

Balázs Bartóki-Gönczy – András Edl

THE ROLE OF THE SPACE SEGMENT IN EUROPEAN STRATEGIC AUTONOMY

THE CHANGING ROLE OF SPACE IN EUROPEAN STRATEGIC THINKING

European countries, like the European Union as an organisation, are aware of the growing importance of space. They follow closely the space activities of the most important space powers, the United States, China and Russia, but they also try to draw the right lessons from the space activities of other states. The aim is to strengthen the European space sector and, as a result of a specific cooperation, to raise the pan-European presence to a level that puts the old continent on a par with the three major space powers, the United States, China and Russia. In his presentation on 13 October 2022, Kai-Uwe Schrogl an ESA Special Adviser for Political Affairs and President of the International Institute of Space Law stated that, taking into account capacities and autonomy, Europe is currently a spacefaring actor, but not a real space power. They want to reach the above-mentioned goal by 2035, by solving Europe's problems. This would require an increase in the budget to €16.5 billion per year, reaching a third of NASA's budget by 2025 (SCHROGL 2022).

European states have changed their space activities to a large extent, security issues became more important, and the need to strengthen their own space industry has also grown. The European Space Agency (ESA), which is not a body of the European Union, has refrained from strictly military programmes, but has proved to be an excellent partner in other security projects and is successfully developing its own programmes. On 12 May 2021, the European Union Agency for the Space Programme (EUSPA) was set up to coordinate the large-scale programmes already under way (e.g. Galileo, Copernicus, etc.), to develop the sector and to promote innovation [Regulation (EU) No 2021/696 of the European Parliament and of the Council].

The importance of space is slightly different for each space actor, depending on their capabilities and goals. As Europe is a unique group of nation states and organisations, space has some specific characteristics for Europe. As Michael Sheehan a Professor of International Relations and space policy expert noted back in 2011, an overall European strategy cannot do without space, which is a physical domain where

the actions of other actors have an impact on European interests. Space is also one of the global commons to which free access is necessary. The term ‘commons’ is not a coincidence, since space is also a resource and different space actors derive benefit from its use. This use has not only economic but also military and security benefits. There are two factors that are specifically European: the ‘federative environment’ of space and the ‘field of ethical activity’. The former implies that the specific physical and economic rules of space activities and the scale of the investment required promote cooperation and closer European integration. The latter means that Europe has the opportunity to shape its own space activities on the basis of its own moral principles and to influence issues such as space weaponisation. In Sheehan’s view, the European interest and position of principle would be to minimise or limit space weaponisation (SHEEHAN 2011: 41–54). But this seems to be changing recently, mainly because of Member States like France.

In addition, Europe is also in the process of emphasising the defence aspects of space, which is also reflected in the changing institutional framework. The creation of the EUSPA is also a result of this, and it is becoming increasingly difficult to reconcile the supposedly peaceful activities of the ESA with the real exploitation of dual-use capabilities, such as the Galileo navigation satellite system, which is also used by the armed forces of the Member States. In the years to come, there will be intense negotiation and redefinition of which organisation will have which responsibility, area of activity and, above all, operational principles (KLIMBURG-WITJES 2021: 526–546). Two other defining characteristics of the European space strategy are the lack of central governance of the institutions (e.g. ESA is not under governmental control like NASA) and the diverging interests of the Member States (VOGL 2021: 255–264).

EU SPACE POLICIES

EU civil space strategy

The competences of the European Union are set out in the Treaty on the Functioning of the European Union (TFEU), which provides that the Union shall develop an autonomous space policy to promote scientific and technological progress, industrial competitiveness and the implementation of EU policies. To this end, it may support joint initiatives, promote research and technological development, and coordinate efforts in space exploration and exploitation (Consolidated version of the Treaty on the Functioning of the European Union, OJ C 326/47, Article 189). However,

the TFEU excludes the possibility of the Union harmonising the legislation of the Member States, i.e. creating a single set of rules for European space activities. The consequence of the latter is that Member States present a very heterogeneous picture of their internal legal systems (BARTÓKI-GÖNCZY 2020: 93–114).

The EU Space Strategy is published by regulation every seven years. It includes the cornerstones of the EU space policy and its most important budgetary figures. The third seven-year cycle (2021–2027) of the EU space policy is laid down in Regulation (EU) 2021/696 of the European Parliament and of the Council (EU Regulation 2021/696). The strategy is based on four pillars: the Copernicus programme, the Galileo programme, the EGNOS programme and the Space Situational Awareness (SSA) programme.

The Strategic Compass and the Security and Defence Space Strategy

In his foreword to the Strategic Compass for Security and Defence, published on 21 March 2022, Josep Borrell Fontelles, High Representative of the European Union for Foreign Affairs and Security Policy, speaks of *Europe's geopolitical awakening*. The document emphasises the changing security environment, including the situation in Ukraine, although this is only really highlighted in the preface, as most of the document was written before the outbreak of the war between Russia and Ukraine. Compared with the EU's 2003 European Security Strategy and the 2016 Global Strategy, this document sets out *a concrete course of action with a specific deadline*. For the European community to actually achieve this, the growing Russian threat has given a rather serious boost. The Strategic Compass also identifies some classic areas for improvement, such as faster and more effective decision-making or the development of command and control systems. It also includes elements such as the creation of an EU Rapid Deployment Capacity of 5,000 troops and the strengthening of intelligence and cyber capabilities. The document gives space the same priority as the high seas, airspace and cyberspace. All of these are areas where the rivalry between states is more pronounced. In case of space, safe, guaranteed and autonomous space access capability is of great importance, as is the global and secure communication network that has been lacking until now (Council of the European Union 2022). It is questionable how far the document can solve the problem of fragmentation between Member States, misallocation of resources or duplication of development. These challenges will remain even though the U.S. has increased the number of troops stationed in Europe as a result

of the Russian–Ukrainian war. Moreover, there is some speculation that this will only be temporary, as the focus will be on the Pacific (WITNEY 2022). It remains to be seen whether European security can be guaranteed without a significant U.S. contribution, especially in space.

The Strategic Compass promised the development of an EU Space Strategy for Security and Defence. A Communication from the European Commission was published in March 2023, laying the foundations for an EU Space Strategy. The Communication focuses on strengthening the security of EU and Member States' space systems, developing defence capabilities and promoting responsible and sustainable space activities. It is important to underline that space is understood in a broader sense, including all the capabilities and assets that are part of an effective space activity, such as ground infrastructure, but also elements in cyberspace. Among the most important space capabilities are Positioning, Navigation, Timing (PNT), Earth Observation (EO), Secure Communication and the aforementioned Space Situational Awareness. The importance of autonomous access to space, the protection of supply chains and the need to develop the industrial and technological base are also highlighted in the strategy. In addition to improving European capabilities, partnership is, of course, also a top priority, especially with the United States and the United Nations (European Commission 2023a). The European Commission published its proposal on “European Space Law” in April 2024.

Other EU development programmes and documents

In addition to the Strategic Compass, there are a number of smaller parallel programmes and guidance documents. Within the EU Space Programme – Space Research and Innovation, there are a number of strands that address security. Crisis response, maintaining environmental security, satellite navigation, satellite communications, earth observation, border protection all fall under this heading (European Commission 2021a). Another is the Defence Industrial and Space Directorate's 2022 Management Plan. The document notes the close links and networking with other programmes and the need to create a comprehensive picture. In addition, several other programmes and their expected outputs and timelines are identified (European Commission 2022a). The 2016 Space Strategy for Europe (European Commission 2016a) and the European Defence Action Plan (European Commission 2016b) provided the framework and basis for the programmes presented below.

INSTITUTIONAL BACKGROUND

European Space Agency

The European Space Agency, which is not part of the European Union, is an international organisation for the exploration and exploitation of space, created from the European Space Research Organisation (ESRO) and the European Launcher Development Organisation (ELDO), taking over their rights and obligations. Its Statute was signed by eleven states in 1975. It currently has twenty-two members, with Hungary joining the international organisation as a full member in 2015, the last to do so at the time of writing.

ESA is based in Paris, but has major facilities in Belgium (ESEC, Redu), the Netherlands (ESTEC, Noordwijk), Germany (ESOC, Darmstadt and EAC, Cologne), Italy (ESRIN, Frascati), Spain (CEDE, Villanueva de la Canada) and the U.K. (ECSAT, Harwell). The Council is the decision-making body of ESA, with one vote by each of the Member States. As a general rule, decisions of the Council are taken by simple majority, with some exceptions of course (European Space Agency s. a.). The Council meets as necessary at representative or ministerial level at the ESA headquarters in Paris. The Council elects its President and Vice-Presidents for a two-year term, renewable once for a further one-year term. The Council defines ESA's activities and programmes, the strategy to be followed, approves the annual work plan, the documents and rules governing the basic functioning of the organisation, the budget and decides on the admission of new Member States. The Council is assisted by committees, with four committees (Scientific Programme Committee, Administrative and Financial Committee, Industrial Policy Committee, International Relations Committee) and programme committees for the application programmes. The ESA is headed by a Director-General (Direteur Général), who is the legal representative of the ESA. The Director-General is appointed by the Council for a fixed term, usually four years, by a two-thirds majority of all Member States (GANCZER 2022: 122).

ESA aims to develop and implement European space policy, to recommend possible space objectives for its members, to coordinate member states' policy objectives with other national and international organisations and institutions. ESA cooperates with the European Union to develop a comprehensive European space policy, based on the Framework Agreement concluded between the two organisations on 25 November 2003, which entered into force on 28 May 2004 (Framework Agreement between the European Community and the European Space Agency, OJ L 261/64, 06.08.2004), and the provision of the Lisbon Treaty

of 13 December 2007 which says “the Union shall establish appropriate relations with the European Space Agency” [Article 189(3) TFEU]. On 22 June 2021, the two organisations signed a Financial Partnership Agreement on the implementation of the new European space programme (GANCZER 2022: 123).

EU institutions

Within the European Commission, space related activity is supervised by the Commissioner for Defence and Space (Andrius Kubilius since 2024). Under his leadership there is the department tasked with space issues, the Directorate-General for Defence and Space Industry (DG DEFIS) lead by Timo Pesonen since 2024. The responsibilities of the DG include the development of the European space industry, the implementation of the space strategy, the preparation of legislative proposals and the development of the “key link” between defence and space policy (European Commission 2022a). Within the DG, the Space Directorate covers three areas: general space policy, satellite navigation and earth observation.

In 2021, the new space strategy established the European Union Agency for the Space Programme as the successor to the European Union Agency for the Global Navigation Satellite System (GNSS). The European Union Agency for the Space Programme is working to ensure that Europe can meet its objectives for the deployment of a global navigation satellite system and that users of satellite services can benefit from the European GNSS through the European Geostationary Navigation Overlay Service (EGNOS) and the Agency also supports the development of applications based on Galileo, EGNOS and the EU’s Earth observation programme Copernicus, and coordinates the user aspects of Governmental Satellite Communications (GovSatCom) for key EU policy objectives (European Union Agency for the Space Programme s. a.). The Agency is based in Prague.

Hungary

In case of Hungary, the institutional set-up of the space sector is still evolving, but some major players can already be mentioned. The Department of Space Policy and Space Activities at the Hungarian Ministry of Foreign Affairs and Trade was at the forefront of the Hungarian space activity. This department is under the State Secretary for Security Policy and Energy Security. An important position inside the ministry is the Ministerial Commissioner for Space Research, who reports

directly to the Minister of Foreign Affairs and Trade. On the codification side, the Department is responsible for preparing the relevant legislation and other public regulatory instruments and also provides technical advice. On the functional side, it develops and coordinates strategies and policies, prepares contracts, liaises with international organisations, represents the Hungarian Government within these organisations, and represents Hungary within ESA and the EU SPA [Official Gazette, Annex to the Hungarian Gazette, 11/2022 (IX.6.) KKM Instruction on the Organisational and Operational Rules of the Ministry of Foreign Affairs and Trade, 4188–4189]. The Ministry also played a major role in the development of the Hungarian space strategy adopted on 18 August 2021. The document sets out in detail the tasks, challenges and opportunities facing Hungarian space activities. The aim is to enable the Hungarian space sector to benefit more from European space activities (Hungary's Space Strategy 2021). Hungary also started a manned space flight program called Hungarian in Orbit (HUNOR) and in March 2024 the country signed an agreement with ESA to receive different kinds of support to implement and better integrate the programme into already running projects.

In 2024, the development of space industry gained importance as it became a task of the Minister of National Economy and responsibilities of Hungary's space activity are split between the two ministries.

In terms of defence and security capabilities in the broader sense, the Hungarian Defence Forces (HDF) are responsible for developing their own national capabilities. At the same time, there is a need for a Hungarian contribution to NATO and the common European capability, but the conditions must also be created to be able to use the capabilities provided by the allies. In 2021, the building of the appropriate professional staff started with a six-month training course at the University of Debrecen, which was completed by 10 people, who will be able to use their knowledge at the HDF Modernisation Institute, which was set up in 2018, where their tasks will include the development of the necessary doctrines and procedures (SZŰCS 2021). One of its main tasks is to plan the usage of the orbital positions reserved for Hungary and to integrate other space capabilities into the Hungarian armed forces' toolbox. This work has already started since 2007, when a decision was taken to make a core capability of the Hungarian Defence Forces satellite communications capable of serving multiple endpoints and handling variable data traffic. It has since become an integral part of training (BALOGH et al. 2020: 289–320). Such developments will allow closer cooperation with European allies and NATO.

In the field of education and research, opportunities will also be opened up for Hungarian professionals to contribute to the security of Hungary and Europe.

One of the most recent developments is the launch of the UNISPACE three-semester professional training course in 2022, which was set up in partnership with 17 universities. Also important is the launch of a Master's programme in space engineering at the Budapest University of Technology.

It is also important to mention the Hungarian space companies, many of which are already able to play a significant role in international projects. The Hungarian space sector is growing and the government lays great emphasis on cooperating with industry and research organisations. The Hungarian Space Kaleidoscope contains the most important organisations and suppliers for the sector, and since 2019, when the first issue was published, the number has grown considerably. In the 2023–2024 issue more than 120 organisations belonged to the space sector with the additional list of 13 suppliers for the industry. The companies in the sector are already part or wish to be part of the international market and provide services, components and equipment for European companies. It is important to note that Hungarian companies are also involved in defence developments.

THE MOST IMPORTANT EUROPEAN SPACE PROGRAMMES

Copernicus Programme

The programme is the European Union's Earth observation programme. Copernicus currently has six dedicated sets of satellites (among them, satellites known as Sentinels) and around 30 supporting satellites. The Sentinels are specifically designed to meet the needs of Copernicus services and users. Since 2014 (the launch of the first Sentinel 1A satellite) the European Union's objective is to expand the Sentinel satellite network to a fleet of more than 20 satellites. The main users of the Copernicus services are decision-makers and public authorities, who need information to develop environmental legislation and policies, or to make critical decisions in emergencies such as natural disasters or humanitarian crises. Many services can be tailored to specific public or commercial needs, based on the data collected by Copernicus services, Sentinel satellites and supporting programmes, creating new business opportunities. The Copernicus programme is coordinated and managed by the European Commission. The development of the observation infrastructure will be carried out under the auspices of the European Space Agency for the space component and the European Environment Agency and the Member States for the local component (Copernicus s. a.).

Galileo Programme

Perhaps the most important programme of the European Union is the positioning and navigation satellite fleet programme known as Galileo. The now \$250 billion market for precise positioning and navigation is critical to defence capabilities (European Commission 2022c). It is therefore a key issue for autonomy that the EU is not dependent on the systems of other powers. The system offers three services: open access for the public, market operators; protected and enhanced services for designated authorities, defence and law enforcement agencies of Member States; supporting service for search and rescue missions. The programme is overseen by EUSPA and is also managed by a dedicated department within the European Commission's Directorate-General for Defence and Space.

The constellation started deployment and in-orbit operations in 2011 and has been in service since 2016. Until August 2023, 28 satellites were launched. They are orbiting 23,222 km from Earth, excluding two satellites in the wrong orbit due to a failure of the Russian Soyuz launch vehicle. The so-called Walker 27/3/1 constellation, when ready, is planned to consist of 30 satellites, three of which will serve as backup satellites.

In the context of the Galileo Programme, it is also important to mention the European Geostationary Navigation Overlay Service (EGNOS), which will improve the accuracy of Galileo services by providing three satellites in geostationary orbit (EUSPA 2022).

European Union Government Satellite Communications Programme (EU GovSatCom)

The European Union's Government Satellite Communications programme is part of the EU Space Programme for the period 2021–2027. The idea was first mooted in 2014 and a phased implementation was outlined. In the first phase, the existing communication capabilities of Member States will be harmonised and further developed. Under the current set-up, funding and political support are secured until November 2025, by which time the first phase should be completed (European Defence Agency 2023). The programme aims to build a secure satellite communication system for Member States and the EU. The objectives also include European autonomy in this area, the elimination of fragmentation and the development of new capabilities. Without these, there can be no fast, secure and high-quality information transmission, and without them, there can be

no proper decision-making or autonomous action. Third-party services, even assuming the maximum goodwill of the provider, do not have full transparency of security protocols, improvements may not continue in the direction of the user, the performance and timing of repairs may not be under the user's control, and the service may be terminated more quickly than it could be replaced from other sources. Eliminating these problems increases freedom of action, so it is worth setting up a system of its own in terms of strategic autonomy. The capabilities expected from GovSatCom are grouped into three main families: detection/monitoring, crisis management and support to key infrastructures. The latter include the diplomatic network, the transport network, but also Galileo and Copernicus. The initiative currently has two predecessor programmes, one under the European Defence Agency (EDA) and the other under ESA. The Entrusted programme (GovSatCom 2022), part of the Horizon 2020 grant fund, is also linked to this initiative. The example of ESA shows that, although the organisation is involved in the implementation, budget and competence issues are a major difficulty (KLIMBURG-WITJES 2021).

Space Situational Awareness Programme

The Space Situational Awareness (SSA) or, in American terminology, Space Domain Awareness (SDA) programmes aim to provide a comprehensive understanding of the extra-planetary environment that impacts on space activities and life on Earth. Three sub-areas can be identified: Space Surveillance and Tracking (SST), Near Earth Objects (NEO) and Space Weather Observation (SWO).

Of the three sub-programmes, SST is perhaps the most important, given that there are now more than a million pieces of tiny man-made debris orbiting the Earth, which threatens space activities and the usefulness of Earth orbit in general (KECSKÉS-MIHÁLKÁ 2022). In addition, in February 2024 there were nearly 10,000 active satellites. Their number has increased dramatically in the last years. The aim of the programme is to enable the EU, through ground-based observatories, to predict collisions (collision avoidance, CA), to monitor the controlled and uncontrolled re-entry of space assets into the atmosphere and to monitor the generation of new space debris in Earth orbit. As the technology is dual-use, it could in principle also be used for military defence purposes. The development and integration of these capabilities, in addition to national efforts, is the task of programmes such as EU-SSA-N (see below).

Near Earth Objects monitoring means tracking hundreds of potentially dangerous asteroids that have been in collision orbit with our planet on numerous occasions

since the Earth's existence more than four and a half billion years ago. Finally, Space Weather Observation plays a very important role, as solar storms reaching the Earth can cause very serious damage to electrical systems, so a signalling system with space-based capabilities can help us to prepare and minimise the damage.

The Secure Connectivity or IRIS² Programme

The Secure Connectivity Initiative (or IRIS²) aims to catch up with Europe in secure space-based communications, an area essential for strategic autonomy. The major space powers have started to build mega constellations with public support, occupying limited frequency ranges and orbital positions. The European gap is already jeopardising the competitiveness of the economy and makes it dependent on non-European players. The aim is to build a reliable, secure and not least economical system that helps government actors to protect critical infrastructure, manage crises and provide other tools to enhance the resilience of states. In addition, the same system would provide high-speed broadband commercial communications throughout Europe. The GovSatCom system and cyber defence are also to be integrated into this system, which is expected to improve the EU's telecommunications infrastructure and economic performance once the programme is successfully completed. According to the original plan, initial service provision would start by 2025 and full readiness with integrated quantum cryptography by 2028 (European Commission 2022b). The French Presidency of the EU can help push through the plans, as Paris has long been a supporter of the idea of European strategic autonomy. Given the orbits needed, the same system could be extended to Africa and the Arctic, further strengthening Europe's position in these regions. The total programme would cost around €6 billion, of which €2.4 billion would be provided by the EU, with the remainder coming from private companies and Member State governments (BORRELL 2022).

OTHER KEY PLAYERS IN EUROPEAN SPACE POLICY

The European Defence Agency (EDA)

The European Defence Agency was set up in 2004 to strengthen European defence. The legal framework of the EDA has undergone several changes and currently has three main objectives: to support the development of Member States' and

the Union's defence capabilities; to stimulate research and development and strengthen the defence industry; to strengthen the link between European policy and the armed forces. The Agency works closely with the European Defence Fund (EDF) and other programmes. Since its creation in 2004, more than 250 R&D programmes have been launched with an estimated budget of €1 billion. The EDA's unique organisational elements are Capability Technology Groups (CapTechs), where national experts, industry and research institutions can meet and freely interact within this forum (European Defence Agency 2022). Since the launch of the EU Global Strategy in 2016, the EDA has also been tasked with facilitating the coordination of national developments, which until then had been rather fragmented. They present annual reports on developments in this area and make recommendations for improvement (*Coordinated Annual Review on Defence* 2017). ESA is also willing to cooperate with the EDA, as they recognise that Europe is lagging behind in this respect and have stressed that ESA is not a civilian organisation strictly speaking, but is intended for peaceful purposes, which may include security components, and ESA is ready to fulfil these (KLIMBURG-WITJES 2021). The four main directions identified for the EDA in space are satellite communications, Earth observation, navigation and space situational awareness (SSA). This is reflected in the Capability Development Plan (CDP). It is worth adding that, in addition to space, the document identifies 10 other priorities reflecting the interests of the Member States (European Defence Agency 2018).

The European Defence Fund (EDF)

Established in 2017, the European Defence Fund aims to finance programmes that will significantly enhance Member States' defence capabilities and ensure their future preparedness for the theatres of war. It also aims to ensure that cooperation to enhance defence capabilities is the norm in the EU. They work in partnership with other funding programmes and funds, including the EU Space Programme, and envisage that the instruments to be used could include VAT waivers, new funding schemes and a reinforcement of the EDF bonus scheme. EDF support is also foreseen in the Strategic Compass (Council of the European Union 2022). The total resources available in 2021 amount to €7.9 billion: of which some €5.3 billion are earmarked for building nationally contributing capabilities, while €2.7 billion are earmarked for research into future threats and challenges. The fund supports research and development and the creation of capabilities, but not the procurement of equipment, which is left to the Member States. Developments

carried out under the Permanent Structured Cooperation (see below) can also benefit from the Fund, with 10% of the costs covered by this resource. To be eligible to apply, three different companies or institutions from at least three EU countries must apply jointly for a grant. The only exceptions to this rule are partnerships for the development of disruptive technologies (two companies from two Member States) (European Commission 2023b). In 2021, EDF launched two calls for proposals in the more specific space segment. The EDF-2021-SPACE-D-SGNS focuses on the development and enhanced protection of space and ground-based navigation technologies. Successful applicants will be involved in research, design, prototyping and testing. The EDF-2021-SPACE-D-EPW call will focus on resilient, jamming-resistant satellite communications. Successful results may also be incorporated into the GovSatCom initiative. Apart from general project umbrella terms there are specific research projects like Odin's Eye II (space-based early warning system), SPIDER (space-based permanent intelligence and reconnaissance) or REACTS (responsive space architecture) (European Commission 2023c). The main areas for funding are research and development. Participating companies could apply for a total of €50 million for these two programmes (European Commission 2021b).

Permanent Structured Cooperation (PESCO)

Permanent Structured Cooperation (PESCO) is an integral part of the European Union's common security and defence policy. It involves cooperating Member States implementing projects that contribute to the security and defence of the EU. PESCO's structure is intended to give priority to strengthening cooperation between Member States, enhancing the EU's strategic autonomy and increasing compatibility. The results will remain in the hands of the Member States, but may also be made available to NATO or the UN (Permanent Structured Cooperation 2022). The fourth wave of the project was launched on 16 November 2021. The total number of projects was then increased to 14, with the number of space-related projects rising to four. Two previous projects have been running since 19 November 2018. The fifth wave of PESCO projects was launched in 2023, and currently the active PESCO projects for space are:

- ♦ The *EU Radio Navigation Solution* (EURAS) project aims to develop and harmonise the Positioning, Navigation, Timing (PNT) capabilities of European forces. The Galileo system and the Public Regulated Service (PRS) it will provide are the main tools to achieve this goal. France is the project leader, but Belgium, Germany, Spain, Italy and Poland are also involved.

- ♦ The *European Military Space Surveillance Awareness Network* (EU-SSA-N) project aims to build an autonomous, sovereign EU military space situational awareness capability. The aim is to coordinate this with existing civil space surveillance. The system will not only be able to react to man-made threats, but will also be able to detect natural threats. Italy is the coordinating state, but France, Germany and the Netherlands are also involved. The Netherlands is also a major player in space, but the other three members form the backbone of Europe's space capabilities.
- ♦ The *Defence of Space Assets* (DoSA) project aims to increase the EU's operational effectiveness in space by improving resilience, space manoeuvrability and training. It is coordinated by France, with the participation of Germany, Italy, Austria, Poland, Portugal and Romania.
- ♦ The *Common Hub for Governmental Imagery* (CoHGI) is aimed at the establishment of a federated system, that allows sharing of classified imagery at European level with members States and other EU entities. The coordinator is Germany accompanied by Austria, France, the Netherlands, Latvia, Luxembourg, Romania and Spain (Permanent Structured Cooperation 2024).

At present time, Hungary is not involved in any of these projects. Of course, apart from the ones already mentioned, there are other programmes running and some of them are related to space. Typical examples are navigation, command and control, intelligence or some of the projects that can be classified under cyber capabilities.

A BRIEF LOOK AT THE ROLE OF THE EUROPEAN SPACE INDUSTRY

Only a strong and highly developed European space sector can be the basis for European strategic autonomy in space. Europe's space industry is advanced but fraught with problems. These include an open market, not necessarily favourable for European startups; exposure to large foreign companies; the brain drain that threatens Europe; the security of supply chains; limited resources; the slow and complex procurement-development cycle; and a fragmented and incomplete legal environment. There is also the lack of reusable launchers, making it difficult for European launch service providers to compete with companies such as SpaceX or BlueOrigin. It is also worth pointing out that there is no European capability for human spaceflight. In addition, with the phasing out of the Ariane 5 rocket, there is currently no European capability of launching larger satellites into space. After

many years of delay, the Ariane 6 rocket did not have its first live launch until July 2024, but the test was only partially successful due to problems with the upper stage's deorbiting process. The next launch is planned for the early months of 2025, hopefully, this time without any issues. Further investment and technological development are needed, and the geopolitical rivalry in space must be prepared for. Supply chains need to be protected and launch capacities need to be created so that European states can reach space autonomously (Policy Department for External Relations 2020). One example of this effort is the idea of the Launcher Alliance, which was proposed by the European Commission. The idea is to get European companies and contractors behind Arianespace to ensure that the next generation of Ariane 6 rockets will receive the necessary orders, thus providing the necessary resources and support for their development. This is necessary because currently European companies' market share is shrinking and companies like SpaceX gained a significant advantage, even getting contracts from European entities. This is partly due to previous decisions, as in 2014 European designers did not move towards the reusability of rockets. Given that the European space industry is particularly exposed to international competition, in the absence of tariffs protecting SMEs and large public contracts, such an alliance could change this and signal a paradigm shift (POSANER 2022). By the end of 2023, the Launcher Alliance was supported by most countries, but as emphasised for example by Germany, in the future they intend to move away from this model and rather rely on a competition-based launcher environment. At the moment reliable access to space and funding for Ariane would be important, but until late 2024 the launcher alliance did not come into fruition; therefore, support seems to be wavering and not on a sufficient level.

CONCLUSIONS

The European Union has recognised that the space segment is an indispensable element for strengthening its strategic autonomy. This is demonstrated by the third civil space strategy and its key elements like the Copernicus, Galileo and SSA programmes in tandem with the first-ever space security strategy. The European Union is also active in regulatory initiatives, such as the proposals on space traffic regulation and on EU Space Law. However, it should also be noted that Europe's major challenges lie in competitiveness and autonomous capabilities. Due to this – despite the highly advanced programs mentioned previously – Europe cannot be classified as a real space power on par with the U.S., China or Russia. The launcher crisis, and the gap between Ariane 5 and Ariane 6 combined with the issues with

the Vega rockets resulted in a temporary loss of the ability to launch satellites from European soil. Even if Ariane 6 can fly on a regular basis, the launch cost and frequency of launches is expected to be way less competitive than the ones offered by competitors. Besides, Europe has no capability to transport cargo or humans to and from outer space and has no plan to develop a low Earth orbit space station, contrary to its main competitors. These are serious vulnerabilities that should be reduced in the future. Without those, real strategic autonomy is not possible.

Another gap is also being addressed by programmes to establish secure satellite communications. This will complement existing and truly advanced PNT and Earth observation capabilities. Europe's scientific and R&D capabilities are also among the best in the world, and, as a result, European space programmes have achieved considerable success, but unified and clear political will, similar funding as of leading space powers and securing the needed supply of highly skilled professionals still seem to be an issue for the coming years.

Hungary makes significant efforts to strengthen the national space sector and gain more favourable positions in the global space community. Turning the space strategy to reality still has many obstacles in its way, and organisational changes still can add to these challenges until a new, more effective structure is set up. Supporting the education and domestic employment of professionals, foster economic growth and the establishment of startups, make the Hungarian astronaut program a success story, while also acquiring the necessary defence and security capabilities seems to be a multi-layered task, but at the same time worth striving for.

REFERENCES

- BALOGH, János – DRILLA, Attila – KÁRÁNDI, Zsolt – ORBÁN, József (2020): Szemelvények az űrhadviselés múltjából és jelenéből. In VÁRI, Péter (ed.): *Ég és föld közötti kapcsolatok*. Budapest: Wolters Kluwer, 289–320.
- BARTÓKI-GÖNCZY, Balázs (2020): Az űrtevékenységek nemzeti szintű szabályozása – a nemzetközi jogi környezet, valamint az ESA tagállamok gyakorlatának elemzése. *Iustum Aequum Salutare*, 16(4), 93–114.
- BORRELL, Josep F. (2022): *Space and Defence: Protecting Europe and Strengthening Our Capacity to Act*. Online: https://www.eeas.europa.eu/eeas/space-and-defence-protecting-europe-and-strengthening-our-capacity-act_en
- Coordinated Annual Review on Defence (CARD) (2017). Online: https://www.eeas.europa.eu/sites/default/files/coordinated_annual_review_on_defence_card_factsheet.pdf
- Copernicus (s. a.): *Infrastructure Overview*. Online: <https://www.copernicus.eu/en/about-copernicus/infrastructure-overview>

- 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://www.eeas.europa.eu/sites/default/files/documents/strategic_compass_en3_web.pdf?fbclid=IwARoagaIPzTx9anHRdx-PRgLd7OSX-eLkabSfinkAlpJN_yPdGIHzTrnO-8rFo
- European Commission (2016a): *Space Strategy for Europe*. Online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DCo705&from=EN>
- European Commission (2016b): *European Defence Action Plan*. Online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DCo950&from=en>
- European Commission (2021a): *Defence Industry and Space: EU Space Programme. Space Research and Innovation*. Online: https://defence-industry-space.ec.europa.eu/eu-space-policy_en
- European Commission (2021b): *Commission Implementing Decision of 30.6.2021 on the Financing of the European Defence Fund Established by Regulation (EU) No 2021/697 of the European Parliament and the Council and the Adoption of the Work Programme for 2021*. Online: https://defence-industry-space.ec.europa.eu/system/files/2021-06/edf-wp2021_en.pdf
- European Commission (2022a): *Defence Industry and Space*. Online: https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/defence-industry-and-space_en
- European Commission (2022b): *Questions and Answers: Secure Connectivity*. Online: https://ec.europa.eu/commission/presscorner/detail/hu/QANDA_22_922
- European Commission (2022c): *Galileo*. Online: https://defence-industry-space.ec.europa.eu/eu-space-policy/galileo_en
- European Commission (2023a): *Joint Communication to the European Parliament and the Council. European Union Space Strategy for Security and Defence*. Online: [https://ec.europa.eu/transparency/documents-register/detail?ref=JOIN\(2023\)9&lang=en](https://ec.europa.eu/transparency/documents-register/detail?ref=JOIN(2023)9&lang=en)
- European Commission (2023b): *European Defence Fund*. Online: https://defence-industry-space.ec.europa.eu/eu-defence-industry/european-defence-fund-edf_en
- European Commission (2023c): *Result of the EDF 2022 Calls for Proposals*. Online: https://defence-industry-space.ec.europa.eu/funding-and-grants/calls-proposals/result-edf-2022-calls-proposals_en
- European Defence Agency (2018): *Capability Development Plan*. Online: https://eda.europa.eu/docs/default-source/eda-factsheets/2018-06-28-factsheet_cdpbo20bo3fa4d264cfa776ff000087efof
- European Defence Agency (2022): *Research & Technology*. Online: <https://eda.europa.eu/what-we-do/research-technology>
- European Defence Agency (2023): *Governmental Satellite Communications*. Online: [https://eda.europa.eu/what-we-do/all-activities/activities-search/governmental-satellite-communications-\(govsatcom\)](https://eda.europa.eu/what-we-do/all-activities/activities-search/governmental-satellite-communications-(govsatcom))
- European Space Agency (s. a.): *ESA Convention Rules*. Rule 18, point 2. Online: https://www.esa.int/About_Us/Corporate_news/Convention-Rules#Art1.1
- European Union Agency for the Space Programme (s. a.): *EUSPA Overview*. Online: https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/search-all-eu-institutions-and-bodies/european-union-agency-space-programme-euspa_en
- EUSPA (2022): *EGNOS Programme*. Online: <https://www.euspa.europa.eu/european-space/egnosc/programme>

- GANCZER, Mónika (2022): Nemzetközi intézményrendszer. In BARTÓKI-GÖNCZY, Balázs – SÜLYÖK, Gábor (eds.): *Világűrjog*. Budapest: Ludovika Egyetemi Kiadó, 117–130.
- GovSatCom (2022): *GovSatCom – Practical and Technical Information*. Online: https://www.belspo.be/belspo/space/euGovSatcom_tech_en.stm
- Hungary's Space Strategy (2021). Online: <https://space.kormany.hu/download/7/bd/c2000/Magyarorsz%C3%A1g%20%C5%Borstrat%C3%A9gi%C3%A1ja.pdf>
- KECSKÉS, Gábor – MIHÁLKÁ, György (2022): Környezetvédelem és űrszemét. In BARTÓKI-GÖNCZY, Balázs – SÜLYÖK, Gábor (eds.): *Világűrjog*. Budapest: Ludovika Egyetemi Kiadó, 235–246.
- KLIMBURG-WITJES, Nina (2021): Shifting Articulations of Space and Security: Boundary Work in European Space Policy Making. *European Security*, 30(4) 526–546. Online: <https://doi.org/10.1080/09662839.2021.1890039>
- Permanent Structured Cooperation (2022): PESCO. Online: <https://www.eeas.europa.eu/sites/default/files/documents/2022-03-23-PESCO-Deepening-defence-cooperation-NewLayout.pdf>
- Permanent Structured Cooperation (2024): PESCO Projects. Online: <https://www.pesco.europa.eu/#projects>
- Policy Department for External Relations (2020): *The European Space Sector as an Enabler of EU Strategic Autonomy*. Online: [https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/653620/EXPO_IDA\(2020\)653620_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/653620/EXPO_IDA(2020)653620_EN.pdf)
- POSANER, Joshua (2021): Europe's Lack of Rocket 'Audacity' Leaves It Scrambling in the Space Race. *Politico*, 15 January 2021. Online: <https://www.politico.eu/article/europe-arianespace-rocket-space-race/>
- SCHROGL, Kai-Uwe (2022): Strategy of the European Space Agency. Conference presentation at the *European Space Policy* conference. Budapest: Ludovika University of Public Service.
- SHEEHAN, Michael (2011): EU Strategy, CSDP and the European Space Programme. *Studia Diplomatica*, 64(1), 41–54. Online: <https://www.jstor.org/stable/26531481>
- SZÜCS, László (2021): A katonák a civilekkel együtt dolgoznak a magyar űrképesség megteremtésén. *Honvédelem*, 13 May 2021. Online: <https://honvedelem.hu/hirek/a-katonak-a-civilekkel-egyutt-dolgoznak-a-magyar-urkepesseg-megteremtesen.html>
- VOGL, Doris (2021): Encounter in the Low Earth Orbit and Outer Space. In FRANK, Johann – VOGL, Doris (eds.): *China's Footprint in Strategic Spaces of the European Union. New Challenges for a Multi-dimensional EU–China Strategy*. Vienna: Schriftenreihe der Landesverteidigungsakademie, 255–264.
- WITNEY, Nick (2022): *The EU's Strategic Compass: Brand New, already Obsolete*. European Council on Foreign Relations. Online: <https://ecfr.eu/article/the-eus-strategic-compass-brand-new-already-obsolete/>