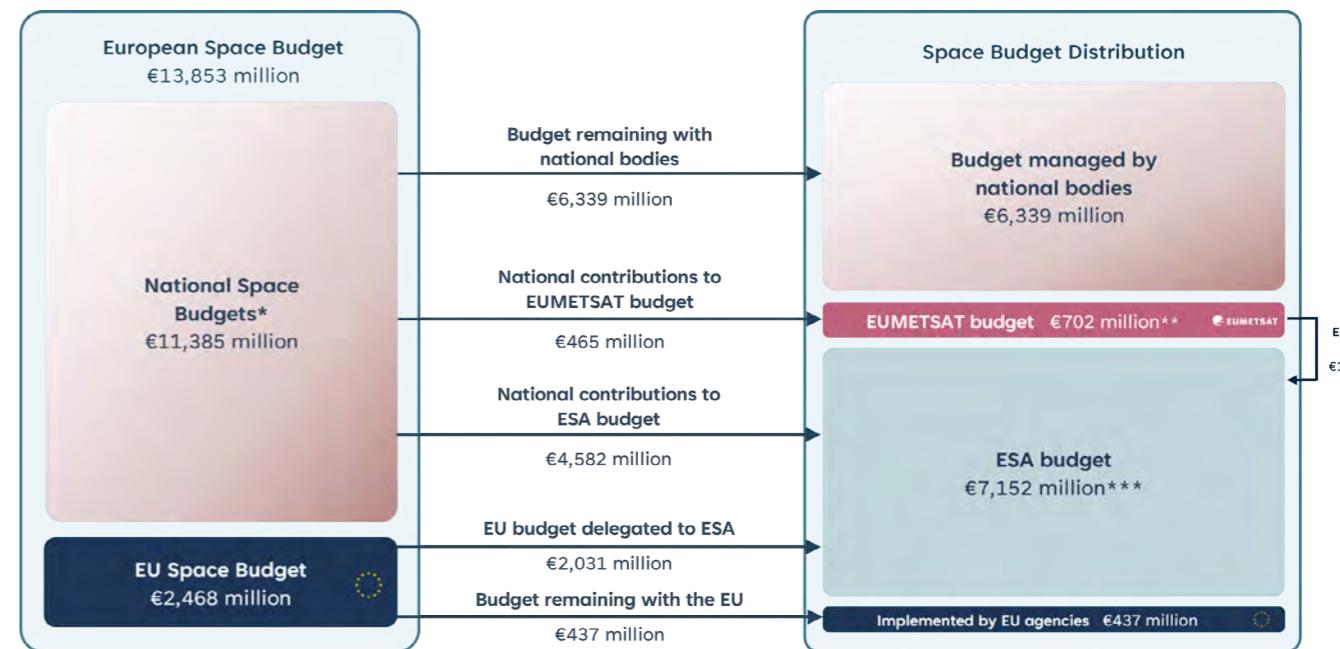
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Europe's actions in space are not guided by a single unified European space strategy that brings together the policy documents of the different stakeholders as one coherent strategy, but rather by a tangle of different and inherently contending space strategies that reflect a rather complex interplay of distinct constituencies composing the triangular structure of the European space governance (national, intergovernmental, supranational). The overarching majority of Europe's public spending in space originates in national budgets (more than 80%).

Over the past years, there has been a wave of new strategic & policy documents in Europe dealing with space, both at the national and EU level, showcasing a growing pan-European interest in space but also the need for reflection on a shared coherent European space strategy. In this regard, the May 2024 EU Council Conclusions noted the "importance to reinforce the ESA-EU strategic partnership in its various forms of cooperation... to reinforce coordination for the development of the overall European Space Policy."

Consolidated European space budget in 2022



* National Space Budgets include all budgets of EU and ESA member states excluding Canada

** EUMETSAT budget includes €237 million from other sources including the contribution from Turkey

*** ESA budget includes €367 million from other sources including the contribution from Canada



Latest releases of comprehensive national strategic documents dealing with space

HIGHLIGHTS FROM NATIONAL AND EUROPEAN STRATEGIES



Foundations

Closer cooperation between players in science and business increases knowledge and technology transfer and the promotion of young talent.

 Swiss Space Policy

Consolidate positioning of companies and research labs, seize opportunities on new markets with significant commercial perspectives and offer a favorable frame to develop the sector and attract private investment.

 National Space Strategy 2023-2027

Space research and space technology must increasingly be put to use for the benefit of Denmark's security, defence and preparedness.

 National priorities for Danish space research, innovation and technology development 2025-2035

Security & Defence

We will ensure that the UK embeds civil defence dual use at the heart of our approach to government procurement.

 UK National Space Strategy

To boost commercialisation in the European space sector, ESA and its partners need to evolve focusing on three key ingredients: talent, access to capital, and fast innovation.

 ESA Agenda 2025

More systematic cross-fertilisation between EU space, defence and security initiatives would facilitate the development of dual-use EU space components taking into account defence and security needs under an overarching capability-driven approach.

 EU Space Strategy for Security & Defence

Thanks to higher participation in (ESA) optional programmes, Polish companies can acquire or develop technologies useful for security and defence needs or create applications responding to the expectations of Polish users.

 Polish Space Strategy 2027-2030

CNES will provide support to the defence industrial and technological base of the space sector and must be able to provide its expertise to the Ministry of the Armed Forces on technological, operational, capability, legal or regulatory matters.

 Objectives and Performance Contract between CNES and the French Government

HIGHLIGHTS FROM NATIONAL AND EUROPEAN STRATEGIES



International Cooperation & Diplomacy

Use cooperation to promote common interests in the international context and to increase the ability to act.

 German Federal Space Strategy

The Mediterranean region, in fact, is of particular political and strategic interest to Italy, which wants to play a relevant role in order to defend and enhance its national interests through space diplomacy.

 ASI Document of Strategic Vision for Space, 2020-2029



Economics

There is a central effort to use satellite data decisively for land and water management and urban planning, and for optimization of new energy systems (solar and wind forecasts).

 Long-term space agenda for the Netherlands, 2024

Our core vision is to support Slovenian space and non-space industries to seize the significant commercial opportunity of the space sector, while providing new resolve regarding efforts towards digitalisation and the green transition across all economic sectors.

 Slovenian Space Strategy

... To exploit the natural alliances with Portuguese-speaking communities all over the world, as well as to develop new strategic alliances ... to tap into the growth potential of Asian markets that are quickly expanding.

 Portugal Space 2030

The most prominent policy instruments in the development of space-related industry in Norway have been the country's participation in ESA, its participation in the EU's Galileo and Copernicus space programmes, and the national technology support programme.

 Between heaven and earth: Norwegian space policy for business and public benefit

Data from space supports the green and digital transformation of our society and economy.

 Austrian Space Strategy 2030+

In absence of such a space policy at the European level, the participants of the 1st ESPI European Space Strategy Workshop aligned with the following **key challenges as drivers for a European Space Strategy**:

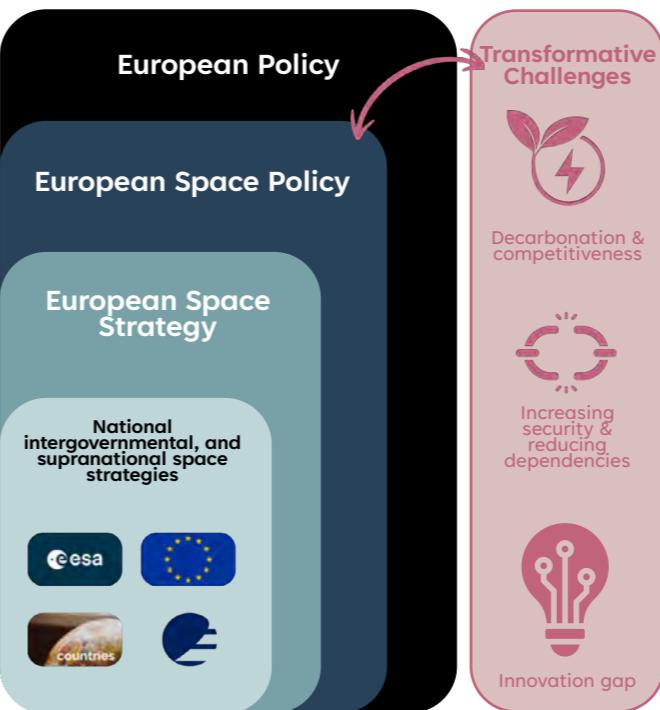
- **NetZero** and a competitive industry for adapting societies to **climate impacts** of +2-3°C global temperature rise,
- **Increasing security and resilience** for civil society, and businesses, alongside defence for protecting Europe and its values in a global context and securing peace,
- **Development of competitive industry and closing the innovation gap**, especially in advanced technologies and their transition into commercialisation, similar to the challenges identified in the Draghi Report on the future of European competitiveness.

"REINFORCE COORDINATION FOR THE DEVELOPMENT OF THE OVERALL EUROPEAN SPACE POLICY."

EU Council Conclusions "Strengthening Europe's competitiveness through space" (May 2024)

CHALLENGES – A GENERATIONAL TURNING POINT FOR EUROPE

A European Space Strategy 2040 must provide answers to the challenges of decades ahead and should respond to a European Space Policy, itself informed by broader orientations in Europe established through a set of overarching policy goals — from trade to innovation, from security and peacekeeping to the environment and a liveable planet.



"PROTECTING EUROPE IS FIRST AND FOREMOST EUROPE'S DUTY. AND WHILE NATO MUST REMAIN THE CENTRE OF OUR COLLECTIVE DEFENCE, WE NEED A MUCH STRONGER EUROPEAN PILLAR."

Ursula Von der Leyen, President of the European Commission, 30. August, 2024

AMBITION – EUROPE'S SHARE AND EUROPE'S INVESTMENT

While the challenges drive the strategic direction, the ambition should identify the opportunity conducive to mobilising resources. **A European share between 15% and 25%** of the global value space brings to the wider economy should be a target when designing a European Space Strategy.

"BY 2040 ... EUROPE WILL HAVE REALISED THE FULL POTENTIAL OF SPACE, CAPTURING 25% OF THE ESTIMATED GLOBAL VALUE OF SPACE FOR THE BROADER ECONOMY ... EUROPE WILL HAVE INTEGRATED SPACE WITH OTHER FUTURE-SHAPING INNOVATIONS, INFRASTRUCTURES, POLICIES AND STRATEGIES, INCLUDING DIGITAL, GREEN, SECURITY & DEFENCE, ENERGY, MOBILITY AND HEALTH."

ESPI2040: Space for Prosperity, Peace and Future Generations

FOUNDATIONS OF A EUROPEAN SPACE STRATEGY 2040



A European Space Strategy requires the political will, economic power and public and private investments to achieve this goal. The workshop considered the investment required to realise the ambition at 0.15-0.25% of European GDP, including significant additional investments for security and defence (S&D), from sectors beyond space and capital markets. In ESPI's view, considering the current economic situation in Europe, both the 25% target as share of the global space economy, as well as the investment target of above 0.15% of GDP appear to be optimistic.

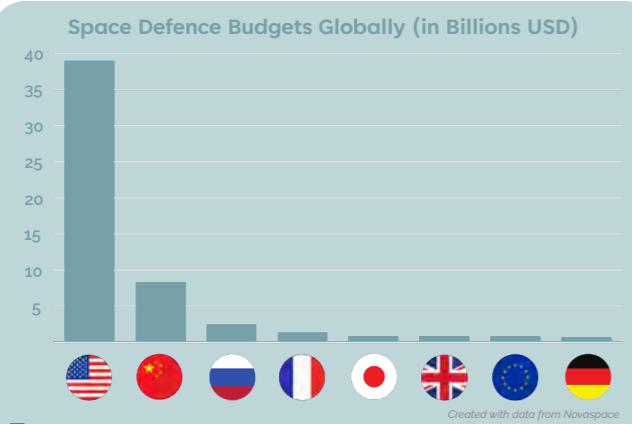
GAME CHANGER – SPACE FOR SECURITY & DEFENCE

“IN BELGIUM ... DEFENCE BUDGET WAS POOLED INTO THE ESA BUDGET AND USED TO FINANCE DUAL SPACE CAPABILITIES. THIS IS A FIRST STEP TOWARDS A BETTER USE OF OUR BUDGET AND A BETTER CONVERGENCE BETWEEN CIVIL AND MILITARY USE. WE STRONGLY ENCOURAGE MEMBER STATES, ESPECIALLY SMALL MEMBER STATES, TO EXPLORE SIMILAR AVENUES FOR THE FUTURE. LET'S BE HONEST, IT IS ONE OF THE ONLY WAYS TO INCREASE SIGNIFICANTLY THE SPACE BUDGET.”

Thomas Dermine, State Secretary for Economic Recovery and Strategic Investments, Government of Belgium, at the 2024 European Space Forum (June 2024)

In the foreseeable future, the only game changer to significantly see Europe in space evolve to these GDP levels is considered to be a substantially increased share of security & defence funding in Europe to be allocated to space. This was also echoed at the European Space Forum in June 2024.

The workshop expectations to reach a 30% share of security & defence funding in public European space budgets would indeed represent a



substantial increase, if compared to the current EDF allocation for space R&D of about 800M EUR (2021-2027) and national funding, which at present is only a fraction of civilian space budgets in Europe. If realized, at present this would correspond to about 6B EUR per year of additional European budget for space. Yet, globally the share of security & defence funding in public space budgets is more than 50% or approximately 54B EUR in 2023.

DOMINANCE OF NATIONAL BUDGETS & LACK OF EUROPEAN VISION

“IT TAKES A VILLAGE”

ESPI Brief #70 on the Draghi Report: It takes a village”

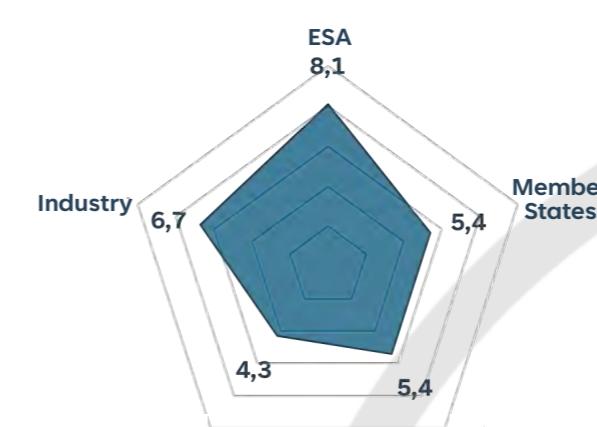
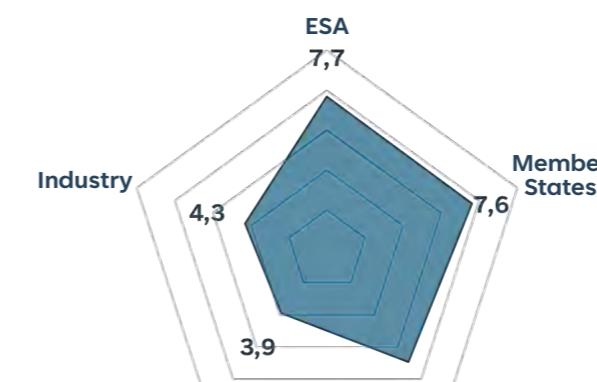
A European Space Strategy must also leverage the full European ecosystem and the distribution of budgets. Today national budgets represent above 80% of public investments in space infrastructure and services and more than 50% are entrusted to and implemented by ESA with industry. While private investment in Europe is increasingly relevant, it only represents about 15% of funding globally, and below 10% in Europe. A European Space Strategy must recognise that space is and will remain a domain driven by public investment for the foreseeable future.

A concrete path for European advancement in space is required to respond to the fragmentation of the European space ecosystem, the emergence of increased national thinking and priorities and, sometimes, even political resistance against an approach perceived as too centralised. Only a forum that can support a shared European vision and ambition, one that all actors legitimise and integrate into their political discourse, can disentangle Europe from its current challenges.

OVERCOMING THE LACK OF INCLUSIVENESS – SHAPERS & IMPLEMENTORS

Overall, inclusiveness through a whole-of-Europe approach was perceived as missing from many of the policies and strategies brought forward at national and European level. This lack of inclusiveness was also documented in **ESPI Brief #70 on the Draghi Report “It takes a village”**. Similarly, speakers at the ESPI Autumn Conference 2024 made an appeal whereby the acute needs of today to maintain peace require pragmatic approaches, to implement space strategies within the existing imperfections of the European governance framework, with need to compromise.

There was a clear vote at the workshop regarding the key stakeholders that should shape a European Space Strategy, with Member States, and ESA together with the EU in the lead, and which stakeholders are key to implement such European Space Strategy, led primarily by ESA and industry, followed by Member States and EU.



INNOVATION AT THE CORE

“THE EU IS WEAK IN THE EMERGING TECHNOLOGIES THAT WILL DRIVE FUTURE GROWTH. ONLY FOUR OF THE WORLD’S TOP 50 TECH COMPANIES ARE EUROPEAN.”

Mario Draghi, Report on the future of European competitiveness

Closing the innovation gap, particularly in future defining technologies like space, is critical, with Research & Development being the most crucial area for a future European Space Strategy to prioritise. Alongside science and exploration, R&D was voted at the Workshop as the driving force behind the concept of a future “European Space Agency”, enabling developments in security and defence, as well as in established

space applications, underscoring the **dual-use nature** of space technology.

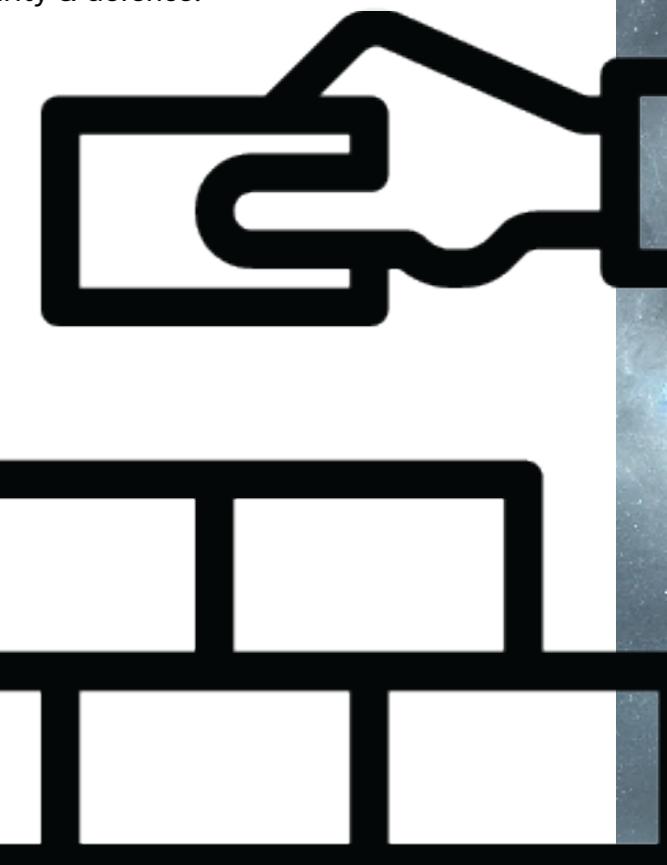
Based on these general considerations, the workshop decided to address two aspects of a European Space Strategy with priority on security and defence as well as economy and competitiveness. Themes of sustainability / climate and cooperation / diplomacy were also identified as important perspectives, to be addressed in the future.

MORE THAN A SPACE PROGRAMME

“A BOLD MISSION WOULD GALVANISE AND REVOLUTIONISE THE WHOLE EUROPEAN ECONOMY, WELL BEYOND THE SPACE SECTOR.”

Revolution Space: Report of the High-level Advisory Group on Human and Robotic Space Exploration for Europe

In ESPI's view, and as also addressed in **“Revolution Space”**, the recognition of space exploration as a catalyst for the overall space ecosystem is largely underestimated in Europe. While this domain is not directly responding to more immediate challenges of the time, it brings a high value to the entire space ecosystem, with its inspirational, economic and geo-political benefits, and is a key driver of innovation, next to security & defence.





“EUROPE MUST RECOGNISE THAT SPACE IS AS IMPORTANT [A] MILITARY THEATRE AS THE AIR, LAND AND SEA. THAT MEANS INVESTING IN OUR CAPABILITIES.”

Anders Fogh Rasmussen at the 18th Autumn Conference 2024 “Scaling Europe’s Space Capabilities for Security & Defence”

With the backdrop of war in Europe and its immediate neighbourhood, Europe's decision-makers are increasingly aware of past strategic failures to ensure a futureproof suite of space capabilities for our security and defence needs to secure peace.

There is an immediate need in Europe to level-up the political will, leverage strengths within existing institutional and industrial efforts and create a coordinated framework for civil, commercial and military cooperation at national and European level.

The urgency to accelerate Europe's approach to space security and defence and to develop a more integrated dual-use space architecture is becoming apparent. It is needed to overcome sometimes artificial barriers between civil & defence programmes and the dual-use nature of the underlying R&D. Additionally, processes need to be improved, to better integrate military requirements into new space programmes from the outset and embedded by design, e.g. as should be done for IRIS².

CRITICAL INFRASTRUCTURE, FOOD SECURITY AND ECONOMIC RESILIENCE

“SECURITY IS MUCH MORE THAN THE MILITARY USE OF SPACE.”

Statement made at the Space Agencies Panel at the Space Defence & Security Summit (Sept. 2024)

The security dimension of space is much broader than the use of space for military operations. A European Space Strategy



Multiplication of space defence strategies and Space Commands in Europe

therefore must embrace system-wide resilience, economic security, protection of critical infrastructures, food and water security, environmental security, protecting people from the short- and long-term ravages of natural and anthropogenic threats, and the deterioration of the natural environment.

The protection of critical infrastructure rises in importance in a time of hybrid threats, e.g. targeting energy and transport networks or telecommunications infrastructures. Space can be an essential element to increase resilience. Infrastructure renewal projects across Europe should build on the required investments in space solutions to increase robustness against attacks.

The interconnection of civil and military security becomes increasingly evident, e.g. with the jamming and spoofing of GNSS systems, a well-known effect of the war in Ukraine, affecting the safety of civil air traffic management.

INITIAL PERSPECTIVES ON THE SECURITY & DEFENCE DIMENSION

THE ELEPHANT IN THE ROOM

“DEFENCE DOES NOT EQUATE TO AGGRESSION; IN FACT, IT IS ABOUT PROVIDING THE MEANS TO DETER AGGRESSION AND AVOID ESCALATION OF CONFLICT.”

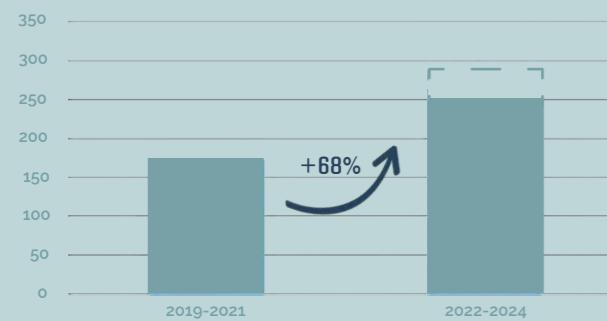
Statement made at the 1st ESPI European Space Strategy Workshop (Sept. 2024)

Defence aspects of space are critical for peacekeeping and should not be avoided as part of the debate. Europe should not fall into the trap of not building up defence-related capabilities because of a moral high ground or normative profile conditioned by decades of peace.

This also applies to the defence of European space infrastructure. Space domain awareness capabilities alone are not sufficient to deter hostile acts. This can only be guaranteed through the development of some space control capabilities, to deter aggressions, avoid escalation of conflict and ensure Europe's continued ability to access and use its space assets in a secure manner.

A distinction needs to be made between the militarisation of space (present since the origins of the space age), and its weaponisation. A perimeter allowing European action should be defined, around the possible development of a space-based early warning and tracking system and an ISR (intelligence, surveillance and reconnaissance) satellite constellation with enhanced security and defence capabilities in all domains.

Growth of military satellites launched since the start of the war in Ukraine



Projections based on data until Aug 2024

INTEGRATION OF COMMERCIAL SOLUTIONS

“MANY NATIONAL SECURITY ACTORS LACK THE NECESSARY KNOW-HOW AND EXPERTISE FOR SPACE-RELATED PROCUREMENT AND COMMERCIAL INTEGRATION. IT IS CRUCIAL TO LEVERAGE EXISTING INSTITUTIONS WITH ESTABLISHED TECHNICAL EXPERTISE AND PROCESSES TO IMPLEMENT COMPLEX DUAL-USE PROGRAMMES, ENSURING SMOOTH DELIVERY, DEVELOPING MINIMUM SERVICE & PRODUCT REQUIREMENTS, AND ENSURING THE R&D REQUIRED FOR NEXT-GENERATION INNOVATION.”

Statement made at the 1st ESPI European Space Strategy Workshop (Sept. 2024)

A level of commercial integration has already existed in Europe (e.g. through the Skynet 5 programme) for decades. However, such examples have not followed a broader strategic reflection targeting the full spectrum of military needs and constraints. It is critical for a European Space Strategy to identify in which domains increased commercialisation for defence is desired and effective.

Europe therefore needs to establish a structured framework for civil-military cooperation and commercial integration. While the concept is long-discussed, limited progress has been made on actually leveraging commercial solutions. This, i.a., is due to commercial companies not necessarily differentiating between military or civil users, prioritising cost efficiency, while institutional actors focus on security & reliability.

To fully embrace the opportunity, industry needs to ascertain longer-term demand to invest towards more resilience, while institutional actors need to revise their requirements depending on mission criticality, to lower entry barriers for innovative companies and solutions. To ensure longer-term demand, novel practices for security-related procurement are required, shifting from project-based approaches, towards an enduring demand-outlook and service procurement approach.

Such an approach will also enable increased industrial co-financing and risk-taking, as well as (most importantly) secure a more competitive

industrial base, a prerequisite for delivering on any security and defence ambition.

The integration of commercial space also creates risks and a European Space Strategy should therefore also **clarify the extent of such integration**, i.e., decide whether Europe wants (and needs) to fully integrate commercial actors at all stages or if commercial capabilities should primarily be used in times of crisis (e.g. as an enhancement/resilience tool) and continue to be considered as supplementary assets.

A failure to leverage the use of commercial dynamics and a strategy only based on traditional procurement processes in the military sector would be highly detrimental, as military innovation would suffer and as the catalytic effect of investments in the military domain for the commercial sector would be lost. All dual-use synergies would be diluted in an economically unsustainable set-up.

REGIONAL PRIORITIES AND COOPERATION BEYOND BOUNDARIES

“TENSIONS IN THE ARCTIC ARE EXPECTED TO INCREASE AND SPACE SOLUTIONS FOR SECURITY & DEFENCE MAY BE REQUIRED URGENTLY.”

Statement made at the 1st ESPI European Space Strategy Workshop (Sept. 2024)

Different regions within Europe have their distinct priorities, in particular the Nordic states in the Arctic and High North, Eastern European states with proximity to the war zones, countries with a particular interest in the Atlantic, or Mediterranean countries directly exposed to conflicts and wars in the Middle East and Africa. A European Space Strategy should consider these priorities along their perceived urgency for action, relying on stakeholders most concerned and implicated.

While for some countries, a solid foundation of domestic capabilities is necessary to ensure national sovereignty, no single country can expect to do it all on its own. Effective cooperation requires alignment of national budgets, investments, and priorities, while strengthening Europe's industrial policy. Cooperation in security & defence is already a European reality beyond political boundaries, e.g. with the UK and Norway being indispensable actors in strengthening the European pillar of NATO.

While the question is valid, it appears unrealistic that Europe in the foreseeable future would be able to equip itself with an agency for security & defence R&D operating at European level as one central entity. Therefore, a European Space Strategy should contain a critical assessment of how Europe may leverage existing and evolving national entities and European institutions, e.g. ESA, for dual-use R&D.

“SECURITY & DEFENCE AND THE ECONOMIC PERSPECTIVE CANNOT BE DISASSOCIATED, INCLUDING THE EFFECT ON INDUSTRIAL CAPABILITY.”

Statement made at the 1st ESPI European Space Strategy Workshop (Sept. 2024)

The discussions at the Workshop identified the strong dependencies between space for security & defence and its economic dimension. This is elaborated in the following chapter.



IV

“THE ECONOMIC DIMENSION IS THE MOST IMPORTANT. IT IS THE GREATEST LIMITER OF WHAT EUROPE CAN ACHIEVE.”

Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

When reflecting on a European Space Strategy, two schools of thought emerged at the Workshop: one arguing that the primary limitation to Europe's ambitions is a lack of political will, while the other holds that the lack of an economic capacity creates the main obstacle.

While a European Space Strategy might bank on the dynamic where space investment is driven through increased political will in security and defence, one could also assert that commercial dynamics and the promise of revenues and profits are crucial in developing state-of-the-art solutions for governmental needs, including for security and defence purposes.

COMPETING ON EXCELLENCE IN INNOVATION

“THE RELATIVE COMPETITIVENESS OF THE EUROPEAN SPACE ECOSYSTEM IS CONDITIONED BY THE HIGH COST OF R&D AND LOW LEVEL OF CAPITAL SUPPORT.”

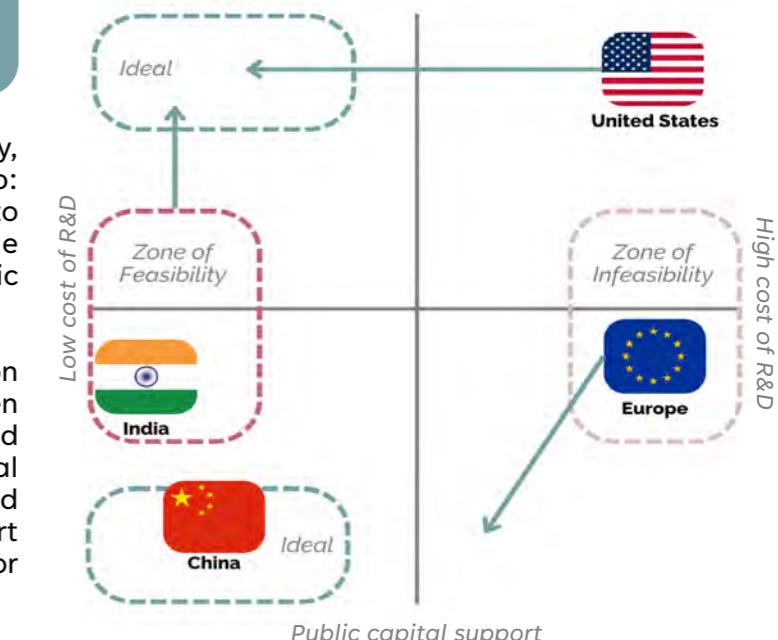
Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

The high cost of R&D in Europe is in contrast with low cost of R&D in India, high capital support from public (China) and from private/public (US). As India may be evolving towards increased private capital support to further increase its competitiveness, while maintaining its low-cost advantage, the United States may develop towards lowering cost while maintaining a high level of capital support.

In this competitive landscape, Europe and a European Space Strategy may need to consider the competitive context of China and how an increased level of public capital support

may improve European competitiveness, with excellency, trust and innovation at its core. This may be more suitable as a reference rather than the United States or India, each with a competitive advantage (cost, private capital) on which Europe may not be able to compete alone.

Private capital support



AN INDUSTRIAL STRATEGY WITH DIRECTIONALITY AND PURPOSE

There are three key economic dimensions that should be considered to strengthen Europe's competitiveness and overall strength in space: securing **diverse sources of financing** to guarantee a consistent supply of state-of-the-art space solutions, leveraging strategic procurement to **stimulate market demand** (acting as a launching and anchor customer), and developing a robust strategy and implementation pathways that **gives direction** to the two preceding elements.

Currently, the absence of such a comprehensive strategy leaves Europe vulnerable, particularly as global competitors intensify their efforts and integrate space as a key element of their future prosperity. Without a cohesive approach, the EU's space industrial base risks gradual erosion, which could lead to increasing dependence on foreign actors, primarily the United States, across various sectors integral to the space economy. Establishing a proactive and strategic industrial policy is therefore crucial to maintain Europe's autonomy and competitiveness in this rapidly evolving field.

PLAY TO YOUR STRENGTHS

A European Space Strategy should leverage and expand upon Europe's established strengths, focusing on areas where it can maintain a competitive edge or overtake today's market leaders.

For instance, Europe holds a leading position in space applications, exemplified by the Copernicus programme, serving 700,000 users globally. However, the **commercial potential** of the programme is still underdeveloped and far from its institutional component, presenting an opportunity for growth.

Europe's defence industry, notwithstanding its space component, is a strong performer in exports, securing approximately 20% of global markets, with a projected market value of 160B EUR by 2024. This solid foundation could be further strengthened by **integrating space capabilities into defence & industrial strategies** and expanding Europe's role in the space-defence nexus.

Above all, Europe's reputation as a **trusted partner** to various world regions can provide an advantage in an increasingly complex multipolar global landscape. As space becomes a critical tool for economic diplomacy, Europe's existing partnerships and alliances could be leveraged to foster new collaborations, strengthen its influence in global space affairs, and propel industrial growth and a higher trade surplus.

HARNESSING NEWSPACE AS A DRIVER FOR INNOVATION AND DISRUPTION

**"NEWSpace:
MAKE THE STRONG STRONGER."**

Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

Economic reflections should also include elements on scaling up public support to the maturation of the NewSpace ecosystem, ensuring that emerging actors with commercially viable or strategically relevant solutions have the required conditions for growth. Achieving this requires more than simply easing access to finance; it necessitates the establishment of a constant stream of innovation. Early-stage ventures need continuous access to pre-seed and seed capital to create a vibrant innovation ecosystem where failure and success are both accepted as natural parts of the process.

Building directionality, as discussed earlier in this chapter, and scaling pathways for ventures demonstrating strategic or commercial potential beyond the early stage should be ensured. This involves providing these ventures with clear opportunities for market entry and sustained support through longer-term demand prospects and partnerships, incl. the catalytic role of public actors as anchor customers & early adopters, when their innovation aligns with broader policy and industry goals.

For companies that cannot yet establish a viable business model but develop significant innovations, integration into established innovation pipelines should be facilitated, allowing a contribution to the ecosystem and ensuring that valuable innovation which might not be market-ready is not lost or transferred abroad.

BETWEEN SHAREHOLDER VALUE AND STRATEGIC PRIORITIES

"PURE ECONOMICS DO NOT PAY FOR SOVEREIGNTY."

Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

Technological dependence does not only constrain European sovereignty and security but also hampers competitiveness. It creates communication challenges, quality control issues, longer lead times, more volatile costs, and disrupts the supply chain for European manufacturers, limiting their access to high-end technologies and, over time, eroding the in-depth knowledge required to develop and master them.

While industry may have an interest in expanding its technological portfolio, it will not invest in developing new technologies without a predictable, recurring demand that supports a stable supply chain. Private businesses inevitably prioritise shareholder value, not European sovereignty—with this responsibility falling squarely on institutions. Traditionally, European institutions have made the majority of funding choices based on promised returns on investment. However, this approach falls short when dealing with critical technologies that lack sufficient recurring demand in commercial markets and do not guarantee a resilient supply chain.

A European Space Strategy must therefore develop a route not only to guarantee the availability of critical technologies from domestic sources, but to also ensure these technologies have the right level of performance, maturity, and affordability.

VARIATIONS OF A CHINESE MODEL

"EACH GEOGRAPHY WILL DEVELOP ITS OWN WINNER. IF CONSOLIDATION HAPPENS BEFORE HIGH-MARKET GROWTH, YOU GET ALL THE NEGATIVES (DECREASED COMPETITION AND NO GROWTH)."

Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

Space developments in China have a strong element of regional support, whereby industrial developments are not only managed centrally as often wrongly perceived by Europe. This model allows regional champions to emerge, which may subsequently be further supported centrally, once the top performers are a class above their competitors. This provides competitive dynamics and adds to the resilience of the overall system, including of supply.

INTEGRATED APPLICATIONS AND INFRASTRUCTURES

"EUROPE SHOULD POSITION ITSELF AS A CHAMPION OF INTEGRATION."

Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

Despite clear differences with China, a model allowing each geography to develop its own early-stage contenders may also be of appeal to Europe. Mechanisms like ESA's geo-return may be further improved to strengthen such dynamics across the continent.

Europe's strength includes its experience in developing complex space solutions, systems and applications in Earth Observation, PNT and communication. The excellence across all established applications should lead towards taking the next step and integrating systems combining these domains, for example fusing geospatial information, PNT and communication systems for rapid crisis response and early warning.

This approach not only enhances Europe's competitiveness, but it also offers differentiation, a wave of industrial growth, and new partnerships. While public investments can support the development of upstream technologies, the **integration of applications** can serve as a **catalyst for new markets**, driven by the private sector and co-funded by the public sector where relevant, e.g. as an anchor customer.

To unlock such dynamics, it is important to disentangle from narrow narratives of the space economy and its value and **focus on the downstream market value of space across sectors of the economy**, targeting the non-space sector and taking inspirations from regions like Japan where over 100 non-space companies have active investments or projects in space.

FRAMEWORKS BEYOND SILOED PROGRAMMATIC SOLUTIONS

"THERE IS A LARGE SHARE OF SPACE FOR THE ECONOMY WE DON'T YET KNOW ABOUT ... THE DOWNSTREAM WHERE SPACE IS USED - THIS SHOULD BE BETTER EXPLORED AND UNDERSTOOD."

Statement made at the 1st ESPI European Strategy Workshop (Sept. 2024)

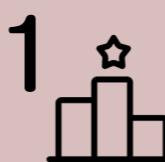
To fully leverage integrated solutions, the shift of long-term strategic planning should go beyond individual programmes and towards the interrelation and cross-enablement between them (e.g. space transportation and IRIS², or exploration and Earth observation). This requires developing a framework of action among a wider community of actors, and connect, federate different initiatives and programmes of national, commercial and European stakeholders that **target economic and societal challenges outside the space sector**.

Such frameworks may also allow to better distinguish between innovation frameworks and procurement frameworks for mature products and services, enabling a smoother and more transparent transition from research & development to commercialisation.



Beyond the initial discussions at the 1st European Space Strategy Workshop, further reflection on a European Space Strategy must clearly address a number of other relevant aspects, to ensure a coherent European action without critical oversights.

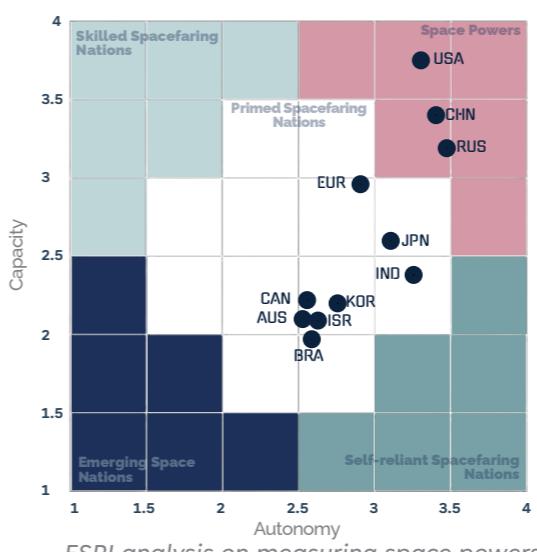
A number of these aspects, without a particular priority and also without the ambition to address the full picture of what's at stake for Europe, are summarised here below by ESPI, each with several initial perspectives. These aspects may be subject to future work, for example in a follow-up workshop or a different platform facilitated by ESPI. They are part of ESPI's effort to translate vision into first steps of implementation.



FROM LAGGING BEHIND TO BECOMING A FULL-FLEDGED SPACE POWER

While Europe remains one of the most experienced actors in the international space arena, boasting state-of-the-art capabilities across a range of activities (in particular applications), it cannot claim the status of a full-fledged space power, lagging behind in several critical areas, such as human space exploration, or the security & defence dimension of space.

Europe also remains very vulnerable to the influence of foreign actors when it comes to both its external and internal decision-making autonomy. The interplay between national, intergovernmental and communitarian frameworks still is a source of institutional misalignment, often harming Europe's ability to develop a clear, coherent and autonomous posturing for the future, and to act decisively.



ESPI analysis on measuring space powers



FROM A TRADITIONAL FOCUS ON DEVELOPING CAPABILITIES TO ADDRESSING THE POLICY VALUE OF SPACE

The policy impact of space on other domains and sectors in Europe is increasingly recognised but remains underdeveloped. It is crucial for Europe to extend beyond a current focus on development of space systems, to give new emphasis to the impact of space in other policy domains, e.g. digital, energy, transport and foreign policy.



EXPLORATION AS A CORE ENabler OF THE SPACE ECOSYSTEM

All big space powers but Europe consider space exploration, especially human spaceflight, as a key component of their space strategy and use it as a tool leveraged far beyond the space sector, from education to diplomacy and day-to-day politics.

Exploration is a crucial component that drives the growth within, pushes the boundaries of innovation and attracts the best and brightest to join the space industry. Exploration can enable spin-offs to other sectors of the economy (healthcare, recycling, agriculture, pharma) as well as towards future missions within the space economy itself (propulsion, refuelling, robotics).

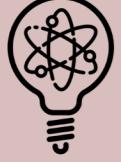
Given the long-term timeframes of true exploration ambitions, Europe's self-limitation in exploration contributes to a less vibrant space sector, opening fewer opportunities for innovation and cross-fertilisation and a perpetual lack of longer-term demand prospects and anchor customer opportunities for exploration capabilities, beyond niche, one-off, projects. Next to space for security & defence, space exploration could be the other game changer in Europe in space. Europe's strategic positioning in space exploration, including human spaceflight, therefore needs to be addressed with priority.

4

PATHWAY FOR EARTH OBSERVATION & SPACE APPLICATIONS

Europe's strength in space applications offers clear pathways for targeted initiatives. As an example, in Earth observation, the strategic focus for the next decade and beyond should expand beyond monitoring to address climate adaptation and place greater emphasis on security and defence policies and make the case of the policy value of Earth observation.

Climate adaptation to live in a +2-3°C world with an increased frequency of extreme weather events will become a major topic of the coming decades. Earth observation can help to mitigate climate impacts. Examples could be to support necessary changes of our infrastructures and cities, help rebuilding carbon sinks like forests or moorlands and support carbon capture, storage, and sequestration (CCS) activities.

5

FROM AN OFTEN DETACHED SPACE SCIENCE TO SCIENCE & TECHNOLOGY AS A DRIVER OF INNOVATION AND POLITICAL BENEFITS

The role of space science in a European Space Strategy has not (yet) been subject to much debate and often falls short next to the more directly visible challenges of our time. Yet, space science is a stronghold of Europe in space and the continent is globally recognised for its excellence.

However, it appears that the wider role of space science reaches beyond scientific objectives; its role in driving technology, challenging industry, establishing spin-offs and facilitating skills transfers (within the space domain and beyond), and producing broader political benefits and societal cohesion, is largely underdeveloped. A European Space Strategy must address these aspects, including how to leverage the NewSpace revolution (and feed into it).

Finally, the role of academia as a key component of a European Space Strategy, in its role as generator of knowledge, cradle of talent and a driver of innovation remains underdeveloped. The European academic ecosystem should benefit from greater integration with the industrial sector to facilitate the transition from innovation to commercialisation.

6

FROM SPACE DIPLOMACY TO SPACE FOR DIPLOMACY

As traditional programmatic agency-to-agency cooperation moves towards a new phase where space capabilities directly support foreign policy objectives, the development of a distinct approach to space for diplomacy needs to solidify. This need is further amplified by the fact that the challenges and risks faced by the European space sector, while being the most diverse in nature, have a strong, sometimes dominant, international dimension.

The crafting of coherent and assertive diplomatic actions to promote Europe's interests globally is of paramount importance. Specifically, it is increasingly pressing to make external action an integral part of a European Space Strategy, in order to address the mounting international concerns over the lack of a level playing field on global commercial markets, while pursuing international solutions that ensure the security of outer space.

In this sense, diplomacy can (and must be) intended as both a strategic goal in itself and a means to meet the goals of growth in a future European Space Strategy such as competitiveness through tapping foreign market access and strengthening Europe's security through partnerships.

To this end, federating these developed assets and services also in a European framework, and ensuring their complementarity, will be key, to maintain national leadership on services and solutions used and leveraged across Europe.

8

FROM SPACE-TO-SPACE NARRATIVES TO COMMUNICATION AND EDUCATION BEYOND THE SPACE BUBBLE

Europe cannot be a successful continent without an inspired society and without citizens who can believe they can achieve great things. A European Space Strategy must contain communication to the public to increase public awareness and support to space as integral element to make the impact and unique benefits of space embraced in a wider audience.

The role of communication is strongly linked to education, to prepare the talent and skilled workforce of tomorrow. A European Space Strategy needs to prioritise the development of talent and the best-educated and most productive workforce. It requires the seamless integration of the space sector into schooling and academia, to attract and develop European and global talent early on. It also requires the creation of a strong European space and entrepreneurial and political culture, including and beyond the inspiring image of astronaut as a profession, acting as a catalyst for space education.

7

ONCE RECOVERY FUNDS DRY UP ...

This document is written at a point in time when parts of the demand-dependent European space industry are struggling to recapture its former glory, while other segments are growing due to secured (temporary) funding pipelines enabled by the Recovery and Resilience Funds deployed over the past years. This context is underpinned by different strategies currently pursued in deploying the funding.

The challenge is however shared wherever RRF funds are currently being used to build up space capabilities, as the investment should not be lost and the capabilities and services developed should be made sustainable, and should be operated, leveraged and renewed or refurbished over time. This would also help to ensure the sustainability of the industrial ecosystem created by the RRF funds.

A COLLABORATIVE PROCESS



VI

The ESPI perspectives are informed by the 1st ESPI European Space Strategy Workshop held at ETH Zurich on 25 September 2024.

The ESPI Workshop was attended by members of the ESPI General Assembly and Advisory Council, together with selected external experts. The workshop:

- Had the objective to **confirm the key transformative challenges and drivers** of European Policy direction, to identify the **level of ambition** a European Space Strategy should have and the **barriers of progress**.

- Aimed at identifying the participants' views on **core and transversal issues** to be addressed and identify any **game changer**, which may define the next decade in space.

This document constitutes **ESPI's independent reflection of the discussions** at the workshop. Furthermore, it is informed by recent events relevant for reflections on a European Space Strategy, in particular the 18th ESPI Autumn Conference "Scaling European Capabilities for Security & Defence" of 1-2 October 2024 in Vienna, the Space Defence & Security Summit of 17-18 September 2024 in Paris and the European Space Forum of 24-25 June 2024 in Brussels.

The initial perspectives presented through this document provide an elaboration on the security & defence and economic perspectives of a European Space Strategy. The document outlines further items that may deserve to be elaborated in the near future, e.g. the dimension of Europe's place in the world and as a space power, including in space exploration, the shift towards leveraging space for diplomacy or seizing the catalytic benefits in Science & Technology beyond the traditional perimeters. It is ESPI's ambition over the next year to elaborate further perspectives, following a similar approach and including follow-up workshops or similar settings on selected items.

Ultimately, the work of ESPI together with its members, advisors and external experts can help to reinforce the ESA-EU strategic partnership in close consultation with Member States in view of fostering a globally competitive European space economy in a highly challenging international market and geopolitical context. The ambition is to **contribute to the development of the overall European Space Policy, in line with the EU Council Conclusions of May 2024**.

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This report on initial perspectives of what the European Space Strategy should consider is the result of a collaborative effort brought together by a diverse group of members, advisors and experts through two workshops and written contributions. We would like to express our sincere appreciation to all participants who provided valuable insights during these stimulating and intense sessions.

A special thanks to those who attended the Preparatory Space Strategy Workshop in Alpbach in August 2024 as well as the 1st ESPI European Space Strategy Workshop held in Zurich in September 2024, where lively and thought-provoking discussions formed the basis of these perspectives. Each input was crucial in shaping the final content of this report.

The ESPI Team expresses its particular thanks to the Swiss Space Office, which facilitated the Workshop, and ETH Zurich for hosting the event. The participants of the workshops and experts providing written inputs (marked with an asterisk) included:

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The content reflects the original work and perspective of ESPI, formulated based on the collective input from the group as a whole. We extend our gratitude to all those involved for their time, expertise, and thoughtful contributions to this important work.



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