BRIEFING
EU Legislation in Progress

European Parliament

EU secure connectivity programme
Building a multi-orbital satellite constellation

OVERVIEW

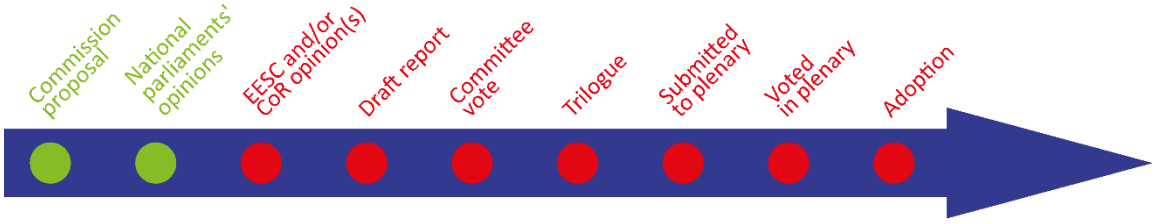
In the context of the twin digital and ecological transition, satellite communication is becoming a strategic asset for governments and civil society alike. Complementary to terrestrial networks, it can contribute to seamless digital communication, even when such networks are absent or disrupted. It builds on technological advances to ensure both low latency and global coverage, and the deployment of other emerging technologies such as quantum-based cybersecurity.

Today, the EU does not have the dedicated infrastructure (including space and ground segments) to offer satellite communication services to governments, the economy, and civil society. Several EU global partners and competitors are investing in parallel in such capabilities.

On 15 February 2022, the European Commission presented a proposal to improve the resilience of EU communications services by developing and operating multi-orbital connectivity infrastructure (with both space and ground segments) based on a public-partnership model. Governmental services would be operational from 2025, and private services at a later stage.

In the European Parliament, the Committee on Industry, Research and Energy (ITRE) is responsible for the file; rapporteur is Christophe Grudler (Renew Europe, France). In the Council, work is ongoing in the working party on space.

Proposal for a regulation of the European Parliament and of the Council establishing the Union Secure Connectivity Programme for the period 2023-2027		
Committee responsible:	Industry, Research and Energy (ITRE)	COM(2022) 57 15.2.2022
Rapporteur:	Christophe Grudler (Renew, France)	2022/0039(COD)
Shadow rapporteurs:	Massimiliano Salini (EPP, Italy) Ivo Hristov (S&D, Bulgaria) Niklas Nienass (Greens/EFA, Germany) Matteo Adinolfi (ID, Italy) Evžen Tošenovský (ECR, Czechia)	Ordinary legislative procedure (COD) (Parliament and Council on equal footing – formerly 'co-decision')
Next steps expected:	Publication of draft report	



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PE 729.442 – May 2022

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Introduction

In the twin digital and ecological transition, connectivity is gaining importance as a key element of societal resilience. Satellite communication connectivity, in particular, is becoming a strategic asset that enables the continuity of critical infrastructure operations, crisis management, and surveillance and security activities, such as border control.

However, satellite communication is a finite resource: only a limited number of orbits are available to operate communications constellations, composed of satellites orbiting at different levels (low earth orbit (LEO), medium earth orbit (MEO), geostationary orbit (GEO)).[1] While the EU and its Member States currently rely on a limited number of geostationary satellites for governmental communications services, other spacefaring nations have already launched satellite constellations. This allows for a wider geographical coverage, but reduces the orbits available for other similar constellations.

The February 2022 European Commission proposal aims to develop and deploy an EU-owned multi-orbital satellite constellation, to provide worldwide, uninterrupted access to secure satellite communication services – primarily for the EU institutions and Member State governments, but also for commercial purposes.

Context

The proposal builds on the latest technological developments to set up and operate space-based infrastructure. Embedded in EU industrial policy, it faces specific risks linked to the growing use of space, as well as security risks.

The technological state of play allows for the deployment of space communications infrastructure, to ensure connectivity continuity both in space (e.g. ensuring broadband connection to remote places) and time (e.g. as substitute in the case of a disruption of the terrestrial networks due to an environmental or human-made emergency). MEO and LEO satellites ensure low latency communications services, including for high-speed internet. The capacity to manufacture and operate these satellites also facilitates global coverage of communications services. Moreover, space communications infrastructure is an opportunity for deploying emerging technological systems to strengthen cybersecurity, such as quantum key distribution (a cryptographic protocol enabling two parties to produce a shared random secret key known only to them). This makes it possible to build a certified end-to-end quantum communication infrastructure, including its space-based infrastructure, as outlined in the declaration on the European quantum communication infrastructure (EuroQCI).

The deployment of an EU space communication infrastructure calls for reducing the risks associated with the growing activity in space. According to the joint communication by the Commission and the High Representative of the Union for Foreign Affairs and Security Policy on an EU approach for space traffic management, more than 20 000 additional satellites are expected to be launched over the next decade. This raises issues relating to the allocation of specific radio-frequency bands and services; the relevant United Nations agency – the International Telecommunication Union (ITU) – is currently tightening the requirements for these allocations to the agency's member states. Furthermore, beyond active satellites, the increase of space debris, particularly in LEO, poses a specific challenge in terms of the continuity of operation of these constellations.

The Commission proposal is set in the context of a dynamic global space market, and the renewed EU industrial policy towards space. Public spending still represents the bulk of global investment in space; however, over the past two decades, there has been a surge in private investment, corresponding to new business models: the 'new space'. Globally, space ventures have attracted over €14.8 billion of investment, including €3.3 billion in debt financing between 2000 and 2017. In order for EU innovation and industrial space ecosystems to reap the full benefits of the 'new space', the Commission adopted an action plan on synergies between civil, defence and space industries.

The proposal puts forward a holistic, 'capability driven' approach, which intends to ensure continuous dialogue between industry and users, and facilitate technological dissemination across both the EU Member States and the economy. It also aims to contribute to the inclusion of newcomers, such as small and medium-sized enterprises (SMEs), in the EU space market.

Existing situation

The Treaty of Lisbon established EU space policy as a shared competence of the EU and its Member States. In 2013, following the entry into force of the Treaty, the European Council welcomed the preparation for the next generation of governmental satellite communications through cooperation between the Member States, the Commission and the European Space Agency (ESA). At the same time, the European Defence Agency (EDA) carried out a demonstration project (the 'GSC demo'), which established a governmental pooled capability to provide satellite communications services that cannot be obtained on the commercial market with sufficient level of guaranteed access and security. The 15 Member States[2] contributing to GSC demo accepted the project arrangement as baseline for mutual support and collaboration; Norway was associated with the initiative. The main outcomes notably include specific recommendations on infrastructure security, and an outline of user requirements to facilitate uptake.

These first initiatives fed into an initiative to establish EU governmental satellite communications in the 2021-2027 multiannual financial framework (MFF). In 2017, the Commission noted that, while an EU governmental satellite communications policy does not exist, more and more EU initiatives (such as on the Arctic) refer to governmental satellite communications as a key asset for crisis management, disaster response, and police, border and coastal surveillance.

This growing importance was reflected in the inclusion of a specific component for EU governmental satellite communications ('GOVSATCOM') in the 2021-2027 EU space programme (Regulation (EU) 2021/696). GOVSATCOM aims to provide a satellite communication service under civil and governmental control, enabling the provision of satellite communication capacities and services for the EU and Member State authorities managing security-critical missions and infrastructures. It includes the development, construction and operations of the ground segment infrastructure; the procurement of governmental and commercial satellite communication capacities and services; and the measures necessary to further interoperability and standardisation of GOVSATCOM user equipment.

Other EU programmes also help support GOVSATCOM infrastructures and services, not least the EU research and innovation framework programmes, Horizon 2020, which is supporting 'Entrusted', a collaborative project with 18 participants, from 2020 to 2023. The project is expected to provide insight into current and evolving user needs, which will be translated into a set of consolidated and prioritised user requirements for future GOVSATCOM services. It will also define a roadmap for research and innovation on the future GOVSATCOM user technology. Horizon Europe, the new EU framework programme for research and innovation, is supporting the further development of GOVSATCOM services. More specifically, under the digital-industry-space cluster, the 2021-2022 Horizon Europe work programme has published two topics for an overall investment of up to €17 million to support the development of quantum technologies for space gravimetry.[3]

Today, EU satellite communications capacities for governmental services rely on a limited number of GEO satellites. This communication infrastructure, which differs from the satellites providing navigation and position services, such as Galileo, or earth observation services, such as Copernicus, is under the steer of only a few Member States[4] that either own or control the infrastructure through public-private arrangements. However, the current infrastructure has two limitations: on the one hand, it covers mostly only the European continent, leaving the rest of the world uncovered. In addition, most of it used for military purposes, which are not always compatible with another complementary service. On the other, current EU capacities are not matching the pace of

technological development. More specifically, no LEO or MEO satellite would respond to evolving user needs, such as the capacity to provide worldwide service.

Following its above-mentioned 2012 conclusions on governmental satellite communications, the European Council updated its political guidance on space-based connectivity. On 10 March 2022, it agreed to invest further in cybersecurity and space-based connectivity.

Comparative elements

In the United States (US), several private initiatives, at different conception and deployment stages, aim to ensure broadband connectivity through a LEO constellation. A 2021 report by the Congressional Research Service shows that, with more than 1 730 satellites already launched (out of 42 000 planned), SpaceX is the largest constellation active so far, also in governmental services. SpaceX has been supported by public investment, mostly through auctions (auction 904) organised by the US Federal Communications Commission. In 2020, SpaceX won a total of around €837.4 million ($885.5 million) over 10 years for the delivery of broadband service spread over 35 states. This decision is challenged by several SpaceX competitors, hinting at the legal and economic uncertainties associated with the bottom-up logic of the public investment. China also considers developing and deploying a constellation of up to 13 000 satellites, as part of its 14th five-year plan. Based on spectrum allocation filings submitted to the ITU by China, the initiative would consist of sub-constellations ranging from 500 to 1 145 kilometres in altitude, with inclinations of between 30 and 85 degrees. The satellites would operate across a range of frequency bands.

Parliament's starting position

In its resolution of 25 November 2020 on a new industrial strategy for Europe, the Parliament recalled the importance of connectivity infrastructures for the deployment of the digital transition. It also highlighted the importance of EU space policy as a lever in support of technological development to harness industrial transformation for advancing the twin transition.

In its resolution of 10 June 2021 on the EU's cybersecurity strategy for the Digital Decade, the Parliament stressed the necessity of relying on an ultra-secure connectivity infrastructure to ensure the security of digital communications. It therefore welcomed the preparation of an EU space-based global secure communications initiative, integrating quantum encryption technologies. It also recalled the need for continuous efforts to secure European space activities, also in cooperation with the EU Agency for the Space Programme (EUSPA) and ESA.

In its resolution of 6 October 2021 on the future of EU–US relations, the Parliament reiterated the importance of EU–US space cooperation, and welcomed the commitment to strengthen that cooperation. Parliament went even further, calling for enhanced EU–US cooperation in the core field of connectivity diversification through all possible mechanisms.

In its resolution of 17 February 2022 on the implementation of the common security and defence policy, the Parliament welcomed the proposal on an EU secure connectivity programme, calling for the rapid completion of this project to improve the level of telecommunications security in the EU. It also underlined the growing risk of cyber and physical attacks on European and Member State satellites, and insisted on the need to prevent such attacks, and to put in place defensive mechanisms against them.

Council and European Council starting position

The Council of the EU has been supporting and promoting an EU space-based connectivity in several configurations, mainly competitiveness and foreign affairs. On 29 November 2019, the Competitiveness Council adopted conclusions on space solutions for the Arctic, which mentioned the relevance of satellite communication. The Council noted that, in the future, the EU space programme's governmental satellite communications component 'could provide solutions for the

needs for secure communication for public authorities in the region, in particular as regards communication associated with search and rescue'. With a set of conclusions of 28 May 2021 on 'new space' for people, the Competitiveness Council took note of the preparation of the EU secure connectivity programme. It also emphasised the need to reinforce European strength towards a more innovative, resilient and competitive space sector in areas such as space-based secure connectivity. On 21 March 2022, the Foreign Affairs Council adopted the Strategic Compass for Security and Defence. The compass contains two main elements regarding satellite communication: on the one hand, it considers that the outer space and the cyber-space are to be deemed global commons, such as the ocean. On the other, satellite communication is characterised as one of the assets on which the compass is to be deployed through the launch of the forthcoming EU secure connectivity programme.

Preparation of the proposal

Recital 104 of Regulation (EU) 2021/696 establishing the 2021-2027 EU space programme mentions that, until 2025, the Commission should procure GOVSATCOM capacities from Member States with national systems and space capacities, and from commercial satellite communication or service providers, taking into account the EU's essential security interests. If a detailed analysis of future supply and demand were to reveal that this approach is insufficient to cover the evolving demand, it should be possible to move to a second phase, and develop additional bespoke space infrastructure or capacities through one or several public-private partnerships, e.g. with EU satellite operators.

Since 2020, the Commission has procured two studies to prepare the initiative. First, following the action plan on synergies among civil, defence and space industries, the Commission issued a tender to outline the space infrastructure's possible architecture, and its exploitation model. The study was awarded to a consortium of eight main players[5] from the European space upstream sector. The conclusions have not been made public; however, the study was discussed several times with Member State representatives in 2021, including during a meeting of the Council working party on space on 26 October 2021. From the published information available, one can conclude that the study methodology follows a capability-driven approach. This means that both the latest technological developments in the field and the user requirements define the operational objectives and the architecture of the systems outlined. Following the launch of the first study in 2021, the Commission issued a second tender, to assess innovative approaches towards a secure space connectivity system, and explore ways in which the initiative could also support commercial activities.

Between 31 August and 23 September 2021, the Commission organised a public consultation to gather stakeholder view, in particular regarding six policy options: no additional EU action; EU fully owned space infrastructure; fully private infrastructure; concession; availability model; and minority stake in a non-EU constellation. Among the 13 answers received, the public-private options (concession and availability model) gathered most support.

The changes the proposal would bring

The proposal aims to develop a multi-orbital infrastructure ensuring the long-term availability of worldwide, uninterrupted access to secure and cost-effective satellite communication services, and the provision of commercial services by the private sector. The infrastructure will be composed of a ground segment and a space segment that may include the construction and launch of up to 170 LEO satellites between 2025 and 2027. To ensure the initiative's efficiency, a public-private partnership under the concession model is expected to allow for the provision of governmental and commercial services. The concessionaire would be tasked with the operations, maintenance and necessary upgrades of the system (except for security assets such as the quantum encryption part, or the security monitoring services directly operated by the EU). In turn, the EU could commit to appropriate long-term service payments to cover provision of services for EU institutions and

Member States. The concessionaire would also bear all costs relating to the provision of commercial services, and any additional infrastructure cost. Beyond the provision of secure communication services, the proposal is also intended to support space industry actors across the EU, and the components of the 2021-2027 EU space programme.

Article 3(2) of the proposal spells out five specific objectives:

Improving the resilience of EU communication services by developing and operating a multi-orbital connectivity infrastructure. Articles 5 (infrastructure of the secure connectivity system), 15 (implementation model) and 16 (ownership and use of assets) set the main rules for building and operating the infrastructure segments both in space and on the ground. Article 5 defines the infrastructure's overall, modular architecture, which consists of a governmental and a complementary commercial part. Both parts include ground and space assets. The governmental infrastructure's (ground asset) centres should be located inside the EU. A centre located outside of the EU would be subject to a hosting agreement in accordance with Article 218 of the Treaty on the Functioning of the EU (TFEU). While article 15 of the proposal provides for an implementation model based on contracts, including a concession contract, article 16 establishes that the EU must be the owner of all tangible and intangible assets corresponding to the governmental infrastructure.

Contributing to cyber resilience and operational cybersecurity, including by integrating the EuroQCI's space and ground segments. Security is a cross-cutting theme in the proposal (as suggested by the inclusion of the adjective 'secure' in its title). Given the proposal's objective of ensuring the availability of worldwide, uninterrupted communication services, there are two security aspects at stake: first, the security of the infrastructure as a whole (space and ground segments). Chapter VI (articles 26 to 35) mirrors the security framework enshrined in Article 33 of Regulation (EU) 2021/696. Second, the security of the provision of governmental communications services, which is specifically addressed through several rules. For instance, article 9 sets out a restrictive definition of the programme participants, which includes only Member States, the Council, the Commission and the European External Action Service. However, EU agencies and bodies may also become participants, and third countries and international organisations may be associated. Moreover, the provision of secure connectivity is linked with the infrastructure's capacity to integrate any relevant technological development, such as the EuroQCI mentioned in article 4(1)(b).

Improving the EU space programme's other capabilities and services. The programme is structured around five components, also delivering positioning and timing data (Galileo), earth observation data (Copernicus), and satellite communication capacities and services. The GOVSATCOM component pools these capacities and services, and provides them free of charge for governmental and institutional users. The proposal includes several rules to ensure the linkage with the services established under the EU space programme. Article 7 (definition of services portfolio) specifies that operational requirements for governmental services should take into account those laid down under the GOVSATCOM component services. Article 8 (governmental services) states that the access to governmental services is free of charge, ensuring the alignment with GOVSATCOM.

Encouraging the deployment of innovative technologies by leveraging the 'new space' industry. The proposal entails the construction of space and ground infrastructure, the modularity of which, as presented above, allows for the provision of governmental and commercial services. The proposal supports the space industry under both the development and operation of the secure connectivity system. Article 6 (actions in support of an innovative and competitive EU space sector) lays down a general obligation to support an innovative and competitive space sector in the EU. It sets out specific support for the participation of SMEs in constructing the infrastructure, and overarching support for the participation of women innovators – also to be achieved through establishing equality and inclusion goals. Article 5 (infrastructure of the secure connectivity system) mentions in its paragraph 5 specific support for the EU space launch sector. Article 7 (definition of services portfolio) includes a specific set of obligations regarding the commercial services to be

provided with the infrastructure. More specifically, appropriate safeguards will prevent distortions of competition to avoid any conflict of interest, undue discrimination, and any other hidden indirect advantages to the contractor.

Ensuring high-speed broadband and seamless connectivity throughout the EU, removing communication dead zones, and enabling connectivity over geographical areas of strategic interest. The objective of providing high-speed broadband throughout the EU is set out in article 3 (programme objectives). It includes the obligation to ensure the long-term availability of worldwide, uninterrupted access to secure and cost-effective satellite communication services, and also applies to commercial services. Recital 22 specifies that commercial services could help remove communications dead zones and increase cohesion across Member State territories, including rural, peripheral, remote and isolated areas and islands. The provision of worldwide access allows for areas outside of Europe, such as the Arctic and Africa, to be covered. Chapter VII (articles 36 and 37) on international relations provides the legal basis for the association of third countries to the programme according to Article 218 TFEU, and for the use of the governmental services by third countries and international organisations, under the same Treaty rule. Recital 60 notes that international partners, their governments and citizens will be recipients of the programme's array of services, with accrued benefits to the international cooperation of the EU and its Member States with these partners.

Chapter III (articles 11 to 14) on budgetary contribution and mechanisms sets out the programme **budget** and **governance**. Article 11 (budget) provides for the commitment of up to €1.6 billion (in current prices) from the MFF for the period from 1 January 2023 to 31 December 2027: €0.95 billion from Heading 1, €0.5 billion from Heading 5, and €0.15 billion from Heading 6. The proposal also allows up to €0.8 billion to be earmarked for investments across other MFF programmes: Horizon Europe (up to €0.43 billion), the EU space programme (up to €0.22 billion) and the Neighbourhood, Development and International Cooperation Instrument (up to €0.15 billion).

Programme governance is set out in chapter V (articles 21 to 25). It defines the roles of Member States, the Commission, EUSPA and ESA. Overall responsibility for implementation lies with the Commission, which may entrust EUSPA and ESA with tasks under indirect management. Chapter VIII on programming, monitoring, evaluation and control (articles 38 to 41) notably states that the Commission must evaluate the programme three years after the regulation's entry into force, and every four years after that.

Advisory committees

The European Economic and Social Committee is currently preparing two opinions, to be adopted during its September 2022 plenary session: an opinion on the space package (rapporteur J.P. Coulon, Workers – Group II / France), and an opinion on 'new space' (rapporteur Maurizio Menzi, Diversity Europe – Group III / Italy).

National parliaments

National parliaments have been consulted on this proposal. No reasoned opinions on the grounds of subsidiarity were submitted by the deadline 2 May 2022.

Stakeholder views

Following adoption of the Commission proposal, stakeholders have generally reiterated support for the initiative, conveying their views on specific rules in more detail. For instance, in a March 2022 paper, ASD Eurospace, for the European space manufacturing industry, reaffirms its overall appraisal of the initiative. It stresses, in particular, the relevance of an EU space-based secure communication system, to support the EU industrial and scientific sectors' competitive edge, and the EU's capacity to act in space, which is part of EU strategic autonomy. As for the proposal, ASD Eurospace raises

concerns about the scope of the definition of 'new space' (article 2), which includes only SMEs and start-ups in its current version.

More broadly, other stakeholders also referred to the linkages between EU space investments and other policy priorities, such as sustainability and education.

As for sustainability, it is worth mentioning that the initiative was tabled back to back with a communication on space traffic management. In 2021, following an initiative by the World Economic Forum, an international consortium including ESA developed a space sustainability rating intended to influence the behaviours of spaceflight actors, especially commercial entities, and disseminate sustainable practices. Other stakeholders have pointed to the contribution of space investment to the association and dissemination of key emerging technologies, such as artificial intelligence, machine learning, additive manufacturing, blockchain or quantum. In a March 2022 paper on space education in Europe, the European Space Policy Institute (ESPI) highlights the links between the space sector and other technological and scientific fields. The growing interactions between space and other areas, including fields such as policy, business, and law, call for the integration of new competences in space study programmes. According to ESPI, this includes not only higher education, but also professional training programmes, which are increasingly necessary to prepare the workforce for addressing emerging trends, and attracting new professional profiles to the space sector.

Legislative process

The file was assigned to Parliament's Committee on Industry, Research and Energy (ITRE), with the rapporteur Christophe Grudler (Renew Europe, France). The Committee on Budgets (BUDG) has appointed José Manuel Fernandes (EPP, Portugal) to prepare an opinion. In parallel, the Council has launched an examination of the proposal in its working party on space.

EUROPEAN PARLIAMENT SUPPORTING ANALYSIS

Evroux C., EU space policy: Boosting EU competitiveness and accelerating the twin ecological and digital transition, EPRS, European Parliament, February 2022.

Space Market, Policy Department for Internal Policies, European Parliament, December 2021.

The European space sector as an enabler of EU strategic autonomy, Policy Department for External Policies, European Parliament, December 2020.

OTHER SOURCES

Union secure connectivity programme for the period 2023-2027, Legislative Observatory (OEIL), European Parliament.

ENDNOTES

[1] A geostationary satellite is an earth-orbiting satellite located at an altitude of approximately 35 800 kilometres (km) over the equator that revolves in the same direction the earth rotates (west to east). A medium earth orbit satellite is an earth-orbiting satellite located at a lower altitude than a geostationary satellite, usually occupying the space between 5 000 and 12 000 km. A low earth orbit satellite is an earth-orbiting satellite located at an altitude comprised between 800 and 1 600 km above the surface.

[2] Belgium, Germany, Estonia, Greece, Spain, France, Italy, Latvia, Lithuania, Luxembourg, Austria, Poland, Portugal, Sweden and the United Kingdom (until 31 December 2020).

[3] A gravimeter is an instrument measuring variations in the earth's gravitational field by detecting differences in weight of an object of constant mass at different points on the earth's surface.

[4] In 2013, according to ESA, only five Member States were operating such an infrastructure (Germany, Spain, France, Italy and the United Kingdom). Since then, other Member States have been investing and launching similar infrastructure, such as Belgium and Luxembourg.

[5] Airbus, Arianespace, Eutelsat, Hispasat, OHB, Orange, SES, Telespazio and Thales Alenia Space.

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