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EU SPACE POLICY — AN ATTEMPT TO BUILD STRATEGIC AUTONOMY

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Abstract
The European Union is trying to play a significant role in space exploration. However, it must contend with powerful competitors, such as the USA, Russia, and China. EU-led space programmes such as the ‚Galileo' satellite navigation system and the ‚Ariane' launch vehicles are proof of the high aspirations of Europeans. However, the costs generated by these programmes and the modest achievements they bring indicate that the EU does not have a dominant position in this area. In recent years, the Russian invasion of Ukraine has had a significant impact on the EU's space policy, with space exploration linked to security and defence policy. It has become an important part of the strategic autonomy built by the EU. European countries have also decided to build their own missile defence system – ESSI.

Keywords
European Union, space policy, strategic autonomy, Galileo, Ariane, ESSI

Introduction

The topic of the article is an attempt to answer the questions: how and why is the EU's space policy, which has been developing for many years in the scientific and commercial sphere, beginning to achieve goals related to European security? In the author's opinion, the reasons for this expansion of European activity are as follows:

- Ambitions to increase independence in the field of security and crisis response – for many decades Europe has been reliant on the care of the USA in this regard, but for about a decade there has been increasing political pressure for the EU to achieve greater independence in this area (the so-called „strategic autonomy").

- The direct factor is Russia's full-scale aggression against Ukraine, which began in February 2022, demonstrating that security in Europe can be compromised by the decisions of one of the stronger actors, and the practice of warfare has shown the significant importance of space for communication and threat imaging.

For the purposes of this article, the following hypotheses have been adopted:

- Both the construction of „European strategic autonomy" and the European space capability, which is a component of it, are tasks that require colossal investment and many years of work. The current actions are merely the beginning of the realization of these projects.
- Europe must compete with powerful rivals: the USA, the PRC, and Russia, who started their space programs many decades earlier; moreover – security was the main motivation for their actions (more important than scientific or commercial considerations). They also spend larger or comparable funds on space policy than those in Europe.
- European countries have undertaken various initiatives, but it is unclear whether they will be conducted under the auspices of the EU, the European Space Agency, or changing intergovernmental coalitions formed for specific projects.

The text uses the following research methods: document analysis, official statements, and positions of creators of European space policy, as well as elements of systems analysis.

European Strategic Autonomy – attempts to define it

The first concept of European Strategic Autonomy (EAS) appeared in the Franco-British declaration issued in 1998 (the so-called 'Saint-Malo Declaration') and referred to the EU's ambitions in foreign and security policy. The idea was to build the EU's ability to conduct military operations in a manner independent of NATO (Dankowski, 2021). Over the years, the strengthening of European defence industry and technology has been added to the EAS. In 2013, the European Council identified the EAS as an objective of EU action under the Common Security and Defence Policy (CSDP). In 2016, the new EU Global Strategy identified the EAS as an objective of the Union's activities in the areas of foreign, defence, space, cybersecurity, digital policy, new technologies, industry, supply chains, public health, production of medicines, trade, foreign direct investment, diplomacy, and other external policies (Turczyński, 2022). Alongside strictly military components, a strong emphasis was also placed on economic ones – one may fear that such a broad, exhaustive list of areas of action, without indicating its priorities, would be difficult to achieve.

Still, in the European Council communication of 20 June 2019, The New Strategic Agenda 2019–2024, cited as the beginning of building Europe's strategic autonomy (Balducci, 2021), is not used in itself – instead, the EU's ‚decision-making autonomy' appears: ‚The EU must also take greater responsibility for its own security and defence, in particular by increasing defence investment, capability development, and operational readiness; will work closely with NATO, in full respect of the principles set out in the Treaties and by the European Council, including the principles of inclusiveness, reciprocity and the EU's decision-making autonomy' (Polkowska, 2021, pp. 63–64). This document specifies four key areas:

- Protecting citizens and freedoms
- Building up the economic base: a European model for the future

- Building a climate-neutral, green, fair, and social Europe
- Promoting European interests and values in the world

The concept of "strategic autonomy" was popularized a year later by the President of the European Council, Charles Michel. In a speech commenting on the negotiations on the EU's Multiannual Financial Framework (Council of Europe summit on 17–21 July 2020), he stated: "European leaders reached an agreement on our next budget and recovery plan. (...) The agreement was a major step towards our key goal: Europe's strategic autonomy" (Michel, 2020). However, the rest of the speech showed that the President of the CoE sees "strategic autonomy" primarily in an economic context: as combating the effects of the pandemic and building the EU's influence in the world.

Until the full-scale Russian aggression against Ukraine, the EU lacked a comprehensive approach to strengthening European security, and cooperation focused mainly on the non-military dimension (Kozioł, 2024). Ursula von der Leyen, during her first term as President of the European Commission (2019–2024), primarily aimed at tightening cooperation in areas related to the development of new technologies, adopting a cybersecurity strategy in 2020 (Kozioł, 2021), a cyberdefence policy in 2022, and a space strategy in 2023 (Kozioł, 2023). The last two documents were developed taking into account the experience of Russian aggression against Ukraine.

Cooperation in developing military capabilities, on the other hand, was in the background. EU countries considered the occurrence of an armed conflict in Europe unlikely and therefore did not invest sufficiently in the development of an industrial and defence base at the national level. The EU launched, among other things, the European Defence Fund (EDF), supporting the development of new armament technologies for the first time, but it had a limited budget – 7,95 billion euros. EU countries implemented several dozen projects of armament cooperation within the framework of the so-called Permanent Structured Cooperation (PESCO), but most of them were small-scale and have not yet translated into a significant strengthening of their military potential. Significant progress was noted only in the project on military mobility – cooperation with EU countries in this area was undertaken by allies from Canada, Norway, and the USA.

However, at the end of the 2019–2024 term, the EC managed to develop unprecedented solutions in response to the security challenges arising from the Russian aggression against Ukraine. In 2021, the European Peace Facility (EPF) was established, which initially had a budget of 5.7 billion euros. After 2022, this amount was gradually raised to 17 billion euros – from these funds, military equipment and ammunition for Ukraine were financed, a training mission for Ukrainian soldiers was launched, and corrective actions were initiated in relation to the production capacities of the European defence sector.

It should be noted that Strategic Autonomy is not a status that can be declared – it is a derivative of numerous elements, which include both military (possessed weapons of mass destruction, aircraft carriers, heavy transport aircraft), political (seats on the UN Security Council, concluded alliances) and economic. The latter aspect has raised concerns in the EU in recent years, as its economic position on a global scale has been weakening: since the financial crisis of 2009–2013, the USA has been significantly stronger than her, and during the COVID-19 pandemic of 2020–2021, China caught up with her. Awareness of this problem is evidenced by, for example, the „Enrico Letta Report" (Letta, 2024), the „Mario Draghi Report" (Draghi, 2024), which indicates that without deep reforms, the EU will not maintain its wealth, competitiveness, and security. He even states that with

very responsible management, it will be possible to maintain two of these components at the expense of the third (otherwise all of them will deteriorate), only one has to choose which to protect and which to sacrifice. Another answer is the so-called „EU Competitiveness Compass" announced on January 30, 2025, which is to provide an answer on how the EU is to regain competitiveness in the global economy. However, these answers are neither easy to implement, nor do they guarantee quick success.

Space policy as an area of activity of the European Commission

The most important position in the structures of the EU is the President of the European Commission. The collegial European Commission (EC), subordinate to him, is built, of course, taking into account the political arrangements of the Member States, but also the substantive significance of the issues it is to deal with.

The EU's space policy aims to address a variety of contemporary challenges, such as fighting climate change, helping to stimulate technological innovation, and delivering socio-economic benefits to citizens. Space technologies, data, and services have become indispensable in the lives of Europeans. Millions of people need these technologies when using mobile phones and car navigation systems, satellite TV, and ATMs. Satellites also provide immediate information in the event of natural disasters such as earthquakes, forest fires, or floods, allowing for better coordination between rescue services and rescue teams.

The specific objectives of the EU space policy include:

- Increasing productivity in agriculture and fisheries: satellite applications improve the mapping of cropland requiring irrigation, harvest forecasting, and fisheries control (e.g., Copernicus1). This guarantees better quality and food safety while protecting the environment;
- Helping remote or isolated regions access knowledge and information: satellites support communication when terrestrial solutions are limited. This reduces regional disproportions, serving communities in areas that do not have access to the Internet;
- Improved emergency response: satellite services help reduce response times in emergencies (e.g., flooding in Lower Silesia in September 2024). Up-to-date damage photos and situational assessment maps contribute to more effective planning and relief efforts and help guide emergency services;
- Protecting the environment and helping to combat climate change: environmental monitoring provides key information on vegetation, ocean currents, water quality, natural resources, atmospheric pollutants, greenhouse gases, and the ozone layer;
- Enhancing security: satellite positioning, satellite communications, and Earth observation contribute to detecting illegal immigration, preventing cross-border organised crime, and combating piracy at sea;

1 Copernicus (formerly: Global Monitoring for Environment and Security, GMES) — an Earth observation programme implemented by the European Commission in cooperation with the European Space Agency, the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for Medium-Range Weather Forecasts (ECMWF), EU agencies and the Mercator Océan research institute). It was created to support activities in the field of environmental protection, civil protection, and security. It is the European contribution to building the Global Earth Observation System of Systems.

- Transport optimisation: Combined with increased communication capabilities, highly accurate satellite positioning (e.g., thanks to the Galileo satellite navigation system) contributes to a modern and reliable transport sector for cars, planes, and ships. It optimizes fleet management, vessel traceability, collision avoidance, speed control, ship manoeuvring assistance, etc.

All these civilian attributes have been supported in recent years by the use of European space capabilities to strengthen security.

In the structures of subsequent ECs of the last decade, space exploration issues have gradually gained in importance and ceased to be only an „element of the puzzle" assigned to individual commissioners. This was still the case in 2014, when the EC was established under the leadership of J. C. Juncker. At that time, the President announced that „space matters" (simply called „space") would be transferred to the Commissioner for the Internal Market, Industry, and Small and Medium-Sized Enterprises – this commissioner in the years 2014–2019 was the Polish Elżbieta Bieńkowska (Dziennik, 2014). In return, responsibility for the pharmaceutical market, which had previously been subordinate to this commission, was taken over by another commission – the one responsible for health.

In the European Commission under the leadership of Ursula von der Leyen, in the years 2019–2024, "space" issues remained in the commission for the internal market, headed by the Frenchman, Thierry Breton. However, at the turn of 2020/2021, a profound correction took place: the Directorate-General for Defence Industry and Space (DG DEFIS) was established, separating its competences, among other things, from the commission for the internal market. The new DEFIS was headed by the Finn, Timo Pesonen. This meant an increase in the importance of research and use of space for the EU, as well as recognition that activity in this area could be important for European security and defence. By establishing a new Directorate-General, the EC wanted to strengthen its mandate to co-shape the industrial and defence policy of the Member States. This initiative is an expression of a qualitative change in the EU itself, whose ambitions in terms of building a comprehensive approach to security have so far been limited.

The DG DEFIS position was created in response to the growing need to strengthen defence cooperation and develop a common space policy. This was due to the dynamically changing geopolitical challenges and the EU's strategic ambitions in terms of common security and space technologies.

In the area of Defence Industry, DEFIS is in charge of upholding the competitiveness and innovation of the European Defence industry by ensuring the evolution of an able European defence technological and industrial base. In the area of Space, DG DEFIS is in charge of implementing the EU Space programme consisting of (Turczyński, 2022, pp. 70–74):

- the European Earth Observation Programme (Copernicus),
- the European Global Navigation Satellite System (Galileo)
- and the European Geostationary Navigation Overlay Service (EGNOS).

"Space" has gained even greater importance in Ursula von der Leyen's 2nd European Commission, formed in the autumn of 2024. Lithuanian, Andrius Kubilius, has become the European Commissioner for Defence and Space. His tasks include overseeing the development of defence capabilities, supporting collaboration between the defence industries of member states and the development of their space programs. The aim of the Com-

missioner's activities is to increase the EU's strategic autonomy and support innovation in the defence and space sectors, and in particular:

- development and implementation of EU defence policy, including European Defence Fund (EDF) programmes. Projects in this area will include: development of military mobility and expansion of transport corridors, creation of a common market for defence products, launching new defence projects of common European interest (such as the European air and missile defence shield – see below),
- supporting cooperation between Member States in the field of defence capabilities, increasing resilience to digital and hybrid attacks. Also in this area, it is planned to launch new projects of common European interest (initially in the area of cyber defence).
- coordination of initiatives related to the arms industry and defence technologies, adoption and implementation of the European Defence Industrial Development Programme (EDIP), as well as searching for innovative solutions to secure financing of defence production from public and private funds.
- supervision of EU space programmes, such as Galileo (satellite navigation system) and Copernicus (Earth observation programme),
- increasing the competitiveness of the European space sector, continuing the implementation of the 2023 space strategy, strengthening the European space industry with particular emphasis on increasing independent access to space,
- strengthening the EU's position as a global leader in the field of security and exploration of space, as well as creating EU space law (primarily standardisation of rules of action in the area of space) and developing a space data economy strategy

The new commissioner's responsibilities include building a European Defence Union, as well as security in space, which is to structure cooperation between member states across the entire spectrum of defence capabilities. The main principle that the new commissioner is to follow is to spend more and better on European technologies. Although the EC emphasises that member states are responsible for their armed forces, the EU can complement their efforts in the area of security by coordinating investment, development, and legislation. These activities are to take place in close cooperation with NATO, in order to strengthen its European pillar.

The creation of a new position of Commissioner for Defence and Space confirms that member states want the EU to take greater responsibility for security in Europe (Kozioł, 2024). This is an important step, especially in view of the weaknesses of the European defence industry, which have been exposed by Russia's aggressive actions. It is also an important step towards strengthening the importance of the EU as a strategic actor. Despite years of neglect, for example in the area of production of military equipment and ammunition, an attempt to adopt a similar solution was previously impossible due to resistance from EU members.

European Sky Shield Initiative (ESSI)

ESSI is a project aimed at building an integrated, ground-based (land-based) European air defence system that will be able to combat not only tactical missiles – but also ballistic missiles. NATO, which has been waging a "war on terror" since 2001, has been building an Active Layered Theatre Ballistic Missile Defence (ALTMBD) since 2005, but it is primar-

ily dedicated to protecting the territory of the United States. It can combat, for example, intercontinental ballistic missiles that Iran could launch. ALTMBD uses kinetic missiles launched from ships or from land bases (in Romania, the Deveselu area, opened in 2016, and in Poland, the Słupsk area, opened in 2024). It is not effective enough in combating ballistic missiles, drones and cruise missiles that could be aimed at Europe. According to the plans, ESSI would have the ability to defeat various categories of targets: from drones, aircraft, and tactical missiles, to ballistic missiles.

The ESSI project is the result of experiences from Russia's aggression against Ukraine, especially to Russia's massive use of drones and missiles against Ukrainian civilian targets (attacks on power plants in the fall of 2022; harassment attacks on Ukrainian cities). Like Ukraine, many European countries would also have difficulty repelling an attack by Russian ballistic missiles (e.g., Iskander missiles deployed in Königsberg).

ESSI was presented by German Chancellor Olaf Scholz in late August 2022 in Prague (Wachs, 2023). In October 2022, fifteen European countries (table) signed a declaration to join this initiative (Die Zeit, 2022). In December 2022, the German Chancellor, as the de facto leader of ESSI, expressed hope that the system would be developed over the next five years. In February 2023, Denmark and Sweden joined the project, and in July 2023 – neutral countries: Austria and Switzerland (this decision means a weakening of their neutrality policy). In mid-February 2024, Greece and Turkey declared their accession to the initiative.

Table 1. Countries participating in the ESSI initiative

State	Letter of Intent	Accession
Albania		February 13, 2025
Austria	July 7, 2023	May 28, 2024
Belgium		Founder, October 13, 2022
Bulgaria		Founder, October 13, 2022
Czech Republic		Founder, October 13, 2022
Denmark	February 15, 2023	
Estonia		Founder, October 13, 2022
Finland		Founder, October 13, 2022
Greece	February 15, 2024	
Netherlands		Founder, October 13, 2022
Lithuania		Founder, October 13, 2022
Latvia		Founder, October 13, 2022
Germany		Founder-initiator, October 13, 2022
Norway		Founder, October 13, 2022
Poland	April 16, 2024	

State	Letter of Intent	Accession
Portugal		February 13, 2025
Romania		Founder, October 13, 2022
Slovakia		Founder, October 13, 2022
Slovenia		Founder, October 13, 2022
Switzerland	July 7, 2023	October 17, 2024
Sweden	February 15, 2023	
Turkiye	February 15, 2024	
Great Britain		Founder, October 13, 2022
Hungary		Founder, October 13, 2022

Source: Author's own study.

In the case of Poland, the attitude towards ESSI was a consequence of the political sympathies of successive governments: the right wing, in power until the end of 2023, sympathized with the USA, and bought weapons from there (such as the Patriot anti-missile systems). Deputy Minister of National Defence in the PiS government, Wojciech Skurkiewicz, argued that our anti-missile defence should be based primarily on short-range „Narew" anti-aircraft missile systems (launchers and missiles from the British concern MBDA UK) and medium-range „Wisła" (IBCS fire control system – Northrop Grumman and Patriot missile launchers – Lockheed Martin).

After the change of the ruling team, the centre-left ruling coalition also changed its approach to the German initiative: on April 16, 2024, Prime Minister Donald Tusk announced that Poland plans to join the project of building a pan-European air defence system. „Poland should be part of many systems that could create an iron dome over the Polish sky. We will cooperate within the European Sky Shield initiative. It does not bother me that the initiators of this system were Germany" (Onet, 2024a). However, President Andrzej Duda, who comes from PiS, remained critical of this solution: „For years, we have been building an air defence system based primarily on the Patriot system", while he described ESSI as a „German business project" that appeared two years ago, „So it is relatively new in relation to what we started building and is something completely different (...) The project is a German project. We have not considered joining it so far, because we are implementing our own – in cooperation with the United States, with Great Britain" (Onet, 2024b).

ESSI was inaugurated by NATO countries, but various European countries joined it, whether they are part of NATO, the EU, or not part of these structures (Austria is not a member of NATO; Albania, Norway, Switzerland, and Turkey are not members of the EU; Finland, a co-founder of ESSI, was not a member of the Alliance at that time but was in the process of accession, which was completed on 4 April 2023). The NATO Communiqué of October 2022 informed: „The initiative aims to create a European air and missile defence system through the joint acquisition of air defence equipment and missiles by European nations. The initiative will also strengthen the NATO Integrated Air Defence

System (NATINADS)." According to NATO assumptions, the air defence systems of the ESSI participating countries would be connected to the NATO Integrated Air and Missile Defence System (NATO IAMD). ESSI would be more strongly integrated – NATO IAMD is only a common command system, but individual countries defend their airspace independently (Miłosz, 2024). ESSI is ultimately about creating a common, integrated air defence system. It is to be a multi-layer system, consisting of the following elements (Fiszer, 2024):

- Short range: Skyranger 30 – this is a short-range air defence turret, developed by Rheinmetall in 2021–2023, which can be mounted on various land vehicles (*e.g.*, infantry fighting vehicles). The diameter of the turret is 1.44 m, its weight is about 2.5 tons. The main armament is a Swiss 30 mm Oerlikon cannon (range 3 km), it is also possible to mount a rocket launcher (range 8 km).
- Medium range: mainly IRIS-T SLM – Infra Red Imaging System Tail, is a family of air-to-air and surface-to-air missiles designed at the turn of the century by Germany (Diehl Defence) in multinational cooperation (including Avio, Litton, and Leonardo from Italy, Saab from Sweden, GPCC from Greece, Nammo from Norway and Finland). It is the European equivalent (significantly improved) of the American AIM-9 Sidewinder missile. Maximum range 40 km, ceiling 20 km, standard up to 15 km and up to 6 km altitude. In December 2022, the German company Hensoldt AG announced that it would build 30 short-range TRML-4D radars for the IRIS-T-SLM air defence system.
- Long range (15–50 km and up to 25 km altitude): MIM-104 Patriot – mobile interceptor missile surface-to-air missile (SAM) system, used by the United States Army since 1984, manufactured by the U.S. defence contractor Raytheon and derives its name from the radar component of the weapon system.
- Very long range (>50 km and up to 35 km altitude exoatmospheric): Arrow 3 (Chetz 3) – this is an exoatmospheric hypersonic anti-ballistic missile built in cooperation between the US and Israel, used by Israel since 2017. The missile's flight range is 2,400 km, flight ceiling is over 100 km (it is assumed that it is a missile capable of destroying artificial satellites).

From this structure it is clear that calling it „European" is a certain inaccuracy: only the first two of its components (the simplest, with the shortest range and the least technologically advanced) are European.

Despite its wide support, the project raises some controversy. The lack of interest from France and Italy is notable, as they question the initiative, citing ESSI's excessive dependence on non-European equipment and technology. France and Italy are particularly unhappy that their Aster SAMP-T (Surface-to-Air Missile Platform/Terrain) missile system is excluded from ESSI. Aster was developed by the Eurosam consortium, which includes MBDA France, MBDA Italy and Thales Group. The missile has two versions: Aster 15 (range 30 km, ceiling 13 km) and Aster 30 (range 120 km, ceiling 20 km); the latter is an equivalent of the American Patriot missile. In June 2023, France called on other countries to explore alternatives to the German proposal. In the same month, the German Bundestag approved nearly €4 billion for the purchase of the AR-row 3 anti-ballistic missile system from Israel (the agreement was signed in November 2023). Other European countries, such as Spain and Poland, also hesitated to join the project.

In the first phase, however, ESSI would consist of joint purchases of air defence systems. In this phase, the aim of the undertaking is to reduce the costs of purchasing and maintaining equipment at the European level, which, in addition to savings, would also ensure better coordination of training and logistics. According to information from NATO, the purchased systems are to be connected to the NATO Integrated Air and Missile Defence System NATINAMDS (NATO Integrated Air and Missile Defence System).

Ariane – the space race

An obvious element of competition in space is having autonomous launch vehicles or other means of launching equipment into space. Europe counts in this race, although it is not the leader (Polkowska, 2021, pp. 31–35). Launching various installations into space requires the ability to reach various altitudes (orbits), which each time means a technological leap

- The easiest to achieve is LEO (Low Earth Orbit) – approx. 200–2000 km above Earth.
- It is more difficult to launch vehicles to MEO (Medium Earth Orbit) – approx. 2000–35,500 km from Earth (in practice 3000–30000 km) – navigation satellites are placed in this orbit
- Using GEO (Geosynchronous Equatorial Orbit, geostationary orbit) – is very attractive. This is a circular orbit contained in the plane of the equator, running at an altitude of 35,786 km. Geostationary orbit is used by geostationary satellites, especially telecommunications, meteorological and satellite telephony.
- To reduce the costs of achieving GEO, GTO (Geostationary transfer orbit) was developed. This is a highly elliptical type of geocentric orbit, usually with the lowest point (perigee) at the level of low Earth orbit (LEO) and the highest point (apogee) at the level of geostationary orbit (GEO). GTO allows for relatively cheap launching of satellites into GEO orbit: the launch vehicle introduces the satellite into LEO orbit, then detaches, and the satellite itself, using its own engines, enters GTO orbit, ultimately to descend into GEO orbit.

Already in the middle of the „Cold War", when the actual duopoly of the USA-USSR reigned in space, European countries decided to build their own launch vehicle system. In 1962, the European Launcher Development Organisation (ELDO) was established, which worked on the Europa rocket project. After the failure of this project in 1973, work began on a new programme, Ariane. In 1975, ESA was established, which combined ELDO and the European Space Research Organisation, ESRO.

The first launch of the Ariane rocket took place on 24 December 1979 from the spaceport in French Guiana. The rocket was designed to carry two (cost reduction) telecommunications satellites into orbit simultaneously. Gradually, more and more advanced versions were built (Table 2).

The next generations of „Ariane" rockets were increasingly expensive. The Ariane 1 program cost 2 billion ECU (in prices from the mid-1980s, before the introduction of the euro currency), and the launch of a single rocket – 32 million ECU. The Ariane 5 program is already 7 billion euro, and the cost of launching one rocket is 150–200 million euro (2016). Finally, the Ariane 6 program costs 3.5 billion euro, and the launch of one version of the A62 is 75 million euro – the estimated cost of launching the A64 version is 115 million euro (2018).

Table 2. Technical specifications of Ariane series rockets

Version	Years of use	Launches (including unsuccessful)	Altitude in meters (degrees)	Weight (tonnes)	Payload (tonnes) carried to orbit	
					LEO	GTO
Ariane 1	1979–1986	11 (2)	50 (3)	207.2	4.85	1.85
Ariane 2	1986–1989	6 (1)	49.13 (3)	215		2.175
Ariane 3*	1984–1989	11 (1)	49.13 (3)	237		2.7
			including 2 auxiliary engines			
Ariane 4	1988–2003	116 (3)	58.72 (3)	240–470	5.0–7.6	2.0–4.3
			including 2–4 auxiliary engines			
Ariane 5**		109 (2)	2 side engines, started before the main engine			
G	1996–2009	25 (1)	54.05 (2.5)	746	18	6.1–6.5
ECA	2002–2023	76 (1)	56 (2.5)	780		10.5
ES	2008–2018	8	53 (2.5)	775	21	
Ariane 6***	Since 2024		2 or 4 side engines, started before the main engine			
62		1 (mission not entirely successful)	63 (2)	530	10.35	4.5
64				860	21.65	12

Source: Author's own study.

* Despite the „later" number, Ariane 3 was used earlier than Ariane 2 – both were various modifications of Ariane 1

** Ariane 5 was built in 3 versions: G (Generic); ECA (Evolution Cryotechnique type A); ES (Evolution Stora-ble).

*** Ariane 6 is built in 2 versions: 62 (2 side engines) and 64 (4 side engines)

The consortium building these rockets also evolved – it was dominated by French companies:

- Aerospatiale (existed in the years 1970–2000, then joined the Airbus consortium and became part of EADS);
- Arianespace (established in 1980 as the world's first company involved in commercial space transport – launching cargo into space);
- EADS (a multinational aerospace and defence consortium, established in 2000, because its key segment was the production of Airbus aircraft; since 2014 it has changed its name to Airbus Group)
- ArianeGroup (established in 2015, specifically for the construction of Ariane 6, established by two French companies Airbus and Safran).

In addition to the „Ariane" rockets, which were supposed to be increasingly powerful and were supposed to achieve increasingly greater cargo launch capabilities to GTO, since 2012 a series of smaller Vega rockets has also been used: with a small payload, mainly for commercial use. „Vega" weighs 1376 tons, is 30 m high, can carry 1.5 tons of cargo on

LEO, the cost of 1 flight is 37 million USD. These rockets are manufactured by the Italian company Avio, 17 launches have been performed by the end of 2024, 2 of which had failures.

Comparing the list of European launch vehicles with similar designs from other countries, several regularities can be noticed. First of all, non-European designs are much cheaper – both in construction and operation. For example, the American equivalent of Ariane 5, which is Delta IV Heavy (Boeing), cost 2 billion USD as a program, and 1 flight is 225 million USD (with a noticeably greater load capacity on LEO and GTO). In turn, Falcon 9 Full Thrust (USA – SpaceX) cost less than 1 billion USD as a program, and a single flight costs 55–70 million USD. Russian Proton M/Briz-M and Angara 5 missiles, or Chinese Chang Zheng 5 are also much cheaper (no data on the overall costs of these programs). European missiles are also not significantly more efficient (less prone to failures) than others (apart from older types of Russian missiles).

Table 3: Technical data of launch vehicles used by non-European countries

Version	Years of use	Launches (including unsuccessful)	Flight/program cost (USD million)	Payload (tonnes) carried to orbit	
				LEO	GTO
Delta IV Heavy (USA – Boeing)	2004–2024	16 (1)	225 / 2000	28.8	13
Falcon 9 Full Thrust (USA – SpaceX)	2015	421 (1)	55–70 / < 1000	22.8	8.3
Proton M/Briz-M (Russia)	2001–2023	335 (41)	65–85 / n.d.	23	6
Angara A5 (Russia)	2014	4 (0)	100 / n.d.	24.5	5.4/7.5
Chang Zheng 5 (China)	2016	13 (1)	70 / n.d.	25	14

Source: Author's own study.

To sum up, in the competition for control of the commercial space flight market (launching payloads into orbit), European projects encounter strong American-Russian-Chinese competition and do not achieve a clear advantage in it.

Galileo satellite navigation system

The Galileo satellite navigation program is a very important and prestigious European project (Turczyński, 2014). The idea of building a navigation system in Europe was born in the 1980s. It is intended to be a system which could compete on equal terms with the systems built by the biggest superpowers:

- American GPS system (*Global Positioning System*) built from 1978 and functioning from 1995 (the only completely "global" system);
- Russian GLONASS system (*Global Navigation Satellite System*) built from 1976, functioning from 1995 (it mainly serves the territory of Russia)
- Chinese Bei-Dou system (the international name is COMPASS) built from 2000, functioning from 2003 (an experimental system that serves only China and the nearest area).

The main reason for building the European system was lack of trust in the existing systems, which at any moment could be turned off or disrupted by their owners. For example, the United States Department of Defence reserves the right to limit, and even shut down civilian access to GPS in the event of a conflict, when supporting the army will have a priority. What is more, these systems were designed as military projects, and later adapted to civilian needs, which limited their usefulness. GPS for civilian users was not only less accurate, but also deliberately distorted by a tolerance error of around 100 m to prevent accurately fixing the position of objects of Selective Availability (SA) (Troszyńska, 2006, pp. 43–50). After removing this limitation on 2nd of May 2000, the error tolerance of a measurement was reduced to 4–12 meters, which significantly improved accurate civilian navigation, but carried some risks while using the system for military purposes. An important experience for satellite navigation systems were terrorist attacks on the USA on 11th of September 2001. They had an effect that had not been expected before – Americans limited the operation of their GPS system only to military users – just as it was designed at first (by using an in-built blockade – the so-called "M-band").

The European Galileo system was designed to provide greater navigational precision than the American GPS – and operate independently of it. What is more, the technologies used in Galileo would make it unaffected by interference by Americans – unless they also blocked the emission of signal in their own GPS system.

The first phase of work on Galileo, called the „definition phase", lasted from 1999 to 2000. During this phase, the needs of future users of the system were analysed and the technical, economic, and software aspects of the project implementation were determined.

In 2002, the second phase of work, known as the ‚implementation phase', began and was scheduled to be completed in 2006. It included a detailed definition of technical parameters and the design of the ground, space, and user segments. In the first stage, completed on 22 December 2004, successful tests of the ground segment were conducted.

Third phase "phase of implementation" started on 28 December 2005, with launching of Galileo's first test satellite GIOVE-A from the Baikonur cosmodrome. The system's space segment was to consist of 30 satellites (27 operational and 3 spares), evenly distributed in three orbits, at an altitude of 23–23.5 thousand kilometres.

Work on Galileo dragged on. Initially, the project was to cost EUR 1.8 billion. Estimates from 2000 were already at €7.7 billion, of which €2.6 billion was to be borne by governments and the rest by private investors. In 2010, the think-tank Open Europe estimated the total cost of Galileo at €22.2 billion, fully covered by governments.

In October 2009, it was announced that orders for Galileo satellites of the Full Operational Capability (FOC) phase were reduced from 30 to 22 and that the construction of the earlier phase of In-orbit Validation (IOV) was delayed. Due to delays, it was decided to make the system available for use at the end of 2016 with 18 operational satellites in orbit, the full operational capability of the system was expected in 2020. Galileo started offering Early Operational Capability (EOC) on 15 December 2016, providing initial services with a weak signal. In October 2018, four more Galileo satellites were brought online, increasing the number of active satellites to 18. In 2020, the Galileo constellation consists of 3 IOV (In-Orbit-Validation) satellites and 21 FOC (Fully Operational Capability) satellites.

The service package of the Galileo system is to consist of:

- **Open Service (OS)** – free of charge service designed to determine horizontal coordinates to an accuracy of 4–15m, altitude to an accuracy of 8–35m and time.

- **Safety of Life Service (SoL)** – it will extend open service to include warnings concerning data integrity. Within a few seconds the user will be informed about the decrease in the accuracy of the position being determined, which is especially important in aviation, sea transport, etc.
- **Commercial Service (CS)** – will offer a greater accuracy (up to 0.8m vertically and up to 1m horizontally) and allow information to be sent from earth stations to users. Also, the quality of system functioning will be guaranteed. Access to this service will be by payment.
- **Public Regulated Service (PRS)** – will be available for selected users requiring a very high accuracy and reliability of data (*e.g.*, European institutions connected with national security, enforcement agencies). Apart from the data necessary for determining position and time, it will provide information connected with national security, transport, telecommunications, and energetics, etc.
- **Search and Rescue Service (SAR)** – will pick up distress signals, determine the location of the person sending the signal, and transmit the signal to rescue services. It will be integrated with the already functioning sea and air rescue system COSPAS-SARSAT. In the long-run, SAR should have a global range, and each satellite will be able to transmit a signal from the sender to the Rescue Co-ordination Centre (RCC). In the same moment, the system will send the signal to the sender to assure him/her that his/her situation is known and rescue is on the way.

The use of basic (lower-precision) Galileo services is free and open to everyone. A higher-precision service is available for free since 24 January 2023, previously only available to government-authorized users.

In total (by autumn 2024), 34 Galileo satellites have been placed in orbit: 2 test-EC, 4 In-Orbit-Validation, 28 Fully Operational Capability). Of this number, 3 satellites have been excluded (2 test, 1 IOV), 4 satellites are not used (all FOCs). 27 satellites are used: 3 IOV, 24 FOC.

Security challenges for the EU under the new European Commission

In the last three years, the European security architecture has been destroyed by Russia's invasion of Ukraine, as well as by the intensification of hybrid attacks against democratic states. Although these challenges were already defined during the previous term, the EC will continue the process of community adaptation to them. Hybrid attacks using the digital space, migrants, and manipulated information are an element of a strategy aimed at both weakening the EU and undermining the current international order. In the coming years, the EC will therefore face the need to develop a coherent and proactive approach of EU institutions and Member States in the international arena, especially towards global partners (Polkowska, 2021, pp. 64–67).

The EU's space and defence potential is significant and offers prospects for further development. The previously mentioned projects: the European anti-missile shield, the Galileo satellite navigation system, and the Ariane launcher program, can significantly strengthen Europe's position in this sector. Other projects can also be indicated – e.g., IRIS² (Infrastructure for Resilience, Interconnectivity and Security by Satellite) – a multi-orbit satellite internet constellation, announced by the Council of the EU in November 2022, planned to be deployed by 2027. Nevertheless, competition from Russia, China, and

especially the USA – poses serious challenges for Europe, especially when it comes to finding the right balance between the costs of undertaken projects – and their reliability.

The EC considers that deepening cooperation between Member States within the EU would facilitate a better response to these challenges. This may prove difficult in the context of the growing fatigue of some European societies with the multitude of crises, including those related to the war in Ukraine, irregular migration, climate change, or instability in the Middle East. Different perceptions of threats, as well as the need to strengthen the well-being of their own societies, may prompt states to limit cooperation. A particular challenge will therefore be to ensure an appropriate level of financing for the expansion of the European defence industry – it is already known that the planned EUR 1.5 billion under the negotiated EDIP will be insufficient. It will also be necessary to seek ways in the EU to achieve political consensus in foreign and security policy – especially in a situation where growing isolationist tendencies in the USA require the EU to take on increasing responsibility for security issues in its immediate neighbourhood. An important support could be the Security Action for Europe (SAFE) program announced by the EU on March 6, 2025. The European Commission will be called upon to issue up to €150 billion of funding by the end of the decade to help EU Member States increase expenditure on common defence procurement. EU borrowing for the financing of the new programme will enable competitively priced and attractively structured long-duration loans to requesting Member States. The terms of these loans benefit from the EU's strong credit rating, as well as high market demand for EU issuances and their liquidity. Another 650 billion euros will be spent on defence by EU member states – with the approval of the EU, which will not count these funds towards the debt limits.

However, the growing divergences in the approach of the Member States to the war in Ukraine and future relations with Russia may affect the perception of the long-term importance of this process and will hamper the initiatives of the new Commissioner. The appointment of Andrius Kubilius from Lithuania to this position is intended to reconcile the different interests of the Member States, as he combines a focus on the expansion of independent European capabilities with a pro-Atlantic attitude, which is presented by many Central European countries, including Poland. From the Polish perspective, it will be particularly beneficial to structure EU cooperation with NATO and strengthen the European contribution to the Alliance's activities.

The proposed portfolio of the Commissioner for Defence and Space complements the cooperation of states in the area of security and defence, which is to alleviate their concerns that the EC wants to increase its competences and influence on the defence policy of EU members, considered the most sensitive dimension of their sovereignty. It also creates an opportunity to organise and combine at the EU level security issues in all operational domains. Focusing on the development of military capabilities, mainly through the EDIP, may facilitate the resolution of some of the most pressing issues, *e.g.*, related to European defence production, and combining them with capabilities in the area of digital and space will help build a more comprehensive EU resilience to threats in the future. Such an approach will therefore create a basis for improving the security and position of the EU, especially in the face of intensifying global competition.

References

Ariane 6 vs Ariane 5: Running in Place or a Step Forward?. (2024, November 5). https://orbitaltoday.com/2024/11/05/ariane-6-vs-ariane-5-running-in-place-or-a-step-forward/

Balducci, L. (2021, August 16). *Europejska autonomia strategiczna – mit czy nadchodząca rzeczywistość?*. https://warsawinstitute.org/pl/europejska-autonomia-strategiczna-mit-czy-nadchodzaca-rzeczywistosc/

Combined Air Operations Centre Uedem (n.d.). https://ac.nato.int/about/caoc/uedem

Dankowski, J. (2021, October 26). *Autonomia strategiczna UE, Cz. I - czym jest i w jakim kierunku zmierza?* DEFENCE24. https://defence24.pl/geopolityka/autonomia-strategiczna-ue-cz-i-czym-jest-i-w-jakim-kierunku-zmierza

Die Zeit (2022, October 12). *Deutschland startet Initiative für neue Luftverteidigung*. https://www.zeit.de/news/2022-10/12/deutschland-startet-initiative-fuer-neue-luftverteidigung

Draghi, M. (2024, September 9). *The future of European competitiveness*, https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en

Dziennik (2014, October 22) *Komisarz Elżbieta Bieńkowska będzie odpowiadać za kosmos*. https://wiadomosci.dziennik.pl/swiat/artykuly/473084,juncker-komisarz-elzbieta-bienkowska-bedzie-odpowiedzialna-za-kosmos.html

European Commission (n.d.). *Space*. https://commission.europa.eu/topics/space_en

The Economist (2024, July 25). *European countries are banding together on missile defence*. https://www.economist.com/europe/2024/07/25/european-countries-are-banding-together-on-missile-defence

Fiszer, M. (2024, April 16), *Europejska „żelazna kopuła", czyli trzy piętra obrony. Jak to działa i dlaczego Polsce się opłaci*. Polityka. https://www.polityka.pl/tygodnikpolityka/swiat/2253161,1,europejska-zelazna-kopula-czyli-trzy-pietra-obrony-jak-to-dziala-i-dlaczego-polsce-sie-oplaci.read

Gotkowska, J. (2022, October 14). *Niemiecka inicjatywa „europejskiej tarczy przeciwlotniczej i przeciwrakietowej"*. https://www.osw.waw.pl/pl/publikacje/analizy/2022-10-14/niemiecka-inicjatywa-europejskiej-tarczy-przeciwlotniczej-i

Komisja Europejska (n.d.) *Nowy plan na rzecz trwałego dobrobytu i konkurencyjności w Europie*. https://commission.europa.eu/priorities-2024-2029/competitiveness_pl

Kozioł, A. (2021, June 14). *Wzmacnianie roli UE w zakresie cyberbezpieczeństwa*. PISM, publikacje 115. https://pism.pl/publikacje/Wzmacnianie_roli_UE_w_zakresie_cyberbezpieczenstwa_

Kozioł, A. (2023, August 7). *Ograniczone zdolności UE do cyberobrony*. PISM publikacje 106. https://pism.pl/publikacje/ograniczone-zdolnosci-ue-do-cyberobrony

Kozioł, A. (2024, November 13). *Zmiana w myśleniu strategicznym UE – powołanie komisarza ds. obrony i przestrzeni kosmicznej*. PISM, 168. https://www.pism.pl/publikacje/zmiana-w-mysleniu-strategicznym-ue-powolanie-komisarza-ds-obrony-i-przestrzeni-kosmicznej

Krzysztoszek, A. (2024, September 13). *Raport Maria Draghiego o konkurencyjności UE: Wszystko, co trzeba wiedzieć*. Euractiv. https://www.euractiv.pl/section/gospodarka/news/raport-maria-draghiego-o-konkurencyjnosci-ue-wszystko-co-trzeba-wiedziec/

Letta, E. (2024, April 20). *Much more than a Market; Speed, Security, Solidarity; Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*,

https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf

Michel, C. (2020, September 8). *Plan odbudowy: jak napędzić strategiczną autonomię Europy.* Brussels Economic Forum. https://www.consilium.europa.eu/pl/press/press-releases/2020/09/08/recovery-plan-powering-europe-s-strategic-autonomy-speech-by-president-charles-michel-at-the-brussels-economic-forum/

Miłosz, M. (2024, April 18). *Czy opłaca się nam dołączyć do wspólnej inicjatywy European Sky Shield?.* Forsal. https://forsal.pl/kraj/bezpieczenstwo/artykuly/9489979,czy-oplaca-sie-nam-dolaczyc-do-wspolnej-inicjatywy-european-sky-shield.html

MON (2024, April 17). *Informacja ws. European Sky Shield Initiative*. https://www.gov.pl/web/obrona-narodowa/informacja-mon-ws-european-sky-shield-initiative

NATO Integrated Air and Missile Defence (2025, September 19). https://www.nato.int/cps/en/natohq/topics_8206.htm

Onet (2024, February 16). *Europejska tarcza antyrakietowa się wzmacnia. Dwa nowe kraje.* https://wiadomosci.onet.pl/swiat/europejska-tarcza-antyrakietowa-sie-wzmacnia-dwa-nowe-kraje/2e71rsk

Onet (2024, Apri 16). *Donald Tusk: nad polskim niebem powinna powstać żelazna kopuła*, https://wiadomosci.onet.pl/kraj/donald-tusk-nad-polskim-niebem-powinna-powstac-zelazna-kopula/ry37jys

Onet (2024, April 16). *Europa zbuduje własną „żelazną kopułę"? Andrzej Duda: to niemiecki projekt biznesowy.* https://wiadomosci.onet.pl/kraj/europa-zbuduje-wlasna-zelazna-kopule-andrzej-duda-to-niemiecki-projekt-biznesowy/tzq3qlh

Rada Europejska (2019, June 20). *Nowy program strategiczny 2019–2024*. https://www.consilium.europa.eu/pl/press/press-releases/2019/06/20/a-new-strategic-agenda-2019-2024/

Rada Europejska, Rada Unii Europejskiej (n.d.). *Reakcja UE na pandemię Covid-19.* https://www.consilium.europa.eu/pl/policies/coronavirus/

Turczyński, P. (2022). *Unia Europejska a Europejska Agencja Kosmiczna – współpraca i rywalizacja w programach badania przestrzeni kosmicznej.* In: P. Turczyński & B. Smolik (Ed.). *Polityka kosmiczna UE. Zagadnienia prawne, polityczne i ekonomiczne* (pp. 49–81). Księgarnia Akademicka.

Turczyński, P. (2014). *European satellite navigation system "Galileo".* In: J. Dyduch, M. Michalewska-Pawlak & R. Murphy R. (Eds.). *European Union as a Global Actor. Political integration: identity issues and foreign policy* (pp. 227–241). Oficyna Wydawnicza Aspra.

Unijny kompas konkurencyjności. (2025, January 30). https://poland.representation.ec.europa.eu/news/unijny-kompas-konkurencyjnosci-2025-01-30_pl

Wachs, L. (2023, June 27). *Russlands Raketen und die European Sky Shield Initiative: die deutschen Pläne zur Luftverteidigung im Kontext der Bedrohungslage.* Stiftung Wissenschaft und Politik, SWP-Aktuell 2023/A 40.