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REPORT

Europe's challenges in space security

This report is an independent output of Friends of Europe's (bold) Making Space Matter initiative (bold). Written by Jamie Shea, it brings together the views of scholars, policymakers and senior defence, space, and security stakeholders.

Unless otherwise indicated, this report reflects the writer's understanding of the views expressed by the interviewees and participants of survey. The author and the participants

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Introduction

Speaking at the Paris Air Show in June 2025, French President Emmanuel Macron declared that "Europe must become again a space power". He pointed to the reality that space is increasingly dominating all aspects of security, whether in the form of internal resilience or external military protection, being "at the intersection of all these public and private questions, as well as civil, military, scientific and industrial ones".

In short, space is a key gauge of international power in today's world.

If that is indeed the case, how much power does Europe really hold?

France underlined its commitment to strengthening Europe's space capabilities by injecting €1.55bn of state funding into Eutelsat, Europe's largest operator of low orbit satellites, and second largest globally behind Elon Musk's SpaceX.[1] This investment, doubling its previous stake, would make France the company's largest shareholder – a move that would certainly boost both France's national space capabilities and the European continent's role in space.

Europe is the world's largest exporter of satellites, with Airbus and Thales Alenia Space, a joint venture between France's Thales and Italy's Leonardo, leading the market. Yet these companies have struggled to make money out of their space activities, and there is growing concern from policymakers and industry leaders that lack of investment in Europe, compared to Europe's main competitors, the United States and China, would progressively erode the leads in space technology that Europe still enjoys – for instance in satellite design and earth observation with the latest generation of the European Space Agency's (ESA) Copernicus constellation.

According to the ESA, the US accounted for two-thirds of the global space budget in 2023 – and Europe only 11%. It is estimated that today the United States is investing nearly four times more in space than the EU. Only 0.2% of the EU's GDP is devoted directly to space activities.

The US and China have larger space markets than Europe, and therefore greater demand for space products and services. At the same time, Europe also has a dependency on foreign launchers, for instance Russian Soyuz rockets (Roscosmos) in the past or today the Falcon 9 of SpaceX.

In 2023, following EU sanctions against Russia for its invasion of Ukraine, Europe lost its independent access to space for more than a year while it waited for the new Ariane 6 rocket of Airbus and Safran to come online. Hence Macron's call for the creation of a new European champion in space to consolidate industrial capacity and increase competitiveness and volume. Such a champion could

[1] Eutelsat has operated 600 satellites since merging with the UK's One Web venture in 2023.

rival SpaceX (which now launches a new satellite every two and a half days on average) and Jeff Bezos's Amazon or Boeing as they also step up their space programmes.

Recently Airbus, Thales and Leonardo have announced the formation of a joint space venture, known as Project Bromo. They aim to set up a new pan-European space company, headquartered in Toulouse, with 25,000 employees and an annual turnover of €6.5bn. While this new venture would certainly help to consolidate Europe's space efforts within the private sector, success is not guaranteed given a history of squabbling among the major European commercial players. Even if the new company goes ahead, it could be thwarted by EU competition rules that have previously hampered the consolidation of Europe's space companies.

Yet while Europe seeks to consolidate its major space companies, it must also nurture the small- and medium-sized space companies and start-ups, which are often at the forefront of innovation and an essential part of the European space landscape.

Certainly, a big increase in investment will be required. At a time when government budgets are under pressure from higher welfare spending and the cost of rearming Europe, "partnership between public and private capital will be needed, and this will require considerable effort" to quote Jean Pierre Darnis, Senior Fellow at the Foundation for Scientific Research in Paris.

The fear is that Europe could be squeezed out of the growing market for cheaper and more numerous low orbit satellites, which are increasingly important for telecommunications, internet and data connectivity, emergency response, space tracking and exploration, and defence.

The Ukraine invasion has highlighted the crucial role of satellite services and connectivity in modern conflicts. At a time of growing geopolitical tensions, when Europe is concerned about its "strategic autonomy" and risky dependence on foreign suppliers for its raw materials, energy, rare earths, critical supply chains and weapons systems, can Europe afford to be less than sovereign in space – a domain that increasingly determines what goes on on land, at sea and in the air, as well as in the digital and cyberspace realms? As Vago Muradian, the founder of Defence and Aerospace Report, puts it: "The big story is sovereignty in the wake of the US questioning its commitment to Europe and NATO."

Enhancing Europe's space capabilities: the current state of play

Europe must be more space-enabled, capable and resilient. To get there, Friends of Europe, in partnership with the European Space Agency, convened a roundtable on 5 June 2025, to deep dive into the challenges and opportunities presented by Europe's current space endeavours and to identify how its space architecture can be further developed to keep pace with the emerging landscape of technology, competition, rivalries, threats and challenges.

Participants, comprised of EU and NATO experts, as well as academia and business, looked at Europe's strengths and weaknesses, identified risks and opportunities and sought to find ways for Europe to increase its individual space capabilities as well as to improve its overall model of space governance and capacity to better operate across the various space domains. The objective was to define a strategy for a European space architecture that would be resilient and adaptive, underpinning Europe's capacity for independent action in security and defence.

The discussion focused initially on mapping Europe's current standing in the space domain, particularly in the context of the growing importance of space to Europe's future security.

A PIVOTAL YEAR

The EU Commissioner for Defence and Space, Andrius Kubilius, has dubbed 2025 a "pivotal year" for the EU's space capabilities. The recently published *Defence Readiness Roadmap 2030* lists a "European Space Shield" as one of four key strategic objectives for the EU's security and defence, using synergy between EU common and member state national investments (the other priorities being drone protection, air and missile defence, and the Eastern Flank Watch – all undoubtedly enhanced by space-based capabilities).

The EU has launched a new programme of very high-resolution satellites to provide the EU institutions and member states with intelligence and imagery every 30 minutes (compared to the current rate of once per day). Kubilius' ambition is also to strengthen the EU's current Galileo navigation system with more precise military-grade features to give military commanders more independence from foreign-supplied information that may not always be available or could be restricted. In 2027, the launch of the IRIS 2 system will also enhance Europe's communications and connectivity.

Space in everything, everything in space

At the moment, the growing importance of space to Europe is clear. Space is the fastest growing global economy, worth around €547bn in 2023 and expected to grow to €1.8tn by 2035 and with an annual growth rate around 10%. By some calculations, a €1 investment in space is estimated to generate between €3-7 of economic output in the EU, fostering the creation of scores of new businesses. One expert at the roundtable went so far as to estimate that €1bn invested in space produced 10 times the return.

Europe relies on space for 60-70% of its weather data and to track the impact of climate change on its agriculture, forests, maritime ecosystems and transportation networks. Its telecommunications, data storage and processing, and banking and financial services are increasingly controlled by and through space.

And this domain is evolving rapidly. Nearly 60 countries now operate their own satellites. With each passing year more are able to launch them independently, even countries that are not at the forefront of scientific and technological innovation. The falling cost of satellite launches and cheaper satellites make it easier for states to become players in the "new" space.

ENTER THE PRIVATE SECTOR

The private sector is increasingly taking over space activities from governments, particularly in the US where private companies now dominate satellite launches and human space transportation, as well as space services like telecommunications and internet connectivity. The technology is also evolving fast with mini and nano satellites, quantum computing and the Internet of Things (IoT). But so too is the threat landscape in space, as vulnerable satellites become targets for space weapons, and space dominance, coupled with the use of disruptive tactics and technologies, becomes more attractive to states pursuing military options and the build-up of their armed forces.

As competition replaces cooperation and earlier hopes that space could be an open and accessible "global commons" – much like cyberspace or the oceans – regrettably recede, Europe is confronted with some uncomfortable choices: where to accept dependence and a tolerable margin of risk vis-à-vis total sovereignty in space; where to invest in order to maximise strengths or remedy weaknesses; and where to accept contributions from partners on a trusted basis rather than try to do everything within Europe itself? In this context, Macron has spoken of India, Brazil, Canada and the Gulf states as partners of choice. But how feasible are these potential partnerships, and how much added value or useful investment could they bring to offset the cost of developing capabilities exclusively within the EU itself?

THE NOT-SO-PEACEFUL USES OF OUTER SPACE

At its London summit in December 2019, NATO declared space as a new domain of military operations and established a Centre of Excellence in Toulouse, as well as a Space Operations Centre at Ramstein, to improve its space situational awareness and capacity to act in space in wartime – both defensively and offensively. These steps reflect the growing spectrum of space threats, as well as the growing importance of space for network-centric and data-driven military operations.

More space-based assets like satellites and space stations increase the potential attack surface. More ground segments offer targets for sabotage or cyberattacks, including on uplinks and downlinks. Satellites can also be vulnerable to jamming and spoofing, as well as to interference or even outright destruction from anti-satellite weapons like lasers or manoeuvrable counter-satellites. And as more countries test anti-satellite weapons, the amount of dangerous debris in orbit increases, making space situational awareness and early warning (for instance of potential collisions) an increasing challenge for the EU.

As activity increases, so does the space supply chain of technology, components and materials in the European economy. These can be attacked too, resulting in a halt to industrial production or a service disruption with knock on effects in space itself.

Case in point: at the onset of the war in Ukraine, Russia knocked out the Ukrainian Viasat space communication system through cyber hacking. Fortunately, Elon Musk stepped into the breach with his more secure Starlink system, but this incident demonstrated the current vulnerability of space assets to disruption. It has also meant that European allies (in this case Poland) have had to pay money to a US company in order for Ukraine to be able to continue to use the Starlink network – hardly an example of the strategic autonomy that the EU aspires to.

The EU's Strategic Compass, approved by both member states and the EU in 2022, called for the development of an EU Space Strategy for Security and Defence. This was realised by the EU High Representative for Foreign Affairs and Security Policy in 2023, when it a strategy was published in the context of the Common Security and Defence Policy. In the strategy, the EU recognised space as a strategic and operational domain for the first time, thereby significantly changing its posture towards deterrence. It put in place a range of measures for shared space threat awareness and response, resilience of its space assets, the increased use of space capabilities for security and defence, and new partnerships – including close cooperation with NATO.

As the military uses of space grow, so too are military establishments becoming increasingly interested in dual use capabilities and ways in which commercial satellites and space services can be used or converted to military purposes. In Europe's case, for example, introducing military segments into the Copernicus, Galileo and forthcoming IRIS 2 constellations or utilising their existing spectrum of services in military planning.

There is now the challenge of integrating the various national space programmes in Europe into Europe-wide initiatives, whether via the European Commission or ESA, and working with non-EU European partners like the United Kingdom, Norway and Turkey. Internal coordination within national governments has also become an issue, as space access, services and reliance are now spread over a wider spectrum of government departments and agencies. This requires deconfliction and prioritisation as more users seek to access space services and data, as well as better coordination in decision-making, determining primary and secondary users and how to make investments pay off in the short- and long-term.

EDITORIAL NOTE

On 27 November 2025, the European Space Agency secured a budget of €22.1bn over three years, a 17% increase when adjusted for inflation, including €1.2bn for the European Resilience from Space programme – this will enable the national space capabilities to share national space assets. The initiative marks ESA's first foray into defence linking satellites like Galileo and Iris 2 to military, police and civil protection functions, thereby enhancing Europe's strategic autonomy. Readers may wish to bear this development in mind when considering the report's discussion of coordination between national space programmes and Europe-wide initiatives.

SPACE DIPLOMACY: HAMSTRUNG AND HUNG OUT TO DRY

Participants at the roundtable also reviewed the state of play with space diplomacy, which is all the more important at a time of growing military rivalries in space and the risk of confrontation or incidents escalating out of control.

There has still been no agreement to ban anti-satellite weapons, although a moratorium on kinetic testing has been promoted with some success by the EU in conjunction with a group of like-minded countries at the UN. An agreement to remove space debris and obsolete satellites is also outstanding. There are half a million large pieces of debris currently in orbit. The European Space Agency has promoted a Debris Charter, but in a more tense international environment it has become more difficult to persuade some key countries to sign up to it.

The United Nations deals with space issues internationally. The 1967 Outer Space Treaty remains the baseline, but it is badly in need of updating – especially when it comes to the militarisation of space and commercial exploration and exploitation, for instance mining on the moon and apportioning zones of national economic activity. The 1967 treaty bans placing of weapons of mass destruction in space, but not other weapons nor the weaponisation of civilian space assets, such as satellites.

The UN open-ended working group on reducing space threats has struggled to produce a new code of space conduct. The International Telecommunication Union has also been hamstrung by different national priorities. There are other multilateral initiatives in smaller groups, like the Artemis Accords or the Combined Space Operations Initiative pushed by the Five Eyes community (US, UK, Australia, Canada and New Zealand) in collaboration with other countries such as Germany and Norway. Yet the general view of the roundtable participants was that, in a more hostile geopolitical environment with open conflicts, international treaties and norms are less likely to be respected or to last.

Although the EU has done useful work on space arms control in the past and has appointed a Special Envoy in this area, Europe must rely more on hard space capabilities and its own sovereign space infrastructure for its security. When it comes to space, hard power carries more weight than soft power, and, without proven capabilities, there is little room for influence or leverage on the diplomatic front.

Getting where we need to be: what needs to be done?

Participants at the roundtable made it clear that EU leaders need to set a new level of ambition – in particular priorities for Europe's space autonomy – over the next 10 years. Given the resource constraints, the consensus of participants was to be realistic and not try to imitate counterparts, whether in the US or China, just for the sake of it. Instead, the focus should be on those capabilities of immediate importance to Europe's security and defence. The objective has to be for Europe to be able to generate and control the key space services that deliver strategic autonomy, for instance for situational awareness, intelligence collection and analysis, observation, navigation and positioning, and communications.

Participants offered a number of solutions up for discussion.

INCREASING AUTONOMY

One participant suggested solving first and foremost Europe's reliance on foreign launchers – because there is no point in worrying about space if you cannot get into it in the first place. The EU must therefore be prepared to subsidise autonomous launch systems as a strategic priority. Further development of recoverable launch vehicles similar to what SpaceX has achieved could come later.

Another participant put the spotlight on a European autonomous space tracking and awareness system, similar to what the US started with its Geosynchronous Space Situational Awareness Program (GSSAP) launched in 2014. As with Galileo in its time, the political urgency is for Europe to determine where it needs full strategic autonomy as a collective European capability as compared to the national autonomy that European countries individually could achieve.

Indeed, in a December 2024 conversation with Friends of Europe, NATO's Supreme Allied Commander for Transformation, Admiral Pierre Vandier, said that EU member states should move from bespoke high orbit satellites and instead focus on cheaper low orbit satellites for communications and intelligence rather than relying on SpaceX. They should also work with the UK, which has an extensive space programme and defence industrial base, for both cost-effectiveness and resilience.

Another participant in the roundtable, thinking of the United States' 1960s Apollo programme, thought that the EU should set a specific objective to mobilise public and political interest and support: if not putting a European on the Moon or Mars, then perhaps developing a European Space Station to replace the current International Space Station after its life span come to an end in 5 years' time. This idea, however, would cover the area of space exploration more than the more immediate concerns regarding space-based services and situational awareness for security.

EU AND MEMBER STATE COOPERATION

Participants pointed out that space is a shared responsibility between the EU and member states, so synergies in budgets and programmes that align the major players in the same direction are crucial. European space policy suffers when there are too many ad hoc contributions, an inevitability brought about when defence is, per Treaty, a national and therefore sovereign prerogative in the Union. Consequently, European systems have had to enable national capabilities to plug in and be connected in order to enhance the system's overall effectiveness. One example is the recent agreement between France and Germany to build the Odin's Eye satellite system to boost missile detection – a priority mission in the EU's defence readiness roadmap. So, to what extent can Odin's Eye help other EU member states with early warning of missile launches?

Another example is in space awareness and tracking, where 16 EU member states contribute their own national assets and data to the EU Space Surveillance and Tracking System. But the US is a major contributor too through data-sharing and cooperation with space awareness efforts. The system has 50 sensors, but these are under national, not EU control. Supported by EU funding, member states could be incentivised to cooperate more to support the growing community of European space users. Yet member states frequently prefer to play the national card rather than seek European-wide synergies.

Some participants felt that this nation-first approach was a worrying and increasing trend in space security.

ESA TO BRIDGE THE GAP: FROM R&D TO END-USE

It was stressed that the ESA has a key role to play here as the body that can develop architectural and sensor solutions. It can manage complex programmes involving different funding streams, national assets and supply chains delivering thousands of different high-tech components. The ESA already manages 60% of Europe's overall funding of space programmes – it could also manage the whole cycle of space capabilities from the upstream development phase to the downstream delivery of services in all domains of space security. A gap often occurs between these two poles, especially in Europe where innovation based on scientific research and technology is strong but the capacity to exploit and monetise the results and produce at cost and scale is much weaker.

This is all the more the case if research and development are not aligned with

user needs. The requirement is for there to be knowledgeable customers at the national and armed forces levels who understand the products that industry can provide. They should not overburden industry with unrealistic specifications, but work with space companies to provide constant feedback and improve the quality of products and services. End users, like the European Satellite Centre in Madrid, do not care so much about how space services are delivered. Only that they are available.

ENGAGE THE PRIVATE SECTOR

Consequently, and given the reluctance of governments to share access to their sovereign space assets, the EU has to rely on commercial solutions, whether European or foreign, with the risk that this entails for autonomy and strategic decision-making. Conversely, space providers need a better understanding of the needs of their clients. The need is for a rational division of labour between providers and operators, with bottom-up user needs playing a more central role in driving industry's choices.

Private sector participants made a plea for the ESA and EU institutions not only to engage industry on technology issues, but also on the definition of Europe's future space architecture. Europe's future in space will be shaped by public-private partnerships in mature domains such as satellite communications and remote sensing. Industry needs to ensure that the EU creates the legal and regulatory environment, as well as the level commercial playing field, so that European companies can do business successfully and optimise their space products and services.

Members of the private sector also stressed the need for the EU and member states to focus on developing the eco-system for future European space sovereignty. Education and training to develop the skills of workers and bring more talent into the space sector is a key priority. The education system and university courses and apprenticeships should be geared more towards encouraging students to pursue STEM qualifications (science, technology, engineering and mathematics); this should also include producing experts in data protection in space and cybersecurity and anti-hacking skills.

(ACCESS TO) FINANCING

It was pointed out that the space sector is often driven by small- and medium-sized enterprises and startups at the forefront of innovation. Where banks are often risk averse or too short-term in their lending policies, Europe must ensure that these small companies have access to banking systems and credit lines. The EU can take the lead by devising financial instruments to help SMEs get their products to market.

The decision of the European Investment Bank (EIB) in Luxembourg to change its lending criteria to finance dual use capabilities and lend capital to national banks, such as Deutsche Bank, for defence projects is a good step forward. But the amounts available for investment are still too modest compared to the overall bank capital potentially available. On the other hand, Europe's space capabilities could also help SMEs to develop by making more open-source information and data available to them. The Earth monitoring data provided by Copernicus is a case in point.

European funding also needs to be spread more equitably across the European space sector and between the large companies and the SMEs given the importance of the latter as the driver of innovation. SMEs need to have more possibilities to leverage this innovation through earlier and more consistent financing. Currently, France and Italy receive the lion's share of EU funding. There should be more regionalisation of funding, and the EU needs to encourage more market diversification geared to user needs.

On a positive note, the European Commission is mapping EU contracts and grants to the space sector to evaluate how they have performed and with the aim of drawing lessons as to which financial instruments work best. The Commission could go a step further and monitor research activities to evaluate their scientific importance for the space sector and how they could be better applied to the development of new technologies that serve Europe's priority capability requirements.

COOPERATION WITH THE US

Cooperation with the US, always a sensitive area for advocates of European strategic autonomy, could be more effective if Europe were to work with US defence and space companies that are willing to operate outside the US International Regulation in Armaments (ITAR) regime, which could restrict European access to US technology or give the US government control over European space capabilities. This said, the US would clearly be reluctant to lose market share to the Europeans and would push for more European defence spending (following NATO's decision to raise its defence spending target to 5% of GDP over the next decade) to be invested in American space industry and services and not just in the more traditional fighter jets, air defence systems and armoured vehicles.

The EU, on the other hand, has set a target of 65% of member state spending and EU common funding to go to EU products and companies in order to strengthen the continent's defence technological and industrial

base. France had wanted this target to be as high as 85%. The EU's Readiness Roadmap 2030 posits a target of 40% of EU member state military procurement to be done jointly within the Union. Therefore, managing the relationship with the US and involving US companies in European programmes would need deft diplomacy.

At the time of its development, the Galileo satellite programme was not seen by some observers to be strictly necessary, given the US willingness to provide NAVSTAR GPS free to its European allies; but the EU decided that Europe could not be dependent on others in such a crucial space service. It also knew that it had to be able to have a higher quality of service and more detailed imagery and data where it deemed necessary for military or economic purposes. Twenty years down the line, this bold approach has been vindicated and now needs to be applied to other key space capabilities, notably Intelligence, Surveillance and Reconnaissance (ISR) and Strategic Shaping and Reconnaissance (SSR).

Yet breaking dependency on the US will be neither quick nor easy. Given the perception of an increased threat from Russia and the lessons of the war in Ukraine, when it comes to the crucial role of air and missile defence, NATO has given its member states a new capability target to increase their air and missile defence assets by 400% over the next five years. Europe will continue to rely on the US for early warning and precision strikes guided from space, as well as on US air defence systems like Patriot, SM3 interceptor missiles and THAAD.

As the Trump administration invests in its Golden Dome project for the air and missile defence of the continental US, American technologies will continue to advance, raising the question of whether European dependence on US assets extended to NATO will actually increase. This might be a convenient quick fix solution for Europeans but would undermine the goal of strategic autonomy in the longer term. One participant suggested that more intelligence sharing of space data between the US and the EU might help to nurture the transatlantic space relationship, although intelligence is a national responsibility and sharing might have to be on the basis of more and intensified bilateral arrangements. Another raised the prospect of more information sharing between Galileo and GPS, which are already interoperable.

Developing a comprehensive action plan for the way forward

- What does it mean to be a 'space power'?
- Which specific benchmarks need to be achieved for that status to be gained and recognised?
- If Europe is currently among the top four in the world in terms of its space capabilities and investments, how much energy should it devote to equalising with its principal rivals and competitors versus seeking to go its own way?
- Given the EU's commitment to a cooperative and rules-based international order, dominance is neither a European objective nor a need. So, what does space sovereignty look like, and how much does it mean complete independence of space capabilities and operations versus the reliance in certain areas on trusted partners and allies?[2]

Some participants agreed that these are the first order questions that Europe needs to address in defining a new level of ambition in space and having a clear set of agreed goals to drive Europe's space agenda across government and industry. This should be a joint task of the Commission and the High Representative.

The sense of the discussion was that Europe has the technical skills and know-how to be an independent player in space. All the ingredients of success are there and the EU institutions have recently published a host of strategic and policy documents that stress the growing importance of space and the need for the EU to raise its game (e.g., the Strategic Compass, the EU Space Strategy for Security and Defence, an EU approach to Space Traffic Management, the White Paper for European Defence and most recently the Defence Readiness Roadmap 2030.

FROM STRATEGIES TO IMPLEMENTATION

As Churchill was fond of saying, "However beautiful the strategy, you should occasionally look at the results."

Implementation will be key, particularly when it comes to overcoming the familiar obstacles such as a lack of investment, political boldness, consistent engagement and focus, and the will to take actions that can effectively bridge the public and private space sectors. EU member states belong to different cooperation networks that do not always overlap. Can the new strategy documents help to create a single, unified effort?

The goal must therefore be to achieve greater synergy of effort among all the key nations and institutions and optimise investments to achieve the most rapid technological advances and greatest operational capability.

[2] A European think tank (IISS) has recently calculated the cost of full European autonomy in core military enablers (including space assets) at around €1 trillion although Andrius Kubilius has suggested a more modest figure of €500 billion.

It is not a question of a single entity being in charge of everything – Europe's space eco-system is too varied and complex. But rather a question of political leadership to identify a shared goal (European autonomy) and thereafter for the lead actors to work more in synchronisation with each other towards that goal.

THE SHAPE OF EU AUTONOMY IN SPACE

The more dangerous geopolitical environment and the hesitations regarding the long-term reliance on the US have meant that Europe needs more secure access to space for its defence and thus more abundant and specific military space assets. A European Space Action Plan or 'Checklist' must have as its starting point a catalogue of military requirements and capabilities to allow the EU to fully implement space as a domain of operations. This task has already been supported at the capability planning level in the military domain by the European Defence Agency.

Participants agreed on the need to better distinguish between "soft autonomy" and "hard autonomy" in space and to refine further the EU-wide annual risk, threat and intelligence assessments that the member states have recently adopted.

The threats to Europe in and from space are not identical to those facing the US. Thus intelligence-driven and classified threat assessments should form the basis for mapping Europe's space vulnerabilities and help space planners both in government and industry to tie decisions on investments and capability priorities more closely to the evolving threat environment. Currently there is still too much of a disconnect between the two. Yet adversaries have already demonstrated that Europe's space systems are vulnerable to cyberattacks, jamming, spoofing, sabotage and the theft or corruption of data. Their power (and willingness) to interfere and disrupt is increasing. Consequently, threat and vulnerability assessments need to drive priorities and resource allocation; this could be a key function of the European Defence Agency's Defence in Space Capability Partners Group, which already looks at capability priorities and planning in space.

Following on from the Strategic Compass and the EU Space Strategy for Security and Defence, the appointment of a European Commissioner for Defence and Space, a role that Friends of Europe similarly advocated for in its 2019 *Vision for Europe* report, has helped to raise the profile of space within the overall discussion on the future European Defence Union. Moreover, the operational aspect of space has been given greater prominence in recent EU policy documents such

as the EU White Paper on Defence and the European Defence Industry Programme. The task is to reflect space priorities and specific capability and investment requirements in the EU's planning for industrial military production and common financing instruments.

INSTITUTIONAL PROGRESS AND SHORTFALLS

The EU Council at the end of June 2025 tasked the Commission to come up with a plan by the following October to convert the recent NATO decision on raising defence spending to 5% of GDP and the EU's own initiative to set up the SAFE €150bn defence loan fund into a specific set of minimum military requirements and an industrial strategy to produce them at speed and scale. This is an opportunity to ensure that defence and security space requirements are factored into the EU Defence Industry Programme (with its initial €1.5bn funding allocation) and other common funding instruments from the very beginning. The first critical test will be whether Europe will be able to build its first genuine dual use System of Systems with Earth Observation Governmental Service (EOGS)/European Resilience from Space (ERS), Low Earth Orbit satellite constellations for Positioning, Navigation, and Timing (LEO-PNT) and secure communications. Such capabilities can be also used by NATO, and hence account for a Member States 5% target.

The sense among participants was that the White Paper lacks a capability vision to guarantee the EU's assured access to space and the ability to protect its assets against a wide spectrum of threats, whether accidental or intentional. A single attack on a satellite could inflict over €100mn in damage. Even if a lot of space architecture is beyond Europe's control, it has to be able to defend its own corner.

The European Defence Agency has worked on a capability development plan for space, which was adopted by EU Defence Ministers participating in the Agency's Steering Board in 2023. A clear way forward exists; the task now is to ensure that efforts are guided by this capability development plan rather than continuing in an ad hoc and uncoordinated fashion.

Beyond the immediate, early discussions on the EU's next 7-year Multiyear Financial Framework (MFF) are now getting underway. An EU Space Checklist linking short- and longer-term goals to specific capabilities shortfalls and technology delivery timelines can drive the science and research projects that the EU will need to stay in contention in the space race. It can equally determine how the next iteration of the EU's Horizon research programme can better bundle and focus the EU's multiple research institutes and universities in both fundamental research and more efficient and cost-effective manufacturing processes.

Participants felt that research and development spending was still largely inadequate, notwithstanding the issue of how those funds could be better allocated across member states and space projects and providers. There was a sense from the discussion that the European space sector is still predominantly civilian in its focus, in contrast to the US Space Force and Space Command and China's testing of anti-satellite weapons and denial of access capabilities. The EU's new strategic agenda for 2024-2029 mentions space under the heading of "A Prosperous and Competitive Europe" whereas the previous agenda for 2018-2024 did not mention space at all. So, space in Europe has to be rebranded to match the EU's greater focus on resilience, security and defence, and strategic autonomy and freedom of action on the world stage.

EUROPE'S VULNERABILITIES

Pressed on what the most important European space vulnerability is at the present time, participants pointed to Space Domain Awareness (SDA), which emphasises detection and tracking as situational awareness does, but takes a more holistic approach with the added characterisations of intent and capabilities, thereby enabling a more strategic approach to space operations. The race is now to improve intelligence in space and track movements in real time. This requires a commonly shared Recognised Space Picture to support common decision-making. Such a picture would help for early warning and to plot longer term behavioural trends or unusual activity. An injection of public money is needed to address this problem of inadequate space data as private sector investment is unlikely to go into this area in the near future, although more public-private partnerships are feasible down the road. One participant, however, stressed secure satellite communications and connectivity through the IRIS 2 constellation as a critical need. IRIS 2 would also allow Europe to reduce its dependence on Starlink and compete with it.

A further element in Europe's space roadmap concerns the space supply chain both inside and outside the EU. At a time when the EU is seeking to diversify its critical supply chains and reshore the production of rare earth, precious materials and electronic components, such as microprocessors, a study of the supply chains applicable to space would be timely to identify potential vulnerabilities or the impact of supply disruptions. The EU could then assess the need for bulk acquisition and storage of vital materials, or how to build redundancy or more domestic production into its supply networks. Natural events like extreme weather

and pandemics could challenge supply chain resilience as much as deliberate attacks or calculated disruptions and manipulations.

COOPERATION AND COORDINATION

Partnerships with allies and like-minded countries could also have a role to play. The EU has recently concluded strategic partnerships with the UK, India and Canada that also cover space security. One participant hoped that the EU could find ways of re-engaging the UK in the Galileo programme that it had to leave in the wake of Brexit.

Turkey was also mentioned as an upcoming space power, as well as a NATO ally keen to have access to EU capability projects, the SAFE investment fund and the European Defence Industry Programme. Turkey has set up a Space Agency and established a space port in Somalia. Meanwhile, Europe is helping India with rockets; the partnership with Norway is already very strong through regional Nordic cooperation and Norway's participation in the European Defence Agency and the European Defence Industry Programme; Canada is looking to do more joint capabilities development with the EU and has recently signed a security and defence agreement with Brussels; similar agreements exist with Japan and the UK, and the EU is negotiating another with Australia. Such agreements could be given a more important space dimension.

Yet participants stressed that partnerships should go beyond mere information-sharing and focus on real operations and joint technology development. On the other hand, there is a political and diplomatic benefit to partnerships, enabling the EU to achieve a critical mass to weigh in on international space issues and better leverage its particular strengths and approaches in multilateral negotiation frameworks such as the UN.

Cooperation with NATO should be stepped up too. The alliance is developing its own space assets and investing more in space-related science and technology as with its Defence Innovation Accelerator for the North Atlantic (DIANA) and its €1bn Innovation Fund. These initiatives are pushing money towards startups and SMEs and the first round of DIANA and Innovation Fund grants have shown a particular slant towards space-based technology, for instance quantum computing and new materials resilience in space. The alliance's HEIST project in Sweden aims to relocate communications data from vulnerable underwater cables in the Baltic Sea to space-based cloud services. Another new NATO project called Sinbad is designed to enhance space monitoring of Ukraine, Russia and the Arctic. It is time to make the EU-NATO dialogue much more operational and capability driven going beyond the mainly information sharing approach enshrined in the latest EU-NATO Joint Declaration of 2023. Staff to staff contacts are useful but a political impetus is needed to go much further and to develop closer coordination.

NATO has officially shared its latest capabilities targets with the EU (previously held back by classification rules) and the EU has agreed that its own Defence Industry Programme will be geared to help Allies (23 of which are also EU member states) to meet their individual capability targets. As NATO's annual defence review process identifies gaps, the EU can step in and feed industry to develop capability solutions, particularly for targets that will be common to a number of Allies, for instance air and missile defence, maritime surveillance or long range precision strikes, all enabled by space assets. Many of these are covered by the existing projects underway in the European Defence Agency with which member states have promised to share more data on their future national procurement plans.

An official dialogue between NATO and ESA has surprisingly not developed before now but should be started immediately in full coordination with EU member states and the EU itself. As NATO develops the command structures for the military direction of space operations in peacetime, crisis and war, the EU has to decide whether to leave military space operations essentially to the alliance planning and force structures (such as Allied Command Operations in Mons, the Joint Forces Headquarters or Allied Command Transformation in Norfolk, Virginia) or to establish operational structures of its own within the EEAS and the EU military planning staff as well as selective national headquarters earmarked for EU joint missions and deployments.

The EU Space Strategy for Security and Defence provides for the EU to develop its own operational structures so the issue of overlap, duplication or roles and responsibilities vis-à-vis NATO (a familiar topic) will have to be discussed. Here the NATO Supreme Allied Commander Transformation could usefully serve as the coordinator of a NATO-EU dialogue on where specific EU capabilities and contributions (and under which arrangements and presumption of availability) can reinforce Alliance security in peacetime, crisis and conflict.

A EUROPEAN SPACE NARRATIVE

Finally, participants noted that at a time when Europe's political leaders are talking about the urgent necessity of rearmament and putting Europe's societies and industries on a permanent war footing, the importance of space and its utility to Europe's

future security and defence (not to speak of growth and prosperity) rarely gets a mention. The debate usually revolves around building armaments factories, stockpiling missiles, developing more agile drones or developing 6th generation aircraft. The ways in which space can enable these land and sea weapons or the importance of space as a domain in its own right need to be highlighted more.

In short, there is a need for a European space narrative that brings space from the periphery back towards the centre and explains how it ties many of the other strands of capability development together. A particular concrete objective, like a European space station or planetary mission, would work better than another strategy document and could help to seize the public imagination and be a tentpole around which the various strands of the European space effort could be communicated.

Turning strategy into action: a priority checklist for Europe’s space future

In space as in other areas, the EU has already produced a large number of documents (strategy papers, White Papers, regulations, Council conclusions, readiness roadmaps and the like). There is little added value in the EU institutions attempting to come up with yet another policy framework when the emphasis must be on implementation of existing targets rather than on setting fresh objectives.

Instead, EU space policymakers and officials must distil all the various components of these documents into an overall priority list, an action plan or comprehensive checklist that can circulate informally as a common point of reference amongst the EU, member states, and the space industry and sphere.

The checklist would benchmark all the various programmes and activities underway in the EU and wider Europe according to how closely they are achieving core European space objectives. The starting point would be a review of existing and effectively shared national space assets and how they stack up against threats, dependencies and both short-term Intelligence, Surveillance and Reconnaissance, (ISR) and long-term Strategic Space Awareness (SSA) capability requirements.

This checklist would take stock of progress according to a traffic light system and identify gaps and shortfalls on a periodic basis. EU space policymakers could then take an aggregated view of which remedial measures are required and where the lead for action and supporting effort lies. This aggregated view is essential when we consider the diversity of the players across the European space landscape: member states, Commission, Council, EUSPA, EEAS, EUMS, SATCEN, EDA, the European Space Agency and the major private companies, SMEs and startups. Thus, a more comprehensive approach is more likely to ensure the buy-in of all these various players.

Another useful activity would be to look at some of the new public-private sector cooperation agreements that are being concluded across the EU and examine how they are helping to deliver additional space capabilities at scale and at pace to draw lessons for the future. A recent example is the cooperation between the German government and Rheinmetall to develop space capabilities in the military domain.

So, what should be at the top of the priority checklist?

1. DETERRENCE

Europeans have spent a lot of time wondering if deterrence can apply effectively to non-nuclear threats. Cyberspace and hybrid interference and disruption campaigns, including disinformation, are key examples of non-nuclear threats. The preliminary conclusion seems to be that neither pure deterrence nor the threat of massive and disruptive retaliation works in the case of emerging technologies.

Adversaries believe that they can hide behind the cloak of anonymity or false flags and that victims will not want to escalate to full-fledged warfare for attacks short of outright territorial aggression or mass physical destruction. So, other concepts, such as deterrence by denial (better protection of one's assets) or a toolbox of tailored responses (diplomatic or economic and financial) have been developed. Persistent engagement and predictable responses over time are designed to progressively deter attacks by enacting a price on the aggressor.

Hybrid warfare and disruptions are equally possible in space (alongside deliberate aggression). There have been instances of Russian satellites moving dangerously close to joint French/Italian satellites.

So, how can the EU build on the existing and emerging mechanisms of the EU Space Strategy for Security and Defence to enhance its capacity and credibility for deterrence in space? Responses include not simply long-term technical measures to protect constellations such as Galileo (adapted to the emergence of new threats), but also diplomatic or economic coercive measures as part of the EU's response toolbox.

2. UPDATED SPACE OBJECTIVES GEARED TO SPACE THREATS

The need here is to present a common threat assessment (perhaps in shortened, declassified form to facilitate wider distribution), and then to benchmark the threats against Europe's current strengths and weaknesses in space.

All operational actors must be notified of new and emerging threats to form a Space Community of Interest that can then mobilise to mitigate those threats and build resilience. The analysis should give an idea of how quickly and easily the gaps can be remedied and through which priority programmes, as well as indicate Europe's critical dependences on foreign providers and suppliers and a description of the associated risk or ease of finding and using alternative providers.

The checklist should also include the definition of an associated capability programme with timelines for partial to full operational capability, as well as the supply chains assessment discussed above. What is of most concern is where adversaries can potentially weaponise supply chains to undermine Europe's space autonomy, for instance through bans on the export of rare earths, critical minerals and metals or critical electronic components or superchips.

3. A CLEAR, ACTIONABLE COMMERCIAL ENGAGEMENT STRATEGY

It is industry, not governments and institutions, that produces space assets and technology packages. So the EU needs to help its space industries to develop, compete and thrive. After all, the space sector is important to the overall European economy. More than 250,000 highly skilled jobs are supported by the European Space Programme, with an estimated value added between €46-54bn.

Part of this effort is to create an effective single market for space products and services that removes regulatory obstacles to open trade and cross-border collaborations. This will require a common legislative framework. The Commission will need to ensure that its Space and Defence Industrial policies are fully aligned and consistent.

One approach would be to introduce targeted European preference rules for the space sector to support the scaling up of European companies. Partners like Norway, the UK and potentially Canada or Turkey could be included in such preference rules. As part of the EU's dialogue with the European Investment Bank and other financial institutions, ways of improving finance to space startups and SMEs can be identified. The EU has an interest in making sure that these SMEs with their skills and innovation can grow in Europe without feeling the necessity to move to the US or elsewhere. As Brussels looks to negotiate or improve its trade agreements with the rest of the world, obtaining greater access to international space markets for European companies while protecting things like intellectual property can move higher up the agenda.

A related issue is to attract talent from the rest of the world to come to Europe to work in research, science, engineering and technology and more specifically the space sector. A generous visa facilitation scheme can help in this regard, as well as partnerships with universities and research institutes in like-minded countries. The cuts that the US administration is currently inflicting on US science and research and its campaign against the major US research universities, like Harvard and Columbia – not to speak of the significant extra H1B visa and work permit costs ($100k) that the Administration is now imposing on US companies seeking to hire foreign highly skilled workers – is an opportunity for Europe.

The Commission has recently reported that applications for EU research grants under Horizon and other programmes are at an all-time high. Many applicants are US scientists, researchers and academics who are looking to escape the more hostile political and funding environment in the US and preserve their academic freedoms by relocating to Europe. The EU should welcome them with open arms and take advantage of what they could contribute to its science and technology and defence industrial base. Expertise in AI uses to speed up the innovation and procurement cycles (an area in which Ukraine has moved ahead during its resistance to Russian aggression) is a particularly sought after capability, making it all the more important to engage Ukraine in the SAFE investment programme and to encourage EU companies to forge joint ventures with their Ukrainian counterparts.

The EU could also usefully consult the private space sector at an earlier stage about its future space plans to give industry a better view of the long-term direction of travel. This will help industry to see where public finance is likely to be invested and how priorities are shifting. For instance, system upgrades and modernisations may be given short term priority over new programmes and technological innovations. Industry can then better align its own production lines and supply chains with the EU's space strategy. Industry has to let Brussels know what it needs to become more competitive. The EU has launched the CASSINI programme to stimulate investment in space and increase the procurement of space services. Industry and the Commission can jointly review its impact and effectiveness. There must also be a discussion on how to make space projects more profitable for the companies in the sector, encouraging more businesses to join, widening the market both inside and outside the EU for space products and services.

4. INCREASED FUNDING THROUGH INNOVATIVE FINANCIAL MODELS AND COORDINATED INSTRUMENTS

The purpose here is to give an idea of the investment envelope required to achieve both partial and full strategic autonomy in space and for the EU to be able to implement space as an operational domain. The budget for the EU's Space Programme in the 2021-2027 Multiannual Financial Framework (MFF) is €16bn. The greater level of ambition for European space capabilities in the future, together with the launch of IRIS2 (costing €10.6bn for 290 satellites) and the new emphasis on security and defence, suggests that this figure will need to be considerably increased. But by how much?

Much of the increased cost will need to come from public finance or a shift in the EU's internal budget. Several EU space instruments currently exist or will be created in the near future (EDF, EDIP, PESCO, SAFE, Horizon and so on). These need to be well coordinated with other revenue and investment streams through the European Space Agency and European Defence Agency.

With budgets tight, there is no room for redundancies.

Space can also benefit from being able to tap into a number of EU funds whether on the civilian or military side, including Horizon, the Competitiveness Fund and the Defence Fund or Defence Industry Programme. But adequate levels of financing will need more private capital injection and more public-private partnerships as well as the development of a European venture capital market in the space sector. The EU's current efforts to induce banks to agree to more flexible criteria for investments in the defence sector and the relaxation of ESG rules, as well to persuade pension funds to consider defence-related investments, can also help the space sector.

The EU's current efforts will need to consider the scope (but also the rules) for direct foreign investment and levels of permissible foreign ownership of European space assets and services, particularly in areas important for military functions such as surveillance, communications, and data collection and distribution.

5. INTEROPERABLE CAPABILITIES ACROSS ALLIES

The checklist must include an analysis of the coherence of the multiple national, ESA and EU space programmes and identify duplication or shortfalls in interoperability. Where programmes clash or risk creating new dependencies on foreign providers, these need to be highlighted. The analysis could discuss how synergies and more cross border cooperation could allow EU member states to collectively gain more space capacity and thus economic and military benefits. The EU should explain how it can incentivise member states to accept more EU oversight of their space programmes and investment plans and to structure those plans to align with EU strategic priorities.

Incentives and carrots are more likely to succeed than sticks, for instance in the withdrawal of EU grants and access to common funding. Yet this could be considered as a last resort where member states refuse to cooperate or to show transparency vis-à-vis Brussels regarding their space activities and future projects. Yet there are also more practical things that can be done in the category of 'low hanging fruit', such as linking up cables and sockets or applying more interoperability standards and protocols to space technologies so that satellites and operators can exchange more real time information and communicate with each other.

6. THE EU AS A 'SPACE BROKER'

Europe's complex space eco-system – with various global partners and 27 EU member states that hold defence competence and control most of the assets and finances – means that governance will always be a more hazardous enterprise than for nation states going it largely alone as with the US,China, Russia and India.

The mixture of national programmes and interests, as well as cooperative activities, commonly funded joint initiatives and a fragmented private sector, adds to the challenge of plotting a coherent way forward, which integrates defence and space capabilities so that they become mutually reinforcing. An immediate challenge is to link the German-sponsored initiative for a European Sky Shield integrated air and missile defence system to the space assets that are necessary for early warning of launches and missile tracking and interception.

Governance by the EU has to emerge progressively and flexibly as member states integrate their space programmes. This as the EU faces the foundational challenge of integrating its own internal governance. Moreover, governance should follow the capabilities as they evolve rather than the other way round.

The EU can also apply governance sector by sector according to where it already has a track record of competent and authoritative policymaking. For instance, data protection in space, rules to govern data breaches and compromises, and protocols for secure data sharing. Common standards for cybersecurity in space and data protection would also be applied with the EU standards acting as the baseline for the insurance market in space assets and operations. Many participants also stressed that EU governance could help to encourage earlier and longer term planning for space capabilities, as well as ensure a degree of predictability and continuity that would motivate the private sector and markets to have confidence in Europe's space endeavours and invest accordingly.

7. THE EU-ESA RELATIONSHIP

At the heart of any system of European space governance is the EU-ESA relationship.

The ESA is not an EU institution. This has certain advantages in the current context, such as being able to include non-EU space powers, notably the UK, which is a pillar of NATO and has been associated with Copernicus since 2023.

Yet as the EU and ESA together form the bulk of European space funding, technical expertise and programme management, Europe's space capabilities cannot move forward unless they work in deeper symbiosis and develop a common vision. In the past their collaboration was behind the success of the Galileo satellite navigation and Copernicus earth

observation ventures. The ESA and the EU have a natural division of labour, with ESA working upstream to devise technology solutions and programmes and the EU working downstream to provide resources and set the legal and regulatory frameworks.

Going forward, the EU and ESA need to conclude a stable, long-term agreement to streamline efforts and reduce fragmentation in security and defence. The immediate goal must be to discuss together the more efficient use of public funding for space and how EU initiatives, such as the Competitiveness Fund and Defence Fund, can be used to ramp up research and development and overcome Europe's lags in key areas like rocket propulsion, mega-constellations for telecommunications, and satellite receivers and applications.

The Draghi Report on EU competitiveness criticised Europe's "complex and fragmented governance model" for space. It recommended eliminating ESA's "geographic return" policy that allocates contracts based on member state contributions. This policy is seen as economically inefficient and detrimental to the competitiveness of the European space industry.

The EU-ESA dialogue should also focus on the upcoming EU Space Law, which aims to establish common rules on safety, security and sustainability in space activities. Currently 11 of 27 EU member states have their own Space Laws, and the difficulty has been to harmonise them to produce a single legal framework that can make a single market in space work more efficiently.

Yet the priority now is to bring ESA and its space expertise more closely into the EU's strategy for security and defence and capability development projects. Many of these have been underway already under Permanent Structured Cooperation (PESCO) and the EU Defence Fund. Others will now follow as SAFE gets up and running. The next EU Space Programme and funding envelope will need to rebalance from largely civilian initiatives to more defence focused ones, or at least defence and military applications.

European space projects should be brought within the new EU defence funds and defence industry programmes.

The ESA Director General should be invited frequently to EU meetings of defence ministers. When it comes to the Common Security and Defence Policy, ESA's contacts would be with the EEAS and the EU Military Committee and Planning Staff. However, ESA is not formally engaged in the CSDP. And at the technical level its natural interlocutors are more with the Commission and its Directorate General for Defence and Space (DG DEFIS).

ESA needs to work closely with the Commission and European Defence Agency committees and working groups so that it is fully integrated into the EU space effort while respecting its distinct status. ESA advice and inputs should be sought on the space implications of EU capabilities projects whenever appropriate. During the Space Council last May, members of ESA and the EU adopted a resolution on strengthening Europe's competitiveness in space, including supporting Europe's space companies. Following up on this resolution, ESA and the EU should produce an annual "State of EU Space" report each year that tracks Europe's progress in implementing all the decisions and initiatives, and benchmarks Europe's development of space capabilities and its strategic autonomy relative to what its competitors and potential adversaries have been able to achieve in the same timeframe.

Castlist

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List of acronyms

CSDP – Common Security and Defency Policy (of the European Union)

EDA – European Defence Agency

EDF – European Defence Fund

EDIP – European Defence Industry Programme

EEAS – European External Action Service

ESG – Environmental, social, and governance

EU – European Union

EUMS – European Union Military Staff

EUSPA – European Union Agency for the Space Programme

GSSAP – Geosynchronous Space Situational Awareness Program

Horizon – Horizon Europe, the EU's key funding programme for research and innovation

IRIS2 – Infrastructure for Resilience, Interconnectivity and Security by Satellite - European Union's new multi-orbit satellite constellation

ISR – Intelligence, Surveillance and Reconnaissance

ITAR – International Regulation in Armaments

MFF – Multiannual Financial Framework

NATO – North Atlantic Treaty Organisation

NAVSTAR GPS – Navigation Satellite Timing and Ranging, US GPS system

PESCO – Permanent Structured Cooperation

SAFE – Security Action for Europe

SATCEN – European Union Satellite Centre

SMEs – Small and Middle-sized Exterprises

SSA – Strategic Space Awareness

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Notes

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