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The EU's Space Policy Framework from a Defence and Security Policy Approach: A Belated Rush or an Elaborated Trial?

INTRODUCTION

2021 was a year of transformation for the European Union's space policy; by making several structural changes, the Space Programme Regulation created the European Union Agency for the Space Programme (EUSPA).[1] The EU aims to stimulate its space economy, strengthen and broaden the sector's market base, and develop European capacities while boosting the region's overall competitiveness. However, the actual framework for such a comprehensive approach to space is the fruit of several decades of dealing with multifaceted challenges. In recent years, space has become a geopolitically strategic area where it is essential to protect the broad European interests and to ensure autonomous access and freedom of action in the political, business and, more recently, defence fields of space – in several cases, including the Member States' competencies. It was not always as straightforward as it is now, however. The perception of space in Europe has slightly shifted, as the main focus of the broad European space policy has encompassed the principle of peaceful use (e.g. ESA Convention Article 2).[2] Nevertheless, the recent imbalances of geopolitics and the prospect of threats emerging either in space or via interconnecting domains (such as cyberspace) have encouraged the notion of enhancing the defence aspect of civilian space programmes. This has been a lengthy process; as such, this chapter elaborates on how the

[1] Regulation (EU) 2021/696.

[2] ESA Convention and Council Rules of Procedure, Article II, 13.

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EU's space policy framework has developed over recent years and whether its responses to the rapidly shifting space environment are a "belated rush or a painstaking process".

THE FORMULATION OF THE EUROPEAN SPACE POLICY

A historical overview

After the Second World War, the two superpowers' intercontinental ballistic missile (ICBM) research programs intensified just as much as their pursuit of space technologies. The then spacefaring nations were competing to optimise space exploration and the use of space (e.g. Sputnik in 1957). Simultaneously, their counterparts – the non-spacefaring countries – tried to use their influence to broadly and jointly restrain the activities associated or thought to be associated with space. The interplay between these two groups of nations created a conceptual "skirt" under which the foundational treaties regarding space were born. These treaties are the 1967 Outer Space Treaty, the 1968 Astronaut Agreement, the 1972 Liability Convention, the 1976 Registration Treaty and the 1979 Moon Agreement – the number of states party to these treaties, however, significantly varies.

During the 1950s, the European conceptualisation of space essentially amounted to investments by a few countries (mainly France, Italy and the United Kingdom). Unfortunately, although quite understandably, considering the political, economic and societal challenges Europe faced during the Cold War, even the most developed powers lacked the resources to establish capabilities comparable to the competing superpowers. This decades-long trial to enter the space race, despite various attempts at space cooperation,[3] contributed to an eventual "revision" to the continent's approach to space

[3] European Preparatory Commission for Space Research (COPERS) 1961; European Space Research Organisation (ESRO) 1962; European Launcher Development Organisation (ELDO) 1962; European Space Conference (ESC) established under ELDO in 1966.

with the establishment of the European Space Agency (ESA) in 1975 (with ten founding member states[4]). The role of ESA was and remains to establish overarching capabilities for Europe, from launchers through satellite systems to space activities in exploration and scientific research. The activities of the ESA allowed Europe to gain a foothold in space in the 20th century and it eventually became one of the critical pillars of Europe's space policy in the 21st century.

THE CONCEPTUALISATION OF THE EU'S SPACE POLICY, THE RISE OF A "NEW" SPACE POWER?

Coherent policy implementations without an outline of power – in our case, space power – would be left without structure and direction. Academics have argued as to whether sea power theories can be applied to space or not. In reflection on such an idea, a slight detour can help create a context to understand how space power can be realised. In his book *The Influence of Sea Power upon History,* Alfred Thayer Mahan, a military theorist, made a formerly unquantifiable (military) domain relevant. He argued that the importance of sea superiority had been greatly underestimated. Mahan's views gained attention, eventually leading to a naval arms race between Germany and Great Britain in the lead up to World War I.[5] Building upon Mahan's theories, Julian Stafford Corbett released a book entitled *Some Principles of Military Strategy* a decade later. Even though Corbett makes it clear in his book that the sea is a multi-dimensional area with various factors influencing the conceptualisation of an effective strategy, his main argument was that sea power ultimately means control over maritime communications – perceived as shared channels of communication. Within these, sea power includes the ability to supply troops and gather information, with forms of command based on their magnitude and duration, allowing a nation to freely access and

[4] Belgium, Germany, Denmark, France, the United Kingdom, Italy, the Netherlands, Sweden, Switzerland and Spain.

[5] Townsend 2019: 14.

utilise the sea to further its interests while being able to prevent an adversary from gaining the same advantage.[6] It only takes a little imagination to see the resemblance between Corbett's ideas about channels of communication and some aspects of several nations' space strategies or their overall approach to space policies (for example in the U.S. Space Force's mission statement). This is logical since activities conducted in space strongly impact activities in other environments, similarly to the sea or the air. Unfortunately, it would be difficult to directly apply Mahan's or Corbett's theories to space instead of the sea; space is still a primarily untested area for several activities (transport, mass material extraction, additive manufacturing, and of course, war).

Thus, the question arises: How did the EU, as such, create a coherent policy approach to allow its evolution into a space power? In its *Resolution on Community participation in space research* (1979), the European Parliament "stresses the importance of the benefits which the Community could derive in the short term from space activities", specifying sectors such as telecommunications, earth observation, agriculture, scientific research and highlighting the industrial benefits of technology deriving from space research.[7] ESA was still at the forefront of European space policy throughout the following years until 1988, when the European Commission issued its communication on "The European Community and Space: A Coherent Approach".[8] The Commission argued that since the ESA's expertise is indispensable, the EU's ties to the Agency should be strengthened through a complementary EU framework. Furthermore, the European Parliament also drew up six guidelines to cover the aforementioned types of space-related activities. As such, an EP resolution in 1991,[9] and an EC Communication in 1992[10] resulted in a broad framework of milestones to be achieved to consolidate a European space industry and space policy.[11] As a result,

6 Straub 2015: 66.
7 Commission of the European Communities 1979: 42–43.
8 Commission of the European Communities 1988.
9 Commission of the European Communities 1991: 26–27.
10 European Commission 1992.
11 Hörber–Stephenson 2016: 39.

the European Commission established connections with the ESA at the beginning of the 21st century, adopting a unified space strategy in 2000 and a space policy in 2003, and developed two flagship space programs: Galileo (satellite navigation) and Copernicus (Earth observation) – in conjunction with the ESA under the terms of an agreement between the institutions in 2004. Over the next years, the role of the EU in "governing" space strengthened; the Lisbon Treaty in 2009 marked a new beginning for an institutional approach to space, recognising shared competencies between the EU and its Member States.[12] In the years that followed, the notions of the security of space infrastructure, autonomous access to space and the mitigation of dependence on specific technologies and services, and ultimately defence and security in space have gained a critical role in the general flow of European space policy. Nowadays, it has been clearly established that European space policy is managed jointly by the EU, the ESA and the Member States. However, maintaining Europe's ambitions with regard to space, and from a certain angle its status of being a "space power" in the wake of modern-day conflicts and the rise of private actors pose quite a challenge.

SECURITY PARADIGMS OF A BROAD EUROPEAN SPACE STRATEGY

In 2016, the Commission outlined a space strategy for Europe in a communication,[13] emphasising the importance of space for security and the ability to assert Europe's presence and capabilities in space. The EU's vision and objectives were based on a set of strategic elements – autonomous access to space, satellite communications and navigation, and Earth observation – which are also reflected in the European External Action Service's (EEAS) "EU Global Strategy document".[14] From a global landscape perspective, the EU's space

[12] Reillon 2017: 11–18.
[13] European Commission 2016.
[14] European External Action Service 2016: 45.

policy is crucial for several reasons. Firstly, space technologies are pivotal to the EU's societal and economic functions, which are deeply woven into our daily lives. Programmes such as Copernicus, Galileo and EGNOS provide essential geo-localisation and Earth observation services, empowering the EU to pursue various objectives independently, aiding in the monitoring of greenhouse gas emissions, border control, enhancing digital transition, combating crime, overseeing transportation, providing weather forecasts, supporting agriculture and more. The integration of space technology into EU sectoral policies has become integral in recent years, significantly shaping our way of life. At the same time, the vulnerability of our societies to potential disruptions in this domain grew in parallel to these developments, necessitating the safeguarding of space infrastructure. The 2016 strategy takes stock of the possible risks – including cyberattacks – and highlights the pressing need to reinforce policy and infrastructure connected to space. One of the distinctive aspects of the EU's space policy lies in its concerted effort to fuse – to a certain degree – civil and defence space capabilities. The EU acknowledges that assets such as Galileo (for example, through its Public Regulated Service – PRS[15]) and Copernicus may serve dual roles. Tailoring the programmes to both civilian and defence–security needs is in line with the demand for optimal resource utilisation and strengthens security measures across member states. This convergence of civil and defence capabilities is a linchpin of the "space for security" notion, a cornerstone of the EU's most recent Space Strategy for Security and Defence (SSSD).[16] The SSSD aims to leverage space assets for crisis management and rapid disaster response and to facilitate using certain assets to benefit military operations while respecting international treaties and obligations. It reflects a comprehensive approach, merging the promotion of secure satellite communication, enhancing space situational awareness and establishing a sophisticated intent to develop a satellite-based early warning, mainly through sharing indispensable data.

[15] Cozzenz 2021.
[16] European Commission 2023.

Moreover, this integration serves a pivotal role in the context of the Common Security and Defence Policy (CSDP). It aligns with the objectives of strengthening the EU's security architecture and augments the interoperability between EU member states and NATO.[17] It also heralds an interconnected approach to security, enabling the development of efficient responses to emerging threats while ensuring a more cohesive defence framework. The recent strides in EU–NATO relations have further underscored the significance of such integration. The synergies between the EU's SSSD and NATO's initiatives[18] in specific interpretation can signify a collective commitment towards bolstering security measures across the transatlantic alliance.

In conclusion, the evolving integration in the security and defence sectors within the European Union in the post-Maastricht phases parallels a significant shift in the approach to space matters, transitioning from mainly scientific or commercial perspectives to a more strategic outlook. This transition coincided with the establishment of the EU space programme, initially presented as a collection of civilian initiatives, while recognising their strategic value by being funded and owned by the EU. The Space Regulation acknowledges the EU space infrastructure's critical nature, calling for a security-centric framework to oversee the EU Space Programme.[19] Exploiting the potential for security of a broad European space policy has been emphasised for several years by certain states and notably by the European Space Policy Institute (ESPI), which have argued that the deficit between socio-economic decisions and defence hinders the EU's potential as a space power.[20] Article 189 of the Treaty on the Functioning of the European Union (TFEU) underscores the need for policy implementation within European space policy objectives. Among these policies, the CSDP emerges as a potential beneficiary of implementing the European space policy. Correspondingly, the Strategic Compass,[21] part of the CFSP,

[17] Council of the European Union 2023.
[18] See more in NATO 2022.
[19] Council Decision (CFSP) 2021/698.
[20] European Space Policy Institute 2020.
[21] Council of the European Union 2022.

highlights the significance of space-related services within the Union's Space Programme for the future development of European defence capabilities.

Gazing into the future, a European Union Space Law proposal has come into the spotlight due to recent Council processes, as possibly representing another measure to expand the purview of addressing specific space threats. However, the persistent legal uncertainties accompanying these initiatives require continued scrutiny and legal assessment. Despite the existing constraints, the ongoing developments in the space sector may catalyse future advancements within the CSDP – and, as such, might eventually pave the way for establishing defence capacities aligning with Article 42(2) TEU,[22] illustrating the potential convergence between space policies and the broader European security architecture.

EU core institutions' roles in shaping the Union's space policy

Building on the previous topics, the EU's space policy is beginning to present itself as a strategic response to address the multifaceted challenges of contemporary society. Among these challenges, combatting the impacts of climate change and propelling technological innovation, while ingraining space technology, data and services into citizens' daily lives are paramount concerns. This policy blueprint aligns seamlessly with and even promotes crucial EU priorities, encompassing the driving force behind the European Green Deal, the relentless pursuit of digital transformation, the steadfast preservation of the European way of life, and the endeavour to amplify the EU's global influence on the international stage while reducing its dependence on third actors, with the aim of ultimately achieving the strategic autonomy it craves.

What distinguishes the EU's space policy from others is its fusion of the EU space programme with synergies such as Horizon Europe Cluster 4,[23] which

[22] Treaty on European Union, Provisions on the Common Security and Defence Policy, Article 42 (ex Article 17).

[23] See more in European Commission 2024.

is dedicated to space research and innovation. Notably, within this collective approach, a series of targeted initiatives aim to increase the competitiveness of space systems and European actors by streamlining access to space into the concept of strategic research and innovation agendas. These ambitious roadmaps, predominantly fuelled by funding from the EU, espouse the objective of strengthening the competitive edge of the Union and advancing the overarching goals of InvestEU. The EU's space policy is engineered to cultivate a vibrant and resilient space ecosystem within the EU and even the broader European sphere.

Crucially, the TFEU, articulated explicitly within Articles 4 and 189,[24] sets the EU the task of devising and executing an encompassing EU space policy. This institutionalised commitment, anchored within the EU's legal framework, underscores the firm dedication of the bloc to exploring the vast potential of space for the benefit and advancement of societal, economic and strategic landscapes within the EU's purview.

EUROPEAN COMMISSION

As the "architect" of EU policies, the European Commission exercises significant influence in defining the strategic vision and operational framework for the EU's space policy. While its proposals are subject to scrutiny and approval by other EU institutions, the Commission actively manages and supervises the EU's flagship space programmes (e.g. Copernicus) and developing space programmes (e.g. IRIS²). It ensures the alignment of these programmes with broader EU policy goals and oversees their development and implementation. The Directorate-General for Defence Industry and Space (DG DEFIS) spearheads space-related activities within the Commission; its proposals and initiatives reflect the EU's broad strategic vision for space through a solid scope of defining strategic goals and outlining budgetary allocations for space

[24] The Treaty on the Functioning of the European Union, 5–6, 86–87.

programmes. In the Multiannual Financial Framework (MFF) for 2021–2027, the EU allocated €14.8 billion to space-related activities, emphasising investment in existing and functioning flagship programmes and the new entrants to the overall space programme. Even though the total budget for the 2021–2027 period is a significant increase compared to previous ones, it still falls short of the budget of the largest global competitor in the field, the USA, which spent 24 billion USD on NASA in 2022 alone.[25]

As the initiator of this effort, this budgetary allocation underscores the Commission's commitment to the core ideas of Europe's space capabilities (fostering innovation, leveraging space data, etc.). The mid-term review of space regulation to be conducted by the Commission (based on its legislation)[26] aims to assess the progress of space programmes vis-à-vis their objectives, ensuring their alignment with emerging needs and technological advancements. While evaluating the effectiveness of existing policies, program performance and budget utilisation, the mid-term review may serve as a tool to recalibrate specific strategies for more cohesive outcomes. Working to meet the Commission's responsibilities, the European Union Space Programme Committees (EUSPC),[27] under its guidance, are fulfilling vital functions in shaping, executing and supervising the EU's policies and initiatives concerning each space programme component. The Commission's role is also significant in promoting international cooperation in space. In some instances, for example, upon authorisation by the Council, the Commission negotiates agreements with non-EU countries or international entities to foster collaboration in space research, exploration and satellite systems – such as the most recent objective of establishing cooperation in launching EU satellites into orbit via SpaceX.[28] These agreements aim to enhance the EU's access to space-related resources, technologies and expertise; however, in some cases, they are concluded precisely because of their unavailability, filling in the gaps in European capacities.

[25] EPP 2022: 2.
[26] Article 102 of Regulation (EU) 2021/696.
[27] As set out in Regulation (EU) 2021/696.
[28] Foust 2023.

COUNCIL OF THE EUROPEAN UNION

The Council plays a key role in shaping the strategic direction and political priorities of the EU's space policy. Within its remit, high-level discussions and decisions shape the overarching objectives of space-related activities, primarily endorsing broad policy frameworks and space programme elements. The Council facilitates a high degree of coordination among member states and serves as a forum for exchanging national and EU policy implications, aligning strategies and achieving consensus on shared objectives. Through summits and different levels of Council meetings such as the Working Party on Space[29] or the Competitiveness Council,[30] member states deliberate on and agree upon overarching policies that outline the EU's ambitions in space. These discussions enshrine critical aspects within the EU's strategy for a coherent space policy. For example, in terms of budgetary negotiations, the Council's mandate involves deliberations and unanimous agreements on financial allocations for various EU programs, significantly impacting the scale and implementation of the space programme and future projects – in contrast to the Commission's role in assessing the financial needs (based on EU policy objectives).

Furthermore, the European Council's political support is vital for significant space initiatives. Strategic endorsement by the Council is essential for specific investments in and even applications of the space programme. The Council's engagement also extends internationally, mainly by authorising aforementioned agreements with non-EU countries or international organisations to foster collaboration in different aspects of the space sector.

EUROPEAN PARLIAMENT

Although the Parliament does not directly manage or execute the operational aspects of space programmes, it plays a crucial role in shaping, overseeing and

[29] See more in Decision establishing a Working Party on Space 14274/1/10.

[30] See more at https://www.consilium.europa.eu/en/council-eu/configurations/compet/.

scrutinising the EU's space policy. Parliamentary committees, such as the Industry, Research, and Energy Committee[31] (which coordinates space policy), discuss and debate proposals that, for instance, the European Commission puts forward. These committees scrutinise and discuss recommendations on possible legislative initiatives, appropriate budget allocations and general policy guidelines concerning space activities. The European Parliament exercises its authority through the ordinary legislative procedure,[32] where it co-legislates regulations and directives, allowing Members of the European Parliament (MEPs) to propose amendments, discuss priorities and approve the EU budget. In its comprehensive role, the Parliament monitors the implementation and performance of the EU space programme through MEPs, evaluating the programme's progress and impact, ensuring their alignment with EU policy goals and their strict financial accountability. Discussions and reviews allow MEPs to channel and shape the general direction of the EU's space policy, directing the bloc's stance and priorities in space exploration and utilisation through its deliberations and resolutions.

EUROPEAN UNION AGENCY FOR THE SPACE PROGRAMME

The European Union Agency for the Space Programme (EUSPA) serves as the entity that is responsible for supporting the implementation, operation and promotion of the space programme components, focusing on user uptake and program security. Inseparable from the EU's institutional framework, EUSPA functions in strong cooperation mainly with the European Commission. At its core, EUSPA focuses on the management, advancement and effective utilisation of prominent EU space programs, making vital contributions to the vast array of the EU's space programs covering for example navigation. EUSPA assumes a multi-directive role by overseeing the operational aspects of the space programme components, ensuring reliability, precision and accessibility.

[31] See more at https://www.europarl.europa.eu/committees/en/itre/home/highlights.

[32] The Treaty on the Functioning of the European Union Article 189 (2) 85.

The Agency acts at the forefront of promoting and utilising space assets across varying sectors. The Agency's mandate extends to enhancing the resilience and security of EU space infrastructure (including through the recently acquired Space Surveillance and Tracking front desk), focusing on safeguarding critical space assets from potential threats, mainly cybersecurity risks and signal interference, thus ensuring the uninterrupted provision of services. Through several bodies (like the Admin Board), EUSPA connects the governance of space between EU member states and industry stakeholders mainly by the constant reporting and sharing of assessments delivered under its aegis.[33]

While specific details about the internal Security Accreditation Board (SAB) within EUSPA might not be openly accessible, the overarching principles of space security governance are paramount in managing and protecting the EU's space assets and services. Setting up security protocols and standards to protect sensitive data, communications and infrastructure connected to space assets are just a few of the common steps the SAB takes to protect vital space infrastructure and data in the larger context of space security. It also plays an essential role in risk assessments, which are used to identify and eliminate threats to space systems, such as those posed by physical vulnerabilities, signal interference and cybersecurity risks. The SAB processes ensure compliance with security standards and regulations, particularly in relation to approving satellite launches, authorising system operations (including services and signal transmission in space), and permitting ground station operations.[34]

THE EUROPEAN EXTERNAL ACTION SERVICE

The European External Action Service (EEAS) in close cooperation with the EU Satellite Centre[35] is the linchpin orchestrating the intricate interplay between the EU's foreign policy strategies and the wide and expanding

[33] Regulation (EU) 2021/696.
[34] Regulation (EU) 2021/696, Chapter II, 43–46.
[35] Council Decision 2014/401/CFSP.

fields of space exploration and utilisation. Its role resonates deeply within European circles due to its comprehensive approach and strategic alignment with the EU's broader geopolitical imperatives. At the forefront of its agenda lies the seamless integration of space policy within the expansive tapestry of the EU's foreign policy architecture. This nuanced approach strategically knits together the aspirations of space exploration with the overarching diplomatic agendas of the union; discerning and leveraging opportunities for global partnerships in space exploration and providing a necessary framework for the security of the Programme in the field of external relations.[36] Such integration empowers the EEAS to wield space capabilities as instrumental tools for fostering international cooperation and jointly addressing global challenges. Armed with its diplomatic prowess, the EEAS diligently forges and nurtures alliances and collaborations across various nations and international entities concerning space-related initiatives, which ultimately propels the EU into a prominent position within the global space arena, allowing it to gain a foothold amongst other stakeholders. Recognising the evolving geopolitical landscape and the inherent vulnerabilities of space assets, the EEAS plays a strategic role in confronting pertinent space security concerns,[37] andadroitly navigates potential risks related to space assets, ensuring the alignment of space policy with the EU's geopolitical imperatives. By advocating for global space security initiatives and actively contributing to the formulation of norms, the EEAS safeguards EU space assets and strengthens the EU's strategic posture, while its adept engagement in global space governance forums, particularly its active participation in influential platforms such as the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS),[38] underpins its commitment to fostering multilateral relationships by steering negotiations and advocating for inclusive and peaceful space exploration. Aligned with the fundamental values of the EU, the EEAS intricately weaves space policy into initiatives championing sustainable development, environmental stewardship

[36] Regulation (EU) 2021/696, 9.
[37] Council Decision (CFSP) 2021/698.
[38] For more see the website of the EEAS at https://www.eeas.europa.eu/eeas/space_en.

and humanitarian aid. Last but not least it actively contributes to disaster response and humanitarian endeavours by leveraging sophisticated space-based technologies, such as satellite imagery, thus solidifying the EU's commitment to global welfare.

THE SIGNIFICANCE OF SPACE ASSETS IN DEFENCE AND SECURITY

Space has evolved into a heavily contested domain since the launch of Sputnik 1 in 1957. This transformation has seen rapid advancements in satellite technology, with the two superpowers dominating the sector during the first space age (1957–1991). Space rapidly became a theatre of competition, with both nations developing counter-space capabilities. From the 1959 Bold Orion missile test to the 1962 Starfish Prime nuclear test by the United States and the Soviet Union's co-orbital anti-satellite system, the militarisation of space gained momentum. The proliferation of ASAT weapon development continued through the 1980s, signalling a further intensification of the militarisation process. However, after a period of relative dormancy in formal debris-producing ASAT tests, the Chinese ASAT test in 2007[39] and Russia's recent test in 2021 contributed to a resurgence of concerns regarding space weaponisation and security threats. As the world transitioned from the Cold War era in 1991, a "second space age" emerged, marked by increased commercialisation and diversification of space capabilities across numerous nations (Japan, China, India and European countries). Later, the eventual appearance of prominent large space companies (including SpaceX, Virgin Galactic, etc.) significantly influenced the commercial space sector, reshaping traditional approaches and fostering ambitions for space tourism and innovative satellite constellations.[40]

The "proliferation" of space capabilities beyond traditional powers has led to a more diverse and competitive era in space exploration. Policymakers within

[39] Harrison et al. 2017.

[40] Del Canto Viterale 2023.

the European Union conceptualise the need to modernise norms and treaties addressing space to adapt to this evolving landscape. The evolution of EU space assets transcends their initial civilian objectives, driving a pivotal shift in defence and security paradigms. Beyond their evident civilian utility, assets have emerged as enablers in fortifying Europe's defence capabilities, contributing to technological advancements and improving its global positioning in the security landscape. Navigation and Earth observation applications of space technology perform critical functions in civilian life while serving as strategic assets for defence and security, providing an unmatchable operational upper hand in specific scenarios. Precise position, navigation and timing (PNT) data provide unparalleled advantages (like Galileo's PRS) in military operations, ensuring resilient and accurate positioning in various scenarios. With comprehensive Earth observation capabilities, border surveillance, natural or man-made environmental damage, disaster management and intelligence gathering, it amplifies Europe's situational awareness and crisis response capacities.[41]

The European Defence Agency (EDA)[42] and the EEAS consistently highlight the dual-use potential of EU space assets in their publications and reports. They emphasise the transformative impact of satellite communications, high-precision navigation and Earth observation data on bolstering military situational awareness, intelligence capabilities and crisis response. Although the ESA covers the civilian aspects of space – in accordance with its Convention – several cooperation efforts and initiatives further underscore the strategic relevance of space assets in security architectures which can bolster Europe's security resilience. The EU SSSD articulates a comprehensive vision for harnessing space assets to safeguard EU interests, underscoring the imperative nature of further solidifying the pivotal role of Space Situational Awareness (SSA), Space Surveillance and Tracking (SST), as well as the Member States' prerogatives relying on Space Domain Awareness (SDA).[43]

41 Harrison et al. 2021.
42 European Defence Agency 2021.
43 Council of the European Union 2023.

Academic scholarship on space activities spans diverse domains, including international relations, security studies and technological knowledge. As such, it sheds light on the multifaceted implications of EU space assets. Articles in journals such as *European Security* and the *Journal of Strategic Studies* investigate the transformative potential of space assets, outlining their substantial impact on reshaping security paradigms, augmenting strategic decision-making and fostering international cooperation. In essence, the multifaceted roles of EU space assets encompass defence and security, technological innovation, global positioning and international collaboration. The use of space assets for defence and security purposes has evolved significantly over the years; space has transitioned from a domain that is primarily associated with scientific exploration to a critical enabler of military and security operations. For some time now, EU institutions have effectively upheld the distinctions between the military and civilian use of European space capabilities. However, these boundaries are beginning to become increasingly blurred due to the more open drive for harnessing space as a domain of European security, including for military and defence-related uses. This idea sets out the paradigm shift of "peaceful uses" given that in international treaties, there is no explicit prohibition of a collective array of military activity in space – as those documents restrict themselves to imposing obligations against the use of space for deploying force against other states.[44]

KEY SECURITY CHALLENGES IN SPACE FOR THE EU

Global security threats in the space field are arising from a variety of directions. Foremost among these challenges is the issue of space debris and sustainability. The proliferation of defunct satellites, rocket parts and remnants of past collisions has led to an immense congestion of space debris, posing a substantial collision risk to operational satellites. Managing this escalating problem makes

[44] Klimburg-Witjes 2023: 830–839.

implementing vigilant strategies on a multi-spectrum basis is imperative. Initiatives focused on debris mitigation aim to reduce space debris generation by advocating responsible behaviour and highly standardised satellites, launch practices and end-of-life disposal methods. Complementing these, there are efforts to develop pioneering technologies for Active Debris Removal (ADR), seeking to extract debris and mitigate collision risks actively – even though ADR is still more of an initiative than an existing practice.[45]

Space security concerns also loom beyond the strategic landscape with fears being voiced about potential threats ranging from the proliferation of technology to the sabotaging of space assets. Developing and testing different Anti-Satellite (ASAT) weapons (from kinetic to electronic) raises concerns about deliberate harm to space assets. Additionally, vulnerabilities of space systems to cyber threats, which could disrupt crucial communication, navigation and surveillance capacities, present an even more pressing concern, primarily in light of the recent experiences of armed conflict returning to Europe. Unauthorised interference with or falsification of navigation signals through jamming and spoofing further impacts military operations and security.[46]

Amidst these challenges, regulatory and legal predicaments have arisen. Either the absence of or the dated perspective of comprehensive international agreements governing space and the corresponding dual capable technology initiatives pose substantial regulatory and legal challenges. The lack of explicit treaties and regulations addressing arms control in, to and from space hampers efforts to prevent an actual arms race, jeopardising the crucial sanctuary of space. Establishing universally accepted norms of (responsible) behaviour in space could be pivotal to avoid weaponisation and to prevent the escalation of tensions stemming from misinterpretation or miscommunication. Liability in space activities, especially regarding potential conflicts arising from certain space-based assets, presents intricate legal challenges that require careful consideration and the identification of the "best" way forward for the space policy of the EU.

[45] Sullivan – Ben-Itzhak 2023: 135–139.
[46] Chatterjee 2014: 41–42.

CONCLUSION

Over many decades, the EU's approach to space has evolved from fragmented efforts by individual member states to a collaborative and strategic framework involving key institutions. The establishment of the European Space Agency in 1975 laid the groundwork for Europe's entry into space exploration and satellite technology, culminating in the developing of flagship programs for the EU and Europe in the 21st century. Throughout its journey, the EU's core institutions have played integral roles in shaping, implementing and overseeing the EU's space strategy. The strategic integration of space assets for defence and security purposes marked a pivotal shift in the EU's approach, acknowledging space systems' dual-use nature and their significance in fortifying Europe's security architecture. Despite some differences of opinion, a nuanced landscape emerges where timeliness meets the intricacies of trial and refinement.

Significant challenges concerning the "traditional" framework for independent access to space and Europe's past space exploration activities in an era of space commercialisation require the pursuit of a multi-pillar strategy on uncharted territories for decision-makers within European borders (launcher policy, human-crewed spaceflight, etc.). Close cooperation between the ESA and the EU is essential to ensure that the space policy pursued by the world's space powers is matched by a mechanism for the European region to build on its dominance and independence. Promoting the governmental and institutional needs for space-based applications requires a public policy approach, as it is clear that both security and defence policy considerations and the need to ensure an institutionalised internal market for the relevant European industries are becoming essential in the "New Space" era. International cooperation is essential for challenging new types of space missions, whether they be of a scientific nature or otherwise. Europe must be able to play a leading role to ensure that it has the necessary level of autonomy while building critical competencies that can be further exploited in future partnerships. Finally, in addition to stimulating space-related R&D investments (e.g. through Horizon Europe or Cassini), it is necessary to develop infrastructures and policy guidelines that, to return

to the comparison made earlier in this article, could ultimately lead Europe to the American approach to national power, whereby in our interpretation a space power creates and exercises all four instruments of power (diplomatic, informational, military, economic). Nevertheless, the evolution of the EU's space policy deliberately balances the rush to adapt to emerging challenges with the imperative to craft sophisticated and sustainable strategies. As the EU moves through this complicated landscape, it embodies both a sense of urgency in addressing immediate needs and a commitment to refining and reinforcing its space policy for the long haul. This convergence of urgency and deliberate refinement shapes a path towards a more responsive and resilient space policy framework, that will be essential for carefully preparing both civilian defence, and security-oriented space policy for the complex set of challenges which are likely to await over the next decades.

REFERENCES

Chatterjee, Promit (2014): Legality of Anti-Satellites Under the Space Law Regime. *Astropolitics,* 12(1), 27–45. Online: https://doi.org/10.1080/14777622.2014.891558

Commission of the European Communities (1979): *Resolution on Community participation in space research JOC_1979_127_R_0024_01, 1979.*

Commission of the European Communities (1988): *The Community and Space: A Coherent Approach. Communication from the Commission.* COM(88) 417 final, 26 July 1988.

Commission of the European Communities (1991): *Resolution on European Space Policy JOC_1991_305_R_0012_01, 1991.*

Council of the European Union (2022): *A Strategic Compass for Security and Defence. For a European Union that Protects Its Citizens, Values and Interests and Contributes to International Peace and Security.* Online: https://data.consilium.europa.eu/doc/document/ST-7371-2022-INIT/en/pdf

Council of the European Union (2023): *Council Conclusions on the EU Space Strategy for Security and Defence.* Brussels, 13 November 2023. Online: https://data.consilium.europa.eu/doc/document/ST-14512-2023-INIT/en/pdf

Cozzenz, Tracy (2021): GEODE Begins Work on Military User Equipment for Galileo. *GPS World,* 9 February 2021. Online: https://www.gpsworld.com/geode-begins-work-on-military-user-equipment-for-galileo/

Del Canto Viterale, Francisco (2023): Transitioning to a New Space Age in the 21st Century: A Systemic-Level Approach. *Systems,* 11(5). Online: https://doi.org/10.3390/systems11050232

European Commission (1992): Communication from the Commission to the Council and the European Parliament COM(92) 360 final. *The European Community and Space: Challenges, Opportunities and New Actions.*

European Commission (2016): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2016) 705 final. *Space Strategy for Europe.*

European Commission (2023): *Joint Communication to the European Parliament and the Council, European Union Space Strategy for Security and Defence JOIN/2023/9 final.*

European Commission (2024): *Horizon Europe Work Programme 2023–2024.* Online: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-7-digital-industry-and-space_horizon-2023-2024_en.pdf

European Defence Agency (2021): *Fact Sheet.* Online: https://eda.europa.eu/docs/default-source/brochures/2021-11-13-factsheet-space-eda.pdf

European External Action Service (2016): *Shared Vision, Common Action: A Stronger Europe. A Global Strategy for the European Union's Foreign and Security Policy.* Online: https://www.eeas.europa.eu/sites/default/files/eugs_review_web_0.pdf

EPP (2022): *EPP Group Policy Paper on Space Policies for Growth, Economic Transition and Security in Europe.*

European Space Policy Institute (2020): *ESPI Report 72. Europe, Space and Defence. Full Report.* Online: https://www.espi.or.at/wp-content/uploads/2022/06/ESPI-Public-Report-72-Europe-Space-and-Defence-Full-Report.pdf

Foust, Jeff (2023): EU Finalizing Contract with SpaceX for Galileo Launches. *Space News,* 7 November 2023. Online: https://spacenews.com/eu-finalizing-contract-with-spacex-for-galileo-launches/

Harrison, Todd – Cooper, Zack – Johnson, Kaitlyn – Roberts, Thomas (2017): *The Evolution of Space as a Contested Domain.* Online: https://aerospace.csis.org/wp-content/uploads/2018/01/Harrison_SpaceNews.pdf

Harrison, Todd – Johnson, Kaitlyn – Young, Makena (2021): *Defense Against the Dark Arts in Space. Protecting Space Systems from Counterspace Weapons.* Washington, D.C.: Center for Strategic and International Studies.

Hörber, Thomas – Stephenson, Paul eds. (2016): *European Space Policy. European Integration and the Final Frontier.* Abingdon: Routledge. Online: https://doi.org/10.4324/9781315675916

Klimburg-Witjes, Nina (2023): A Rocket to Protect? Sociotechnical Imaginaries of Strategic Autonomy in Controversies About the European Rocket Program. *Geopolitics,* 29(3), 821–848. Online: https://doi.org/10.1080/14650045.2023.2177157

NATO (2022): *NATO 2022 Strategic Concept.* Online: https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf

Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU

Reillon, Vincent (2017): *European Space Policy, Historical Perspective, Specific Aspects and Critical Challenges.* European Parliamentary Research Service.

Straub, Jeremy (2015): Application of a Maritime Framework to Space: Deep Space Conflict and Warfare Scenario. *Astropolitics,* 13(1), 65–77. Online: https://doi.org/10.1080/14777622.2015.1014296

Sullivan, Kathleen – Ben-Itzhak, Svetla (2023): Securing the Space Domain with Active Orbital Debris Removal: Lessons from Europe and Japan Towards a U.S. Strategy. *Astropolitics,* 21(2–3), 127–149. Online: https://doi.org/10.1080/14777622.2023.2274922

Townsend, Brad (2019): Space Power and the Foundations of an Independent Space Force. *Air and Space Power Journal,* 33(4), 11–24.