European Parliament

European space policy

Historical perspective, specific aspects and key challenges

IN-DEPTH ANALYSIS

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This publication aims to provide an overview of European space policy based on an historical perspective of the involvement of the European Union (EU) in the field. The in-depth analysis focuses on the role played by the different EU institutions and the European Space Agency in defining and implementing a space policy in Europe and the current issues and challenges.

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EXECUTIVE SUMMARY

In the 1950s, development of the space sector in Europe was limited to investments made by individual Member States (France, Italy, the United Kingdom). The failure of the first European partnerships in space activities in the 1960s led to the establishment of the European Space Agency (ESA), an intergovernmental institution, in 1975. ESA allowed Europe to develop its capacities by supporting the upstream space sector: designing and developing European launchers, developing an emerging satellite industry, and implementing programmes for space science and space exploration.

In the 1980s and 1990s, two evolutions triggered European Community involvement in the space sector. On the one hand, space capacity and infrastructure led to the development of a downstream space sector (telecommunications, satellite navigation, and earth observation services) that impacted on European societies. On the other, the Community progressively acquired competencies in additional policy areas and played a stronger role in regulation of the space sector.

At the turn of the century, the European Commission established links with ESA, developing a joint space strategy in 2000, and a space policy in 2003. The Commission also developed flagship space programmes: Galileo for satellite navigation and Copernicus for earth observation. These programmes were funded by the European Union (EU) and developed in collaboration with ESA in the framework of the 2004 agreement between the Union and the agency. European space policy was updated in 2007, dividing roles between ESA (upstream sector) and the EU (downstream sector).

In the following years, the security and defence aspects of space policy, space infrastructure security, autonomy and access to space, and the 'non-dependence' of the European space sector gained importance. The Commission developed an EU industrial policy for space, and set up a programme on space surveillance and tracking (SST) to protect European space infrastructures. Discussions began on the opportunity to set up a programme for governmental satellite communications (Govsatcom). These new initiatives were integrated in the European space strategy adopted by the European Commission in October 2016.

The introduction of space as a shared competence between the EU and the Member States in the European treaties in 2009 gave the Union a stronger role in the field. The asymmetry between the EU and ESA in terms of membership and voting rights, financial rules and uptake of security and defence matters implied an assessment of their roles and their relationship. Different options for ESA's development were discussed between 2012 and 2016 to address the situation, but no decision was taken.

The governance of European space policy is shared between the EU, ESA and the member states. This situation provides the latter with a certain degree of flexibility. Nevertheless, it creates inefficiencies in areas such as support for research activities in the space sector, development of international relations, and implementation of European space programmes.

In an evolving environment where the private sector is developing strong capacities and playing a more active role, the EU, ESA and their member states face key challenges if Europe is to keep its position as a space power: maintaining independent access to space, increasing efficiencies by developing synergies between civil and defence space programmes, securing space infrastructures, ensuring uptake of space data and services, and adopting a long term vision and financial commitment to increase private investment in the sector.

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List of main acronyms used

EDA	European Defence Agency
EEAS	European External Action Service
EGNOS	European Geostationary Navigation Overlay Service
ESA	European Space Agency
ESP	European Space Policy
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite Systems
GOVSATCOM	Government Satellite Communications
GSA	European GNSS Agency
SSA	Space situational awareness
SST	Space surveillance and tracking

1. Introduction

In October 2016, the European Commission adopted a space strategy for Europe aiming to provide a clear framework for the development of the space sector in Europe.[1] This communication marked the prominent role of the Commission in the definition of European space policy. However, European space policy coordination remains a complicated endeavour, as governance of the sector is shared between the European Union (EU), intergovernmental institutions such as the European Space Agency, and the different member states of these institutions.

2. Historical overview

2.1. First European cooperation in space

Until the beginning of the 1960s, space was a national activity, with France and the United Kingdom leading the development of space programmes. The first European initiative, the European Preparatory Commission for Space Research (*Commission Préparatoire Européenne de Recherche Spatiale*, COPERS), emerged from work by European space scientists in March 1961. This preparatory work led to 10 European states establishing the European Space Research Organisation (ESRO) under a convention signed in 1962.[2] In parallel, activities to develop launchers led to the establishment of the European Launcher Development Organisation (ELDO), coordination structure between six European states set up by a convention also signed in 1962.[3]

The European Space Conference (ESC), established under ELDO in 1966, became the main forum for European space policy discussion. Faced with the difficulties of managing both organisations and ELDO's failure,[4] the ESC began to discuss merging ESRO and ELDO into a single agency in 1972.[5] Ten European states[6] signed the convention[7] establishing the European Space Agency (ESA) on 30 May 1975.

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1 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions on a 'space strategy for Europe', COM(2016) 705.

2 Belgium, Denmark, the Federal Republic of Germany, France, Italy, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom.

3 Belgium, the Federal Republic of Germany, France, Italy, the Netherlands, and the United Kingdom, with Australia as an associated member.

4 All attempts to launch the three stage Europa launcher developed by ELDO failed.

5 For more information on the history of ESA and its preceding organisations, see ESA, A History of the European Space Agency Part I and Part II, April 2000. See also the ESA website.

6 The ESA founding member states were the same as ESRO member states. The current member states are Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the UK. Canada is an associate member. Bulgaria, Cyprus, Lithuania, Malta have signed cooperation agreements with ESA. Latvia, Slovenia and Slovakia participate in the plan for European cooperating states (Figure 2).

7 ESA Convention and Council Rules of procedure, ESA, 2010.

The European Space Agency

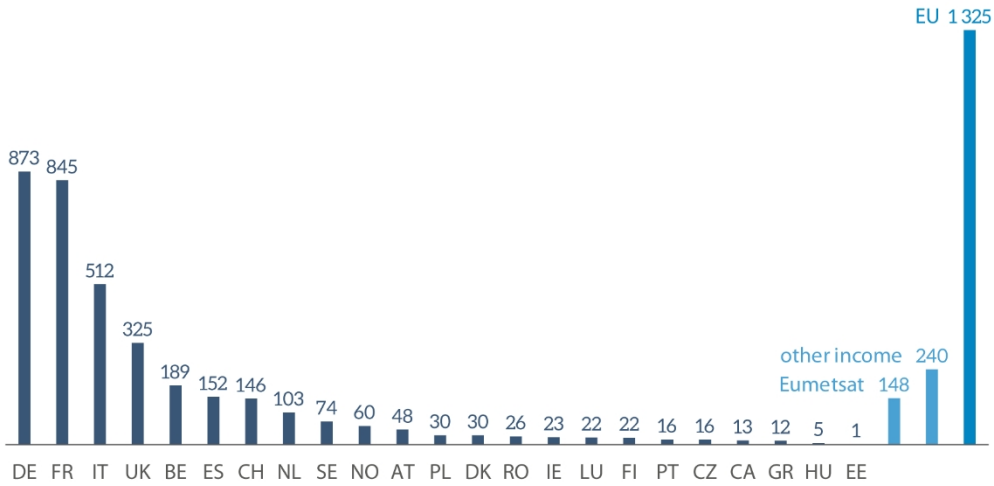
The European Space Agency (ESA) is an intergovernmental institution established by a convention signed in 1975. As the European research and development space agency, ESA develops and implements a common space programme defined by its 22 member states. The council of member states is the agency's governing body. ESA's Director General, elected by the council for four years, implements the council's decisions. ESA remains outside the scope of the EU institutions.

All ESA member states participate in the mandatory programme covering scientific research activities. Each member state can also participate in optional programmes on launcher development, and space applications research and development (R&D), such as earth observation, navigation, telecommunications, human spaceflight and exploration. The mandatory programme initially represented the largest part of ESA activities but is now limited to around 15 % of the budget. ESA also acts as the implementing agency for EU space programmes. In 2016, member state contributions represented 71 % of ESA's €5.2 billion budget. EU contributions make up 25 % of the agency's budget (Figure 1).

ESA's industrial policy is based on the principle of 'fair return' (*juste retour*), under which procurements for industry follow a geographical distribution matching member state budgetary participation in a given activity. The flexibility offered to the member states by the existence of the mandatory and optional programmes and the fair return policy led to the development of a strong European space industry.

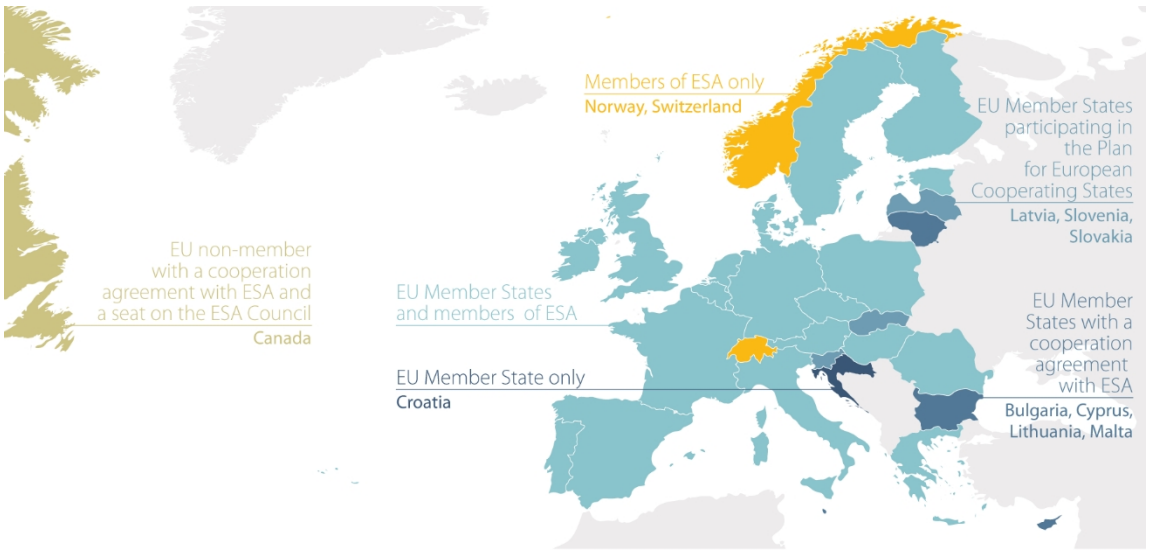
The Agency's main successes include development of launcher programmes Ariane and Vega, scientific missions such as the recent Rosetta/Philae mission to an asteroid, and participation in international space station activities.

Figure 1 – Provenance of the ESA budget for 2016 (in € million)



Source: European Space Agency.

Figure 2 – EU and ESA member states



Source: EPRS

2.2. Space in the European institutions

2.2.1. The European Parliament requests action

In 1979, the European Parliament adopted its first resolution[8] on European Community participation in space research. It **insisted on the benefits that the Community could derive from space activities** (telecommunications, earth observation, scientific research), as well as the industrial benefits of space programmes. The Parliament also believed that Europe had to maintain its autonomy and that the 'Community could play a decisive role in space only if it draws up a space policy setting out long-term objectives'. The European Commission was invited to assist and cooperate with ESA in preparing and implementing a comprehensive space programme.

The first flight of the American space shuttle on 12 April 1981 triggered the adoption of a new resolution on European space policy.[9] The **European Parliament asked the Member States and the European Community to increase their efforts on space activities**. Parliament requested the 'immediate formulation of a powerful and coherent long-term policy on space applications' and asked that ESA formulate a more ambitious space policy. The Parliament urged the Council to call a European Space Conference at ministerial level.

Following the success of ESA's launch of meteorological satellite Meteosat in 1977, the agency's member states decided to create a new intergovernmental organisation, the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). The EUMETSAT convention, signed in 1983, entered into force in 1986.[10]

In the 1980s, ESA led the development of European space policy. In 1985, it began to adopt 'a coherent, complete and balanced long-term European space plan' to orient the

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[8] European Parliament resolution on Community participation in space research, OJ C 127, pp. 42–43, 21 May 1979.

[9] European Parliament resolution on European space policy, OJ C 102, pp. 102-104, 12 October 1981.

[10] EUMETSAT has now 30 member states: all EU Member States except Malta and Cyprus, Iceland, Norway, Switzerland, and Turkey. Serbia is a cooperating state. The EUMETSAT convention can be found on the organisation's website.

European space programme.[11] However, in June 1987, the Parliament considered that the time had come 'for the European Community to work out a coherent policy on space activities'.[12] Parliament requested the Commission draft a communication on space policy and proposed that the European Community should become a member of ESA.

EUMETSAT

EUMETSAT was founded under a convention in 1983 as an intergovernmental organisation. It operates a system of meteorological satellites and supplies the data collected to national meteorological services. EUMETSAT cooperates with ESA to develop the satellites required by the organisation, while EUMETSAT develops ground systems to deliver its products and services to users. The governance of the organisation is similar to that of ESA, with a council representing the member states adopting the programmes and a Director General in charge of their implementation.

2.2.2. European Commission initial involvement

In July 1988, the European Commission issued its first communication regarding space policy,[13] providing three reasons for its involvement in the field. First, following the adoption of the Single European Act in 1986, Commission competences had increased in different domains affecting space activities, especially R&D. Second, the establishment of the single market would have an impact on the regulation of space activities. Third, the benefits derived from the applications of space exploitation such as telecommunications or earth observation would affect European society.

Despite ESA successes, the Commission pointed out that 'Europe is still without a cogent overall policy' on space. The Commission suggested that the Community should **strengthen its links with the ESA** to ensure coherence and complementarity, frame **policies to support European space industry** and ensure that the actions of Member States, ESA and other European organisations remained **consistent with Community law**. The Commission proposed six lines of action, covering the topics suggested by the European Parliament in 1987: on R&D, telecommunication, earth observation, industrial development, legal environment, and training.

A resolution[14] on European space policy, adopted by the Parliament in October 1991, called on the Commission to support the development of an economic, legal and commercial environment that could support space industries. It asked 'the Commission, Council and Member States to stimulate or initiate major international, technical and scientific cooperation in the space sector'.

2.2.3. A visionary report on European space policy

The expert report 'Crossroads in Space', produced for the Commission and published in November 1991, acknowledged that Europe must retain its **independent and reliable launch capability as a strategic necessity**.[15] The experts noted the absence of an overall European strategy for earth observation, a sector which could be 'the most important of future space activities' for the European Community, and advised the Commission to

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[11] ESA Council resolution on the long-term European space plan, 31 January 1985. The European long-term space plan was frequently updated, for example in 1987 and 1992.

[12] European Parliament resolution on European space policy, OJ C 190, pp. 78-80, 20 July 1987.

[13] The Community and space: a coherent approach, Commission of the European Communities, COM(88) 417, 26 July 1988.

[14] European Parliament resolution on European space policy, OJ C 305, pp. 26-27, 25 November 1991.

[15] Commission of the European Communities, The European Community crossroads in space, 1991.

take the initiative on this topic. The report also suggested that the Commission should maximise spin-off opportunities from space-related activities.

The panel proposed **better coordination** of all European space-related activities. The experts expressed their view that the defence and civil aspects of space policy should be considered together, avoiding the development of completely separate, and parallel, defence space capacities. The panel concluded that the European Community needed a coherent long-term strategy for its space-related activities and that better internal coordination within the Commission was an essential prerequisite to an enhanced Community role in the space arena. Most of the priorities stressed in this report remain at the top of the current European space policy agenda.

2.2.4. European space actors in a new geopolitical context

By September 1992, the dissolution of the Soviet Union, the rise of new space powers and the development of the European Union and the single market had affected the overall context of European space policy. In a new communication, the European Commission stressed that the main competence of space agencies was research, development and demonstration of space technologies and systems.[16] **Space policies**, driven so far by a **technology push**, needed to evolve to respond to a **demand-pull** in the field of space applications (satellite communications and earth observation).

The Commission concluded that there was both an opportunity and a need for the European Community to make a greater contribution to successful further development of the European space effort, through five objectives to:

- encourage and support the development and exploitation of earth observation applications;
- ensure the appropriate regulatory conditions for the development of new markets for satellite communication services;
- develop the complementarity and synergy between Community, ESA and Member States' R&D activities;
- encourage the consolidation and growth of a competitive space industry;
- encourage the widening of balanced international cooperation.

2.2.5. Establishing links between ESA and the European Commission

With the support of the Council,[17] the European Commission set up the space advisory group composed of officials from the Member States, ESA and the Western European Union in 1993, in order to better coordinate European space policy between the different actors. In May 1994, the European Parliament renewed[18] its call on the Commission to reinforce its coordination and cooperation with ESA and other relevant European organisations by working towards the formation of a European Space Council.[19] With the Commission entering the space policy arena, in October 1995, the ESA council considered it necessary to adapt the agency's operations.[20]

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16 The European Community and space: challenges, opportunities and new actions, Commission of the European Communities, COM(92) 360, 23 September 1992.

17 Council conclusions on the European Community and space, April 1993.

18 European Parliament resolution on the European Community and space, OJ C 205, pp. 467-468, 25 July 1994.

19 The Space Council, now defined as 'the joint and concomitant meeting of the Council of the European Union and the Council of ESA at ministerial level', was established in 2004.

20 ESA, resolution on directions for the agency's policy and future programmes, 20 October 1995.

2.2.6. Space policy as a horizontal policy in the Commission

Following the European space forum held in November 1995, the Commission adopted a third communication on the European Union and space in December 1996.[21] This marked the **shift in space policy**, from research and development to a more transversal policy. If the space infrastructures (part of the upstream space sector) were important, applications and services derived from these infrastructures (the downstream space activities) represented 'the bulk of business and employment', and were growing fast. Satellite navigation and defence aspects of space were introduced as new priorities.[22]

Upstream and downstream sectors in space

The upstream sector covers all the activities that lead to the development of space infrastructures, including research and development activities, the production of satellites and launchers, and the deployment of space infrastructures. The downstream sector relates to all commercial activities based on the use of data provided by the space infrastructures, such as services in broadcast, communication, navigation or earth observation.

Space and ground segments

Space infrastructures are composed of two segments: the elements in space (space segment) and the elements on earth (ground segment). The ground segment includes launch facilities, mission control centres, and transmission and reception stations.

The Commission also reflected on the role of the different partners in the development of space technologies and applications in the European Union. ESA and the national space agencies were to keep a key role in the development of space infrastructures, launcher activities, and space research and exploration. The European Community's role included contributing to a 'progressive awareness of the common European interests' and supporting the 'development of the market, pilot and demonstration projects'.

The Council acknowledged[23] the 'need to optimise Europe's investment in space by seeking synergies between EU policies and relevant European agencies' in September 1997, and called upon the Commission to assure the internal coordination of space activities and strengthen cooperation and coordination with ESA. The European Parliament emphasised[24] the 'urgent need for reshaping the European Union's space policy' in January 1998, and again recommended that 'a European Council meeting be set up in the near future to deal specifically with European space policy'.

2.3. EU space programmes launch

In the 1990s, two priorities emerged regarding the application of space at the European level: satellite navigation and earth observation. At the end of the decade, the EU began to design and implement what would become its two flagship space programmes.

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[21] Communication from the Commission to the Council and European Parliament 'The European Union and space: fostering applications, markets and industrial competitiveness', COM(96) 617, 4 December 1996.

[22] Other priorities included space industry, earth observation, telecommunications, launch services or international cooperation.

[23] Council Conclusions on the European Union and space, 23 September 1997.

[24] European Parliament resolution on the European Union and space, OJ C 34, pp. 27-30, 2 February 1998.

2.3.1. EGNOS and Galileo

In April 1994, the Commission discussed the use of satellite navigation in the context of the development of the trans-European transport network.[25] The European Parliament called on the Commission to establish a European Strategy for Satellite Navigation to enable European industry's role in the next generation of Global Navigation Satellite Systems (GNSS).[26]

In June 1994, the Commission issued a communication: 'First European approach to satellite navigation services'.[27] As an initial step, Europe should establish a navigation service based on enhanced resolution of the signal provided by the American Global Positioning System (GPS). As a second step, the European Union should develop its own independent infrastructure for satellite navigation. The Council approved this dual approach in November 1994.[28]

The implementation of the first system, known as the European Geostationary Navigation Overlay Service (EGNOS), began in June 1998 with the conclusion of an agreement[29] between the European Community, ESA and Eurocontrol.[30] EGNOS is based on more than 40 ground stations and three geostationary satellites. It is mainly used for critical applications such as flying aircraft or navigating ships through narrow channels.[31] The EGNOS open service became operational on 1 October 2009, and the EGNOS safety-of-life service was certified for civil aviation in 2011.

The implementation of an independent infrastructure for satellite navigation – Galileo – began in 1999 with a communication from the Commission assessing the possible options following the discussions held since 1994.[32] To ensure funding for the project, the option of establishing a public-private partnership for Galileo's development was favoured. The Galileo joint undertaking was established in May 2002.[33] However, the difficulties of developing the programme under a public-private partnership led to the decision to fund the project through public contribution alone, in 2008.[34] This situation

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25 Proposal for a European Parliament and Council decision on Community guidelines for the development of the trans-European transport network, COM(94) 106, 7 April 1994.

26 OJ C 205, pp. 467-468, 25 July 1994.

27 Commission communication, 'Satellite navigation services: a European approach', COM(94) 248, 14 June 1994.

28 Council Resolution of 19 December 1994 on the European contribution to the development of a Global Navigation Satellite System (GNSS), OJ C 379, pp. 2–3, 31 December 1994.

29 Agreement between the European Community, the European Space Agency and the European organisation for the safety of air navigation on a European contribution to the development of a global navigation satellite system (GNSS), OJ L 194, pp. 16–24, 10 July 1998.

30 Eurocontrol is the European organisation for the safety of air navigation.

31 For more information, see the EGNOS website.

32 Commission communication, 'Galileo – involving Europe in a new generation of satellite navigation services', COM(99) 54, 10 February 1999.

33 Council Regulation (EC) No 876/2002 of 21 May 2002 setting up the Galileo joint undertaking, OJ L 138, pp. 1–8, 28 May 2002.

34 Regulation (EC) No 683/2008 of the European Parliament and of the Council of 9 July 2008 on the further implementation of the European satellite navigation programmes, OJ L 196, pp. 1–11, 24 July 2008.

created considerable delays in the programme's implementation.[35] Support for the EGNOS and Galileo programmes was renewed in 2013.[36]

The Galileo space segment will ultimately be composed of 30 satellites (24 operational satellites and six spare satellites). The first launch of two satellites took place in October 2011. In December 2016, there were 18 satellites in orbit, resulting in an early operational capability offer. Full operation capability is expected in 2019, and the system's completion is scheduled for 2020. EGNOS and Galileo are managed and operated by the European GNSS Agency (GSA), a European Union agency established in 2004.[37]

European GNSS Agency

The European GNSS supervisory authority was set up as a European Community agency in 2004, with the task of implementing and managing the deployment and operational phase of EGNOS and Galileo. In 2007, the agency took over the tasks previously assigned to the Galileo joint undertaking. It was renamed European GNSS Agency (GSA) in 2010. The administrative board is composed of representatives from the Member States. The Commission adopts the agency's work programme annually. It also appoints the Executive Director in charge of implementing the work programme.

2.3.2. GMES – Copernicus

In 1998, the European Commission, ESA, EUMETSAT and national space agencies adopted a manifesto for the development of an initiative in the field of earth observation, in Baveno (Italy). In November 2011, the Council requested the Commission launch, in cooperation with ESA, a programme on global monitoring for environment and security (GMES).[38] The Commission adopted communications in 2004, 2008 and 2009 regarding the development of the programme.[39] In September 2010, the Council and the European Parliament adopted a regulation for the initial operation of the GMES programme (2011-2013).[40] In April 2014, the GMES programme was renamed Copernicus in a regulation extending European Union support for the programme.[41]

Copernicus is composed of various systems: earth observation satellites and in situ-sensors such as ground stations, airborne and sea-borne sensors. The ESA is in charge of

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[35] The first estimate in the 1999 Commission communication planned that the service would be operational in 2008.

[36] Regulation (EU) No 1285/2013 of the European Parliament and of the Council of 11 December 2013 on the implementation and exploitation of European satellite navigation systems, OJ L 347, pp. 1–24, 20 December 2013.

[37] For more information, see the GSA website.

[38] Council resolution of 13 November 2001 on the launch of the initial period of global monitoring for environment and security (GMES), OJ C 350, p. 4, 11 December 2001.

[39] Commission communications: Global Monitoring for Environment and Security (GMES): Establishing a GMES capacity by 2008, COM(2004) 65, 3 February 2004; Global Monitoring for Environment and Security (GMES): we care for a safer planet, COM(2008) 748, 12 November2008; and Global Monitoring for Environment and Security (GMES): Challenges and next steps for the space component, COM(2009) 589, 28 October 2009.

[40] Regulation (EU) No 911/2010 of the European Parliament and of the Council of 22 September 2010 on the European earth monitoring programme (GMES) and its initial operations (2011 to 2013), OJ L 276, pp. 1–10, 20 October 2010.

[41] Regulation (EU) No 377/2014 of the European Parliament and of the Council of 3 April 2014 establishing the Copernicus programme and repealing Regulation (EU) No 911/2010, OJ L 122, pp. 44–66, 24 April 2014.

developing the Sentinel satellites that represent the main part of the space segment of Copernicus. The programme collects and processes the data received from its systems across six thematic areas: land, marine, atmosphere, climate change, emergency management, and security. The data allow public authorities and private companies to develop services on a wide range of applications from environment protection and management of urban areas to fisheries, civil protection and tourism.[42]

2.4. Developing a European space policy

2.4.1. First joint resolution between the EU and ESA

In June 1998, the Council of the European Union and the ESA Council adopted a resolution on the **reinforcement of synergy between ESA and the European Community**.[43] The resolution established that ESA was responsible for elaborating and implementing long-term European space policy, while the European Community had competences in legal, economic and social fields which affected the regulation of space-related markets. At the same time, the ESA council adopted another resolution, supporting the Director General of ESA in his actions with a view to proposing 'a coordinated European space policy and corresponding strategy, based on the ESA convention'.[44]

2.4.2. Progressing together

In May 1999, the ESA council adopted two resolutions. In the first, on shaping the future of Europe in space, the ESA council noted that the 'deepening relationship between ESA and the European Union will be a key element' in the future.[45] It welcomed the work initiated by the Director General of ESA 'and in parallel by the European Commission towards defining an overall European space strategy' and called 'for a fully developed strategy to be prepared'. In the resolution on the Agency's development, the ESA council requested a report 'identifying measures for adapting the Agency's rules and procedures' and 'its legal framework', in order to adjust ESA to a changing environment.[46]

In parallel, the Commission presented a working document: Towards a coherent European approach for space, in June 1999.[47] The document explained that, compared to other space powers such as the USA, 'Europe shows a **lack of consensus** amongst the main actors in the space sector, **which has led to delays** in designing, financing and launching future projects or applications'. Following this document, in December 1999, the Council asked the Commission to prepare, in coordination with ESA, a European strategy for space by the end of 2000.[48] In May 2000, the European Parliament

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[42] More information is available on the Copernicus website.

[43] Council resolution of 22 June 1998 on the reinforcement of the synergy between the European Space Agency and the European Community, OJ C 224, pp. 1-2, 17 July 1998 and ESA Council, ESA/C/CXXXVI/Res.1, 23 June 1998.

[44] ESA Council resolution on immediate measures and preparatory steps towards the Council meeting at ministerial level related to the agency's new programmes and its evolution, ESA/C/CXXXVI/Res.1, 24 June 1998.

[45] ESA Council resolution on shaping the future of Europe in space, ESA/C-M/CXLI/Res.1, 11 May 1999.

[46] ESA Council resolution on the agency's evolution and programmes, ESA/C-M/CXLI/Res.2, 12 May 1999.

[47] Commission working document, 'Towards a coherent European approach for space', SEC(1999) 789, 7 June 1999.

[48] Council resolution of 2 December 1999 on developing a coherent European space strategy, OJ C 375, p. 1, 24 December 1999.

welcomed 'the Commission's intention of establishing a policy framework for future programmes' in the field.[49]

2.4.3. First joint Commission-ESA space strategy

In its communication 'Europe and space: turning a new chapter', adopted in September 2000,[50] the Commission fully acknowledged the role of space-based information in the implementation of a wide range of EU policies.[51] For the Commission, the '**challenge is to organise the various activities in different legal and institutional settings, but in a coherent fashion**'.

The joint Commission-ESA document on a European strategy for space included in the communication was built around three objectives:

- **strengthening the foundation for space activities**, with a focus on independent and affordable access to space and support for R&D and industrial capacity;
- **enhancing scientific knowledge;**
- **reaping the benefits for markets and society** though a demand-driven exploitation of the technical capabilities of the space community, focusing on space applications.

Both the Council[52] and the ESA council[53] welcomed the three lines of action identified by the Commission and ESA for a European space strategy, in November 2000. The ESA council endorsed 'the objective of establishing a cooperative structure, bringing together the ESA executive and the European Commission'. It reiterated 'the political willingness and technical readiness of the Agency ... to act as the implementing organisation for the development and procurement of the space segment ... associated with the EU's projects and initiatives'. The Council requested the Commission establish a joint task force (JTF) with ESA.

2.4.4. Space governance in question

In a report for the ESA Director General accompanying the joint document, experts noted that 'Europe must integrate its space activities into the wider political and economic strategy'.[54] Overall, the experts suggested Europe 'reinforce the political role of the European Union when it comes to space policy'. They recommended that 'the European Council should define European space policy and the guidelines for its implementation'; that the 'ESA should be the space agency of Europe setting and implementing co-operative programmes' and could be brought 'within the treaty framework of the European Union'; that the 'Commission should define the regulatory framework under which space activities are conducted' and 'bring together user interests around common objectives'; and that the 'European Parliament should be given the opportunity to regularly discuss and review the European space policy'.

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[49] European Parliament resolution on a coherent European approach for space, OJ C 59, pp. 248-250, 23 February 2000.

[50] Communication from the Commission to the Council and the European Parliament 'Europe and space: turning to a new chapter', COM(2000) 597, 27 September 2000.

[51] Such as policies on environment, transport, telecommunications, culture, research, agriculture, fisheries, regional development and international relations.

[52] Council resolution of 16 November 2000 on a European space strategy, OJ C 371, pp. 2-3, 23 December 2000.

[53] ESA council resolution on a European strategy for space, ESA/C-M/CXLVIII/Res.1, 16 November 2000.

[54] C. Bildt, J. Peyrelevade, L. Späth, Towards a space agency for the European Union, Report to the ESA Director General, November 2000.

In November 2001, the ESA council agreed that 'steps shall be taken by the agency to ensure that space matters are addressed at the highest political level in Europe'.[55] The council added that ESA could become the instrument of the space components of projects of general European interest. To develop a comprehensive European space programme, the ESA council decided that ESA would take the lead in establishing a European long-term space plan, integrating all programmes in Europe. It emphasised 'that a closer cooperation of the European space agency with the European Union allows the integration of space activities in a wider political, economic, scientific, environmental and social frame' and supported the work of the JTF and Joint Space Strategy Advisory Group (JSSAG).[56] Finally, ESA invited ESA Director General to initiate discussions with the EU to set up a framework agreement giving 'guidance for the relationship between the two organisations' and to 'prepare for an informal meeting of the two Councils to discuss the development of a European space policy'.

In January 2002, the European Parliament emphasised 'the importance of close and effective cooperation between the Commission and the European Space Agency' and expressed 'its support for the three lines of action proposed in the Commission document', while requesting the preparation of a white paper[57] on European space policy.[58] The Parliament also believed 'that the ESA with its basis of intergovernmental cooperation should in the longer term be brought within the EU'.

2.4.5. Joint Task Force: first results

The Commission communication 'Towards a European space policy' of December 2001 was the first Commission-ESA joint task force report covering progress on the objectives presented in 2000.[59] The communication stated that a **genuine European space policy** should **combine a strategy** as sketched in 2000, **a European space programme** as requested in the 1990s, together with **a set of implementing rules**. The Commission noted that development of cooperation with ESA 'may require the conclusion of a framework agreement between the EU and ESA ... leading to an effective co-operative structure with a clear partitioning of roles regarding the policy-shaping and the policy-making responsibility'. To 'improve the political decision making process and guidance', the report suggested to 'convene future joint informal meetings of the EU Council and ESA ministerial Council', referred to as the 'Space Council', by mid-2002. A fully developed European space policy was to be presented at the European Council at the end of 2003. The report also outlines space policy developments that could be derived from the adoption of a new European treaty.

In January 2003, the Commission and ESA presented a green paper on European space policy.[60] The objective was to open the discussion on key issues with stakeholders, in the

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[55] ESA council resolution on directions for the agency's evolution and policy: 'Space serving European citizens', ESA/C-M/CLIV/Res.1, 15 November 2001.

[56] The Joint Space Strategy Advisory Group (JSSAG) was composed of representatives from EU and ESA member states.

[57] White papers are documents containing proposals for European Union action in a specific area while green papers are documents published by the European Commission to stimulate discussion on given topics at European level.

[58] European Parliament resolution of 17 January 2002 on Europe and space: turning a new chapter, OJ C 271E, pp. 398–400, 7 November 2002.

[59] Communication from the Commission to the Council and the European Parliament 'Towards a European space policy', COM(2001) 718, 7 December 2001.

[60] Commission green paper, 'European space policy', COM(2003) 17, 21 January 2003.

context of the (then) upcoming enlargement of the European Union and the preparation of the Constitutional Treaty. The presentation of the green paper was followed by an open consultation.

In May 2003, the Council endorsed the green paper and consultation process.[61] The Council reiterated that the organisation of a Space Council 'could provide additional new momentum to the joint efforts to develop a European space policy'. At the same time, the ESA council welcomed discussion of 'the possible inclusion of space-related matters in the renewed competences of the European Union' and the recognition of the role of ESA for the definition and implementation of European space programmes.[62] In October 2003, the European Parliament underlined the horizontal nature of space policy and called on the 'Commission to probe more deeply into the common policies ... for which space policy provides support and which constitute the key areas of public demand'.[63]

2.4.6. European space policy: an implementation action plan

The Commission adopted a **white paper on European space policy** in November 2003,[64] describing it as **'a call to action'** for all the stakeholders and partners **'to mobilise behind new goals and to rise to new challenges'**. Space is fully recognised as a horizontal policy that 'can support the Union's key policy goals': economic growth, sustainable development, or stronger security and defence.

The key priorities remained the same: satellite navigation, earth observation, telecommunications, seeking to bridge the digital divide in Europe, security and defence, and the development of international partnerships. A particular focus was given to the objective to secure Europe's strategic independence regarding access to space, space technologies and space exploration. The white paper also mentioned the objective of creating the right environment for innovation and competitiveness in support of the space industry, through investments, procurement and balanced regulations. The Commission also proposed a draft European space programme to act 'like a strategic agenda for Europe'.

2.4.7. EU-ESA framework agreement

The European Community and ESA adopted **a framework agreement**[65] on 25 November 2003 which entered into force on 28 May 2004. The agreement aimed to provide a basis for 'the coherent and progressive development of an overall European space policy' and a 'common basis and appropriate arrangements for an efficient and mutually beneficial cooperation' between the two parties. The agreement represented **a strategic partnership** between the **supply-side of space systems** (ESA) and the **demand-side for space systems** (the Community). The agreement established the Space Council, a joint secretariat (to replace the JTF) and a high level space policy group (to

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[61] Council resolution of 13 May 2003 on the development of an overall European space policy, OJ C 149, p. 10, 26 June 2003.

[62] ESA council resolution on relations between the European Space Agency and the European Union, ESA/C-M/CLXV/Res.3, 27 May 2003.

[63] European Parliament resolution on European space policy – green paper, P5_TA(2003)0427, 9 October 2003.

[64] Commission white paper 'Space: a new European frontier for an expanding Union – An action plan for implementing the European Space policy', COM(2003) 673, 11 November 2003.

[65] Council Decision of 29 April 2004 on the conclusion of the Framework Agreement between the European Community and the European space agency, OJ L 261, pp. 63–68, 6 August 2004.

replace the JSSAG). The agreement was concluded for four years and could be automatically extended for subsequent periods of four years.

2.4.8. Space in the Constitutional Treaty

The above mentioned white paper on European space policy noted[66] that, with the foreseen adoption of the Constitutional Treaty, the Union would enter 'a new and more political phase'. In the view of the Commission, under the new treaty, the EU would become 'the natural point of reference for a European space policy driven by demand'. ESA should be 'the implementing agency of the Union for space matters' and 'be positioned within the EU framework and its convention modified accordingly'.

In October 2004, the proposed Treaty establishing a constitution for Europe specifically included space as a shared competence between the EU and the Member States.[67] The Union would be responsible for the development of a European space policy and a European space programme. It was also expected to establish appropriate relations with ESA, acknowledging the existence of the agency in the treaty. However, the Constitutional Treaty was rejected in 2005.

2.5. Updating the European space policy

In November 2004, the Barroso Commission took office and space policy was transferred from the Commissioner for Research portfolio to the Commissioner for Industry. The first Space Council – which took place on 25 November 2004 – was an opportunity to discuss 'the coherent and progressive development of an overall European space policy'.[68] The ministers also recognised the need to develop a European space programme as a 'common, inclusive and flexible framework' to coordinate the activities of all the actors.

2.5.1. Restarting the process

In May 2005, the Commission adopted a communication on preliminary elements for a European space policy (ESP), as prepared by the Joint Secretariat.[69] The **ESP** was expected to **consist of a strategy, the definition of the roles and responsibilities** of the main actors, a European **space programme** and a set of **implementing principles**. The communication focused on developing a European policy for space industry, on strengthening international cooperation, and on establishing an adequate regulatory and institutional framework.

The Space Council endorsed this approach at its second meeting in June 2005.[70] It established clear roles and responsibilities for each actor. On the one hand, the EU was expected to 'use its **full potential to lead** in identifying and bringing together **user needs** and to **aggregate the political will** in support of these and of wider policy objectives' and should **'ensure the availability and continuity of operational services** supporting its policies' and 'contribute to the development, deployment and operation of corresponding dedicated European space infrastructure'. On the other hand, ESA and its member and cooperating states should **'develop space technologies and systems'** and

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66 COM(2003) 673, 11 November 2003, *op. cit.*

67 Treaty establishing a Constitution for Europe, Conference of the representatives of the governments of the Member States, CIG 87/2/04, 29 October 2004.

68 Conclusions of the first Space Council, 14687/04, 25-26 November 2004.

69 European Space Policy, 'Preliminary Elements, Commission of the European Communities', COM(2005) 208, 23 May 2005.

70 Conclusions of the second Space Council, 9501/05, 6-7 June 2005.

focus 'on **exploration of space** and on the basic tools on which exploitation and exploration of space depend: access to space, scientific knowledge and technologies'.

Reflecting on the implementation of the ESP, the Space Council noted the need to develop an industry policy tailored to the space sector, to 'maintain and reinforce scientific and technological expertise and capacities' and 'encourage the Member States and stakeholders to make the necessary investment to maintain know-how, independence in selected critical technologies and a globally competitive space industry'.

At its third meeting in November 2005, the Space Council set out directions for the GMES programme, and reflected on the development of an international cooperation strategy, common to all actors.[71]

The evolving space environment in Europe, and the involvement of the EU, the 2004 EU enlargement, and increased international competition, led the ESA council to adopt a resolution on the development of ESA's internal operations in December 2005.[72] The ESA council welcomed the implementation of the programme for the European Cooperating States (begun in 2003), which sought to progressively involve new EU Member States in the agency.

2.5.2. New European space policy

The new European space policy (ESP) was adopted by the Commission in April 2007.[73] Although presented as the 'first ever European space policy', the Commission and the Director General of ESA's joint document covered the same priorities as some of the previous Commission communications and compiled decisions made during the first three Space Councils.[74]

The ESP objectives, 'based on the peaceful exploitation of outer space', were to:

- develop and exploit space applications serving Europe's public policy objectives and the needs of European enterprises and citizens;
- meet Europe's security and defence needs in space;
- ensure a strong and competitive space industry;
- contribute to the knowledge-based society by investing strongly in space science and exploration;
- secure unrestricted access to new and critical technologies, systems and capabilities.

In order to reach these objectives, the EU, ESA and their Member States were expected to take 'significant new steps in establishing a European space programme and the coordination of national and European level space activities … ; increasing synergy between defence and civil space programmes … ; and developing a joint international relations strategy in space'.

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[71] Conclusions of the third Space Council, 14155/05, 28-29 November 2005.

[72] ESA Council resolution on the evolution of the agency, ESA/C-M/CLXXXV/Res.5, 6 December 2005.

[73] Communication from the Commission to the Council and the European Parliament 'European space policy', COM(2007) 212, 26 April 2007.

[74] The communication listed the usual space applications: satellite navigation with Galileo, earth observation with GMES, satellite communications and security and defence. It also recalled the key foundation for space activities: investment in R&D with a focus on critical technologies, training and know-how in the space industry, space exploration and independent and cost-effective access to space. The Commission gave a particular focus to support for the space industry regarding the regulatory framework and public investment in space.

As far as governance was concerned, the communication copied the guidelines on the role of the EU and ESA adopted at the second Space Council in 2005. The communication therefore **confirmed the clear separation of activities**: upstream activities for ESA, downstream activities for the EU. Nevertheless, the Commission noted that 'the different approaches, separate legal processes and divergent membership of the EU and ESA can lead to cumbersome decision-making processes'. In that context, the 2004 agreement should be assessed and improved if required.

The ESP presented only preliminary elements of a European space programme, discussed at the first and second Space Council and expected to be adopted already in 2005. The ESP also mentioned that coordination mechanisms should be implemented regarding the development of space programmes and international relations.

The Space Council reacted positively to the ESP in May 2007 during its fourth meeting.[75] It noted however that key issues relating to operational and practical arrangements for European space programmes, to the implementation of instruments and funding schemes for Community actions, and to the development of a strategy for international relations should be considered. The Council supported the continuation of the 2004 framework agreement beyond 2008, and invited the Commission and the ESA Director General 'to propose an implementation plan for the European Space Policy'.

2.5.3. Implementing the European space policy

The Commission issued a progress report in September 2008, discussing implementation of the ESP.[76] Besides reviewing the key issues regarding all aspects of the ESP, the Commission proposed elements for a **European strategy for international relations in space**. The objective of this strategy was to allow European space actors to speak with one voice on the international scene.

The Space Council reacted to this report and its proposals at its fifth meeting in September 2008, through a resolution aiming at taking the ESP forward.[77] The resolution identified a list of issues to be addressed, including the promotion of a coherent approach to international cooperation in space programmes, the continuity of autonomous, reliable and cost-efficient access to space and the promotion of an appropriate regulatory framework for downstream services. The resolution noted that **space infrastructure security was a growing concern**. At this time, ESA was preparing a programme proposal for the creation of a European space situational awareness (SSA) capacity. The Space Council also pointed out new priorities for the ESP on space and climate change, the contribution of space to the Lisbon strategy,[78] space and security, and space exploration.

The European Parliament welcomed this Council resolution in November 2008.[79] The Parliament asked the Council and the Commission 'to make progress on the subject of

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[75] Resolution of the Space Council on the European space policy, 10037/07, 25 May 2007.

[76] Commission working document, European space policy progress report, COM(2008) 561, 11 September 2008.

[77] Council resolution of 26 September 2008 'Taking forward the European space policy', OJ C 268, pp. 1-6, 23 October 2008.

[78] The Lisbon Strategy was adopted by the European Council in March 2000 as the framework to strengthen employment, economic reform and social cohesion in the EU. It was replaced in 2010 by the Europe 2020 strategy.

[79] European Parliament resolution on the European space policy: how to bring space down to earth, P6_TA(2008)0564, 20 November 2008.

international relations' and stressed 'the importance of developing a space-related industrial strategy'.

In November 2008, the ESA council adopted a resolution on the role of space in delivering Europe's global objectives.[80] It recognised the priorities set out in the European space strategy and the role of ESA in achieving these objectives. It identified the need for change in ESA's decision-making process and to industrial and procurement policy rules, and adopted a resolution regarding the agency's further development in these aspects.

In the context of the development of a European Council recovery plan for the European economy, the Space Council discussed the contribution of the space sector to innovation and competitiveness, at its sixth meeting in May 2009.[81] It discussed the current development of GMES and the elaboration of a fully-fledged political vision on the role of Europe in space exploration.

2.5.4. Towards the Lisbon Treaty

In June 2007, the European Council mandated the Intergovernmental Conference to draw up a Reform Treaty (later known as the Lisbon Treaty). Provisions initially introduced for space in the Constitutional Treaty were to be included in the **Reform Treaty**, recognising **space as a shared competence** between the EU and the Member States, and the role of the Union in developing a European space policy. However, a modification was required to prevent that EU measures 'entail harmonisation of the laws and regulations of the Member States'.[82]

2.6. Developing an EU space industrial policy

The Barroso II Commission took office in February 2010, and adopted the Europe 2020 strategy in March 2010.[83] Under the flagship initiative 'An industrial policy for the globalisation era', the Commission pledged to 'develop an effective space policy to provide the tools to address some of the key global challenges and in particular to deliver Galileo and GMES'. The European Commission issued a communication on this flagship initiative in October 2010, and suggested initiatives for a sectoral industrial policy for space.[84] Indeed, the Lisbon Treaty,[85] which entered into force in December 2009, allowed the EU the possibility to develop and implement an industrial policy in the space sector. Development of an industrial space policy was supported by the Council[86] in May 2011 and by the European Parliament[87] in January 2012.

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[80] ESA Council resolution on the role of space in delivering Europe's global objectives, ESA/C-M/CCVI/Res.1, 26 November 2008.

[81] Conclusions of the 6th European Space Council, 10306/09, 29 May 2009.

[82] European Council Conclusions, 11177/1/07, 20 July 2007.

[83] European Commission, Europe 2020 – A strategy for smart, sustainable and inclusive growth, COM(2010) 2020, 3 March 2010.

[84] Communication from the Commission, An integrated industrial policy for the globalisation era – putting competitiveness and sustainability at centre stage, COM(2010) 614, 28 October 2010.

[85] The Treaty on the Functioning of the European Union provide a new basis for the involvement of the EU in space policy under Article 4 and Article 189.

[86] Council of the European Union conclusions on 'Towards a space strategy for the European Union that benefits its citizens', 10901/11, 31 May 2011.

[87] European Parliament resolution on a space strategy for the European Union that benefits its citizens, P7_TA(2012)0013, 19 January 2012.

The Commission adopted its EU space industrial policy in February 2013.[88] It stressed that space 'always had, and will continue to have, a strong political dimension which has not been developed properly at European level so far'. The Commission set five objectives for EU space industrial policy to:

- establish a coherent and stable regulatory framework (regulation, standards, skills);
- further develop a competitive, solid, efficient and balanced industrial base in Europe and support SME participation;
- support the global competitiveness of the EU space industry;
- develop markets for space applications and services; and
- ensure technological independence and independent access to space.

The European Commission proposed a legislative initiative on production and dissemination of private satellite data, to provide stronger support for research and innovation activities, to expand the type and use of financial instrument, and to 'establish and implement a real European launcher policy'.[89]

In May 2013, the Council welcomed the communication and took note of the objectives proposed by the Commission.[90] It also recognised 'the need to examine existing legal frameworks' and invited 'the Commission to assess the need for the development of a space legislative framework'.

2.7. Developing a new European space strategy

2.7.1. First steps towards a European space strategy

The Space Council noted that the entry into force of the Lisbon Treaty strengthened 'the political dimension of space in Europe' at its seventh meeting in November 2010.[91] The Council invited 'the EU, ESA and their Member States to further develop an overall space strategy'. It also called upon 'the European Commission and the ESA Director General to develop and propose a European exploration strategy'.

The communication 'Towards a space strategy for the European Union that benefits its citizens', adopted by the Commission in April 2011, refocused the ESP on four objectives:

- promoting technological and scientific progress,
- stimulating industrial innovation and competitiveness,
- enabling European citizens to reap the benefits of space applications,
- raising Europe's profile on the international stage in the area of space.

To achieve these goals, 'Europe needs to keep independent access to space'.[92]

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[88] Communication from the European Commission, EU space industrial policy, European Commission – releasing the potential for economic growth in the space sector, COM(2013) 108, 28 February 2013.

[89] The Commission adopted a proposal for a directive on the dissemination of earth observation satellite data in June 2014. The proposal was withdrawn in July 2015, as positions diverged significantly, making it unlikely to be adopted in a form that would meet its internal market objectives.

[90] Council of the European Union conclusions on the EU space industrial policy, 9599/13, 24 May 2013.

[91] Council resolution 'Global challenges: taking full benefit of European space systems', 16864/10, 26 November 2010.

[92] Communication from the Commission from the Commission to the Council, the European Parliament, the European economic and social committee and the Committee of the regions 'Towards a space strategy for the European Union that benefits its citizens', COM(2011) 152, 4 April 2011.

The Council welcomed this communication in May 2011.[93] Besides the support for flagship programmes and the security dimension of space, the Council invited 'the Commission in close cooperation with ESA to examine possible options for involvement in space exploration'. It considered the need to draw up 'research and innovation strategic agendas for space, in order to ensure consistency between the R&D efforts of the EU with those undertaken by ESA and the Member States'. Finally, it invited the Commission to 'organise broad consultations on main elements of a possible future European Space Programme'.

The European Parliament also welcomed the Commission communication on the space strategy in January 2012, noting however that the identified priority areas remained 'in part somewhat vague'.[94] It believed that the EU 'should focus its efforts on the development of downstream space services'. The Parliament welcomed the Commission's intentions to draw up an international cooperation strategy. It called for the Commission to develop a strategic agenda for space research and examine options for space exploration.

2.7.2. Preparing the European space strategy

In November 2014, the new President of the European Commission Jean-Claude Juncker highlighted, in Commissioner Elżbieta Bieńkowska's mission letter, that 'space is a highly strategic sector' and requested a focus on 'establishing a coherent and stable regulatory framework for the service and manufacturing of space applications in Europe and exploiting the internal market and job-creating potential of space'.[95]

At the seventh Annual European Space Conference in January 2015, Commissioner Bieńkowska stressed her priorities for the Galileo and Copernicus flagship programmes and the space research programmes.[96] In its 2016 work programme adopted in October 2015, the Commission announced its intention to 'present a strategy for releasing the full benefits of the European space programmes such as Galileo and Copernicus for the European economy and citizens'.[97] The Commission presented the roadmap for the adoption of the space strategy for Europe in December 2015.[98]

Commissioner Bieńkowska provided an overview of the space strategy for Europe in a speech at the eighth Annual European Space Conference in January 2016.[99] The strategy should seek 'to maximise the benefits for the European citizens and economy, and to help the European space industry to keep its competitive edge and remain a world leader'. A public consultation was launched in April 2016 'to obtain stakeholder views on the policy priorities, challenges and opportunities that could shape a future Space Strategy for Europe'.[100]

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93 10901/11, 31 May 2011, *op. cit.*

94 P7_TA(2012)0013, 19 January 2012, *op. cit.*

95 Mission Letter to Elżbieta Bieńkowska, European Commission, 1 November 2014.

96 Commissioner Elżbieta Bieńkowska's closing speech at the seventh annual European space conference, 28 January 2015.

97 Commission Work Programme 2016, COM(2015) 610, 27 October 2015.

98 European Commission, Roadmap for the Space strategy for Europe, December 2015.

99 Commissioner Elżbieta Bieńkowska's speech at the eighth annual conference on European space policy, 12 January 2016.

100 As mentioned for the launch of the public consultation. The synopsis report of the Commission consultation was published in October 2016.

Eurospace, a European trade association created in 1961, representing the interests of the European space manufacturing industry in 14 ESA member states, pointed out 'the importance of an independent, reliable, safe and cost-effective European capacity to conceive, develop, launch, operate and exploit space systems'.[101] The organisation also called 'for further synergies to be developed between space and other EU public policies'. The Network of European Regions Using Space technologies (NEREUS), a non-profit organisation of 41 members from 25 regions, expected the strategy to establish a 'strong vision of promoting space within Europe's societies, economies and public policies'.[102] The network called for concerted action at national and European level, as well as at regional and local level. The European Association of Remote Sensing Companies (EARSC) representing the earth observation geo-information services sector in Europe, with 75 members from 22 countries, focused its contribution on Copernicus, regarding access to the data produced, stimulation of public demand for products and services, and enabling private initiatives.[103]

In May 2016, the Council discussed the issue of uptake of space data from European programmes.[104] It noted that 'these data can produce valuable contributions to numerous markets' but that the pace of new initiatives 'has been slow until now'. The Council recognised that 'investments in downstream developments are also necessary to demonstrate the important role of space in achieving the key objectives of the EU policies'.

In June 2016, the European Parliament adopted two resolutions on space. The first, on space capabilities for European security and defence, highlighted a key role of space-based capabilities, and called on the EU to ensure European 'non-dependence' in access to space and critical space technologies.[105] To that end, the resolution called on the Commission, in collaboration with ESA and the Member States, to coordinate, share and develop planned space projects and European markets, support launch infrastructure, and promote R&D, including through the instrument of public-private partnerships. The second resolution, on space market uptake, focused on the support to be provided by the EU, so that data produced by Galileo and Copernicus would be used to create services and applications maximising the socio-economic benefits of EU space programmes.[106]

In July 2016, the Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) published a working document preparing the discussion with the Member States on the European space strategy.[107] It presented the goals and vision of the Commission and a draft outline of the strategy.

2.7.3. The European space strategy

The Commission adopted the space strategy for Europe in October 2016.[108] The Commission noted that 'space technologies, data and services can support numerous EU

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[101] ASD - Eurospace, A space strategy for Europe - Contribution of the European space industry, 2016.

[102] NEREUS, Recommendations on adding a regional dimension to the European space strategy, April 2016.

[103] EARSC, EARSC Views on European Space Strategy, July 2016.

[104] Outcome of the 3470th Competitiveness Council meeting, 9357/16, 26-27 May 2016.

[105] European Parliament resolution on space capabilities for European security and defence, P8_TA(2016)0267, 8 June 2016.

[106] European Parliament resolution on space market uptake, P8_TA(2016)0268, 8 June 2016.

[107] DG GROW meeting with Member States in preparation of space strategy, 8 July 2016.

[108] COM(2016) 705, 26 October 2016, *op. cit.*

policies and key political priorities'. The strategy clearly states the **EU's ambitions in space** and asserts that space is becoming an increasing **priority for the Union**. The Commission proposed four strategic goals:

- Maximising the **benefits of space for society and the EU economy**. This includes support for the uptake of space services and data, especially from EU space programmes, by improving access to the data, launching enabling platform services and ensuring that EU legislation supports the uptake.
- Fostering a **globally competitive and innovative European space sector**. The Commission aims to support space research, skills development, entrepreneurship and new business activities. It plans to establish space-hubs between the space, digital and user sectors, to open up space to non-space industries.
- Reinforcing Europe's **autonomy** in accessing and using space in a **secure and safe environment.** The Commission is committed to supporting and maintaining 'autonomous, reliable and cost-effective access to space'. This includes support for launcher activities, access to radio frequency spectrum for space systems, protection and resilience of critical European space infrastructures, and synergies between civil and security space activities.
- Strengthening Europe's role as a global actor and **promoting international cooperation.** The Commission expects the EU to take 'a much stronger role on the world stage'.

If these priorities seem similar to those of previous communications (see Table 1), the Commission was more explicit about strategy regarding autonomy, support for launchers, and the defence dimension of space activities. The topic of space exploration was omitted, demonstrating that space strategy is centred on the actions and activities of the Union in space (exploration falls under the ESA remit).

Table 1 – European space policy priorities in Commission communications

European space policy topics	1988	1992	1996	2000	2003	2007	2011	2016
Space capacity foundation – upstream sector								
R&D activities	●	●	▪	●	●	●	●	●
Launchers and launch services	▪	●	●	●	●	●	▪	●
Space industry	●	▪	●	●	●	●	●	●
Space applications – downstream sector								
Telecommunications	●	●	●	●	●	●	●	●
Earth observation	●	●	●	●	●	●	●	●
Satellite navigation		▪	●	●	●	●	●	●
Space science and exploration		●		●	●	●	●	
International cooperation		●	●	●	●	●	●	●
Defence and security								
Space for security issues		▪	▪	●	●	●	●	●
Defence and dual-use		▪	●	●	●	●	●	●
Secured space infrastructures							●	●
Other aspects								
Training/careers in space sector activities	●		▪		●	▪		▪
Financing the space sector			▪		●	●		
Regulation for the space sector	●	▪		▪	●	●		▪
Governance of European space sector	▪	▪	▪	▪	●	●	●	

Data source: Elaboration on European Commission documents. ● = key priority ▪ = mentioned area

On 29 November 2016, the Council held a public debate on space strategy without adopting conclusions.[109] The ESA council welcomed the strategy and reaffirmed the ambition for the agency to 'efficiently implement EU-funded space programmes and activities' in December 2016.[110]

The President of Eurospace welcomed the new strategy and noted that the 'Commission adopted a very inclusive stance during the public consultation process'.[111] The innovative solutions proposed by the Commission to support private investment in space (EU space economic diplomacy, public-private partnerships, access to finance) were noted. The EMEA Satellite Operation's Association (ESOA) highlighted that 'the Commission needs to ensure that its space strategy adequately fosters a proper understanding and exploitation of satellite communications services and defends satellite spectrum from sharing and interference from terrestrial networks'.[112] EARSC was 'happy to see an industry dialogue with the Commission mentioned', and was 'pleased to see the private sector role in Copernicus services addressed'.[113]

In the European Parliament, the Industry, Research and Energy (ITRE) organised a committee public hearing on the space strategy: the Director of the European Space Policy Institute (ESPI)[114] thanked all actors for bringing space to the top of the EU political agenda in 2016,[115] noting that long-term political commitments, transparency, budget predictability and infrastructure security were necessary to stimulate private investment in space, as expected under the strategy. ESPI also stressed that some topics were not addressed in the strategy regarding aspects of security in space, different launcher capacities and space law.

2.8. Security and defence programmes

2.8.1. Security of space: the space surveillance and tracking programme

Following the resolution of the fifth Space Council (see above, 2.5.3), the ESA council took a decision regarding the development of a space situational awareness programme (SSA) in November 2008.[116] In October 2010, the Commission noted that the Union should engage in the organisation and governance of a European SSA, based on existing Member States' capacity.[117] In November 2010, the Space Council recognised 'the need for a future SSA capability as an activity at European level'.[118] The 2011 Commission communication on the space strategy marked the beginning of the work to establish a SSA system at the European level.[119]

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[109] Competitiveness Council Meeting n°3503, 29 November 2016.

[110] ESA Council resolution 'Towards Space 4.0 for a United Space in Europe', 2 December 2016.

[111] Making Europe more agile in space, Jean-Loic Galle, Euractive, 2 November 2016.

[112] ESOA welcomes the European Commission's 'Space strategy for Europe', 26 October 2016.

[113] EARSC welcomes European Commission new space strategy, 26 October 2016.

[114] The ESPI was created by ESA and the Austrian research promotion agency (FGG) in 2003. It is supported by public and private actors in space and provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities.

[115] Improving Industrial Competitiveness, Presentation by Jean-Jacques Tortora, ITRE Committee Public Hearing, European Parliament, 10 November 2016.

[116] ESA/C-M/CCVI/Res.1, 26 November 2008, *op. cit.*

[117] COM(2010) 614, 28 October 2010, *op. cit.*

[118] 16864/10, 26 November 2010, *op. cit.*

[119] COM(2011) 152, 4 April 2011, *op. cit.*

The Commission proposed establishment of a space surveillance and tracking (SST) support programme in February 2013.[120] The programme was adopted in April 2014, with the aim of networking national SST assets to monitor space debris and thus protect European space infrastructures.[121] This programme addresses one strand of SSA capability. The other two – space weather monitoring and forecasting and the monitoring of near-earth objects – are part of the optional programme on SSA developed by ESA since 2009.[122]

2.8.2. Space for security and defence: the Govsatcom initiative

At its eighth meeting, in December 2011, the Space Council stressed that 'space assets can contribute significantly to the objectives of the common security and defence policy' and noted the signature of an agreement between ESA and the European Defence Agency in June 2011.[123] The Space Council also supported the development of the SSA preparatory programme.

In July 2013, the Commission issued a communication regarding the defence and security sector containing a chapter on space and defence.[124] The Commission noted that 'contrary to all space-faring nations, in the EU there is no structural link between civil and military space activities' and that 'this divide has an economic and political cost that Europe can no longer afford'. It also tackled the growing issues of governmental and military satellite communications capacities and of satellite high resolution imagery to support security policies.

In December 2013, the European Council welcomed the 'preparations for the next generation of governmental satellite communication through close cooperation between the Member States, the Commission and the European Space Agency', requesting that a user group to be set up in 2014.[125] This orientation followed initial work done by the European Defence Agency (EDA) on this topic.

European Defence Agency

The European Defence Agency (EDA) is an intergovernmental agency reporting to the Council of the European Union. All EU Member States except Denmark participate in EDA. It was created in 2004 and its head is the High Representative of the Union for Foreign Affairs and Security Policy. The Steering Board is composed of the Defence Ministers of the participating states and defines the annual budget, the three year work programme and the annual work plan. The EDA Chief Executive is appointed by the steering board and implements the decisions.

In December 2014, the Council recognised new priorities in 'pursuing synergies in space, security, and defence activities' and noted the growing demand for governmental

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[120] Proposal for a decision establishing a space surveillance and tracking support programme, COM(2013) 107, 28 February 2013.

[121] Decision No 541/2014/EU of the European Parliament and of the Council of 16 April 2014 establishing a framework for space surveillance and tracking support, OJ L 158, pp. 227–234, 27 May 2014.

[122] For more information, see the SSA programme overview on the ESA website.

[123] Administrative arrangement between the European Defence Agency and the European Space Agency concerning the establishment of their cooperation, Council of the European Union, 10085/11, 12 May 2011

[124] Communication from the European Commission to the European Parliament, the Council, the European economic and social committee and the Committee of the regions 'Towards a more competitive and efficient defence and security sector', COM(2013) 542, 24 July 2013.

[125] European Council conclusions, EUCO 217/13, 20 December 2013.

satellite communications (Govsatcom).[126] In October 2016, an inception impact assessment procedure was initiated by the Commission to assess the possibility of launching an EU initiative on Govsatcom.[127]

2.9. EU-ESA relationship development

2.9.1. EU-ESA relationship review

In October 2010, the Commission noted the need to re-evaluate its relations with ESA.[128] The November 2010 Space Council supported this idea, as it invited the Commission and ESA to evaluate their partnership under the framework agreement.[129]

In 2011, the Commission recommended that the EU 'strengthen its cooperation with the Member States, examine its relations with the ESA and ensure the best possible programme management'.[130] On the first aspect, the Commission stated that the EU needed to strengthen the political dimension of space. On the, the Commission noted that 'ESA should continue to develop into an organisation with an intergovernmental and an EU dimension in which military and civil programmes can coexist' and that 'the framework agreement between the EU and the ESA will need to be reviewed'. On the last aspect, the Commission acknowledged that 'space programme management remains fragmented', and called for better coordination.

In January 2012, the European Parliament also stressed 'the need for clear governance in relation to space policy' and called for EU relations 'with ESA and the national agencies to be redefined'.[131]

2.9.2. Identifying possible options for development of ESA

The relationship between the EU and ESA was the object of a communication of the Commission in November 2012.[132] The Commission noted that 'the growing importance of EU space programmes and the EU's reliance on ESA's technical expertise have not yet translated into an evolution of the governance of space matters at European level'. However, **the EU and ESA differ in their financial rules, their membership and voting rights and the uptake of security and defence matters**. For the Commission, ESA also lacks a structural connection with the EU framework as the 2004 agreement does not provide this. **ESA has no formal link with the European Parliament, resulting in a lack of political accountability**. The Commission committed to studying several possible options for a rapprochement between ESA and the EU by 2013: 'improved cooperation under the "status quo", bringing ESA as an intergovernmental organisation under the authority of the EU… or transforming ESA into an EU agency'.

On the other hand, the ESA council recognised 'the increasing role of the European Union in integrating European space policy into numerous core European political and economic initiatives and its growing involvement as an actor in space matters' in

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[126] Council of the European Union, Underpinning the European space renaissance, 5 December 2014.

[127] European Commission, Govsatcom inception impact assessment, 18 October 2016.

[128] COM(2010) 614, 28 October 2010, *op. cit.*

[129] 16864/10, 26 November 2010, *op. cit.*

[130] COM(2011) 152, 4 April 2011, *op. cit.*

[131] P7_TA(2012)0013, 19 January 2012, *op. cit.*

[132] Communication from the Commission to the Council and the European Parliament 'Establishing appropriate relations between the EU and the European Space Agency', COM(2012) 671, 14 November 2012.

November 2012.[133] In this context, it considered that 'ESA must further evolve ... towards the European space agency that best serves Europe'. The ESA council mandated 'the Director General to elaborate and assess ... the different scenarios for ESA'.

The Space Council discussed the relationship between ESA and the EU at its ninth meeting, in December 2012, without taking any position.[134] This Space Council turned out to be the last formally organised.

In February 2013, the Council acknowledged 'the important role which ESA as an independent intergovernmental organisation plays in space matters and in relation to European space programmes'.[135] Given the evolving context, it recognised that 'there may be a need to review and enhance the functioning of the relationship between the EU and ESA' and that the framework agreement 'may, in its present form, no longer provide the most appropriate framework'. It invited the Commission to work with the Director General of ESA to prepare common proposals on future relations, for decisions to be taken in 2014.

In December 2013, the European Parliament noted that 'the political weight of the EU Member States in national terms may no longer suffice to address the challenges ahead in this sector' and that 'there is still not sufficient coordination of measures in the field of space policy between the EU, the Member States and ESA'.[136] It deplored that ESA 'has no formal relationship with the European Parliament'. The Parliament called the Commission 'to investigate very carefully' whether ESA 'could … be linked to the Union's governance structures'. Parliament called 'on the Commission, the Member States and the ESA to establish a form of coordination group' to organise strategies and measures and avoid duplication.

2.9.3. Assessing the different options

In February 2014, the Commission issued a progress report on establishing appropriate relations between the European Union and the ESA.[137] By investing €12 billion in its space programmes (Galileo and Copernicus) and space research activities under the multi-annual financial framework 2014-2020, mostly delegated to ESA, the EU had become ESA's largest contributor (See Figure 1). The management of EU programmes by ESA according to EU rules had become a key concern in the relationship.

The options for the ESA's future development suggested by the Commission in 2012 (improved cooperation, 'EU Pillar' in ESA or ESA as an EU agency) were assessed based on their effectiveness to address the structural issues, operational inefficiencies and their costs in implementation. The first option would be the easiest to implement simply through an amendment to the framework agreement or the adoption of a new agreement. The second would require an EU legislative act to define the tasks of the EU pillar in ESA. The last option would imply the creation of an EU agency and ensure the

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[133] ESA Council resolution on the role of ESA in sustaining competitiveness and growth in Europe, ESA/C-M/CCXXXIV/Res. 1, 20 November 2012.

[134] Outcome of the 3208th Competitiveness Council, 17410/12, 10-11 December 2012.

[135] Council conclusions on establishing appropriate relations between the EU and the European Space Agency, 6571/13, 19 February 2013.

[136] European Parliament resolution on EU space industrial policy, releasing the potential for growth in the space sector, P7_TA-PROV(2013)0534, 10 December 2013.

[137] European Commission, Progress report on establishing appropriate relations between the European Union and the European Space Agency, COM(2014) 56, 6 February 2014.

transition from the current intergovernmental institution to this new status. It appeared that the two last options addressed most or all current limitations.

The Commission noted that 'additional work is necessary to assess the options in terms of effectiveness of policy coordination and implementation'. It considered that 'the selected way forward should bring added value to the benefit of both organisations, EU and ESA, and avoid a blurring of responsibilities'.

In May 2014, the Council welcomed the approach of the Commission,[138] emphasising that 'it is essential to establish appropriate, sustainable and transparent relations between the EU and ESA'. The Council considered the first two options (amendment of the EU-ESA Framework Agreement and 'EU Pillar' in ESA) more favourably, because it shared 'the Commission's assessment that transforming ESA into an EU agency would require political consensus which may be difficult to reach in the foreseeable future'. The Council noted however that 'both options have yet to be fully defined'.

2.9.4. A new vision for ESA

The ESA council developed in December 2014 a long term vision for ESA 'as one of the world-leading institutions within the fields of space science, earth observation, space exploration and related technology development'.[139] It acknowledged 'that the ESA member states have expressed their clear preference for a relationship between ESA and the European Union which keeps ESA as an independent, world-class intergovernmental space organisation' and 'makes of ESA the long-term partner of choice for the EU for jointly defining and implementing European space policy'. It also invited the ESA Director General 'to work with the European Commission to identify and propose improvements for developing a reliable and sustainable partnership between ESA and the EU, by 2016 to the ESA council'.

In December 2014, the Council invited the Commission to make progress 'on the ongoing assessment of institutional relations between the EU and ESA'.[140]

2.9.5. A joint statement of EU-ESA relations

When releasing the new joint strategy, the EU and ESA signed a joint statement on the shared vision and goals for the future of Europe in space.[141] Because of 'changing paradigms and new user needs, an increasing number of space faring countries and new private actors, as well as increasing reliance on space', 'the space sector is becoming more diverse and complex'. The EU and ESA share the ambition 'that Europe remains a world-class actor in space and a partner of choice on the international scene'. They envisage maximising 'the integration of space into European society and economy', fostering 'a globally competitive European space sector' and ensuring 'European autonomy in accessing and using space in a safe and secure environment'. EU and ESA also emphasised 'their intention to reinforce their cooperation in the future'. However, revision of the 2004 agreement was not mentioned.

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[138] Council of the European Union conclusions towards a shared EU-ESA vision for space fostering competitiveness, 26 May 2014.

[139] ESA Council resolution on Europe's Access to Space, ESA/C-M/CCXLVII/Res. 1, 2 December 2014.

[140] Competitiveness Council meeting conclusions, Underpinning the European space renaissance, 5 December 2014.

[141] Joint Statement on Shared Vision and Goals for the Future of Europe in Space by the European Union and the European Space Agency, 2016.

2.9.6. Space 4.0

In November 2016, ESA presented its own vision for the future of the agency under the space 4.0 concept seeking to innovate, inform, inspire and interact.[142] The ESA council adopted this vision in December 2016, inviting the Director General of ESA 'to further shape and promote ESA as THE space agency for Europe'.[143] Besides strengthening the cooperation with the EU and its agencies, the ESA council recalled that 'ESA elaborates and implements a long-term European space policy'.

3. Specific aspects of EU intervention in space policy

3.1. EU support for space research

Space research is supported by EU funds under the Horizon 2020 framework programme for research and innovation. The programme regulation recognised four priority areas for action: European competitiveness, 'non-dependence' and innovation in the European space sector; advances in space technologies; exploitation of space data; and European research in support of international space partnerships.[144] The budget for space research in the programme is around €1.4 billion (about 1.8 % of the Horizon 2020 budget).

The Horizon 2020 work programmes[145] show that space research activities are organised in four main parts:

- **Applications in satellite navigation – Galileo and EGNOS**: supports the development of Galileo services and applications, for example in precision agriculture or transport, and research in infrastructure development (managed by ESA under a delegation agreement).
- **Earth observation**: funds research to develop operational services offered by Copernicus and to create new services for new customers. Funding for technological development, such as managing big data or developing new sensors is also included.
- **European space sector competitiveness**: funds projects developing technology critical to maintaining 'non-dependence', general technologies for the satellite industry, specific space communication technologies, and components linked to the launcher systems. Also funds the space qualification of new space components with in-orbit demonstration, and supports the scientific work behind space exploration and space science by funding the use of data from past and present space missions.
- **Protection of European assets in and from space**: underpins Member State activities under the SST programme, and additional activities regarding the SSA programmes (space weather etc.).

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142 ESA, The next era of space, November 2016.

143 ESA Council resolution 'Towards Space 4.0 for a United Space in Europe', 2 December 2016.

144 Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020), OJ L 347, pp. 104–173, 20 December 2013.

145 See the work programmes for the period 2014-2015 and 2016-2017.

3.2. Security and defence

3.2.1. Space: a key dimension of security and defence

As mentioned in the historical overview above, space use for security and defence purposes has become an important dimension of European space policy.[146] Civil and defence aspects of space are usually linked in space faring nations, whereas in Europe, security and defence has long remained an issue for national sovereignty. The European Commission noted as early as 1996, that 'any European strategy should ensure the convergence of civil and military effort in order to avoid duplications and make the best use of the available public funding'.[147]

The European Council conclusions of December 2013 on defence supported the projects developed by the European Defence Agency (EDA) on four priorities: remotely piloted aircraft systems (drones), air-to-air refuelling, satellite communication and cybersecurity.[148] All these priorities have direct links with space. The European Galileo[149] and Copernicus programmes can provide security and defence capabilities.

The **2016 Space Strategy requested reinforced synergies between civil and security space activities**. The European defence action plan adopted by the Commission in November 2016 confirmed the shift towards establishment of jointly developed security and defence space programmes, with renewed support for the SST programme and Commission involvement in the Govsatcom programme.[150] Cybersecurity has also been identified as a growing issue for space programmes security.[151]

3.2.2. 'Non-dependence' and critical technologies

Both the space strategy and the European defence action plan stressed the need for Europe to maintain access to space and freedom of action. Europe is not in a position to be **fully independent** but seeks to be able to **remain 'non-dependent'** regarding space technology. This means having free, unrestricted, access to any required space technology.

In order to maintain this 'non-dependence', the Commission, ESA and EDA have worked jointly to identify space technologies critical for the manufacture of launchers or satellites. Once a technology is considered critical, meaning that Europe would become dependent regarding this technology, measures are taken by one of the institutions to maintain or restore 'non-dependence'. The last action plan on critical technologies was adopted in March 2015 for the period 2015-2017.[152]

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[146] See also on this topic N. Paradiso, The EU dual approach to security and space, Report 45, European Space Policy Institute, August 2013.

[147] COM(96) 617, 4 December 1996, *op. cit.*

[148] EUCO 217/13, 20 December 2013, *op. cit.*

[149] Galileo integrates a Public Regulated Service (PRS) that is 'an encrypted navigation service for governmental authorised users and sensitive applications that require high continuity'.

[150] Communication from the Commission to the European Parliament, the Council, the European economic and social committee and the Committee of the regions 'European Defence Action Plan', COM(2016) 950, 30 November 2016.

[151] On this last aspect, see D. Livingstone and P. Lewis, Space, the final frontier for cybersecurity?, Chatham House, September 2016.

[152] European Commission, ESA and EDA, Critical space technologies for European strategic non-dependence, March 2015. The process to update the action plan is ongoing.

3.3. International relations

Space activities have an inherent international dimension linked to the development of space infrastructures (ground segments need to be deployed across the globe), the defence and security aspects of space and the fact that space is a policy tool in diplomatic relations. The European Parliament has often called for a greater EU intervention in the international aspects of space.[153] The Commission also pursues this direction in its latest communications.[154] At EU level, a space workforce established within the European External Action Service (EEAS) follows the international activities in the field, together with the European Commission.

3.3.1. International framework for space

The United Nations Office for Outer Space Affairs (UNOOSA) offers a framework for the discussion on international aspects of space activities. It serves as the secretariat of the UN Committee on the Peaceful Uses of Outer Space (COPUOS).[155] Space is also debated under the first committee (Disarmament and international security) and the fourth committee (Special political and decolonization) of the UN General Assembly.[156] Since 2011, the EU participates in the UN as an enhanced observer.[157]

Space activities are regulated by the 1967 Treaty on Outer Space and specific international agreements.[158] In 2008, the EU proposed an international code of conduct for outer space activities within the framework of the first committee.[159] Russia and China countered this initiative with a proposal for a treaty on prevention of the placement of weapons in outer space.[160] The EU proposal has not as yet been adopted.

3.3.2. Bilateral dialogues

The Commission has established space dialogues (jointly with ESA and the EEAS) with key international partners such as the USA, Russia, China, Japan and South Africa. Discussions are also underway with other third countries. Cooperation covers the economic potential of space, defence and security issues, as well as negotiations regarding the use of the data and services provided by the EU Galileo and Copernicus space programmes.

3.3.3. Participation in global programmes

Europe participates in global space programmes through its own programmes. Copernicus represents the European contribution to the Global Earth Observation

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[153] In October 2003, the Parliament considered that the Commission should recognise 'the role falling to the Union in the sphere of international negotiations, standardisation and security' (resolution P5_TA(2003)0427, op. cit.) and in December 2013, it called 'on the Commission and the Member States to work towards global governance for space' (resolution P7_TA-PROV(2013)0534, 10 December 2013, *op. cit.)*.

[154] In 2011, the Commission put a certain focus on the integration of space-related matters into the Union's external policy and on the involvement of the EU in 'the efforts of the international community to strengthen the security, safety and sustainability of activities in outer space'. International cooperation is one of the key priorities of the space strategy adopted in 2016.

[155] For more information, see the UNOOSA website.

[156] For more information, see the General Assembly of the United Nations website.

[157] General assembly resolution, Participation on the European Union in the work of the United Nations, A/RES/65/276.

[158] The treaty can be consulted on the UNOOSA website. The other agreements include the 1968 Agreement on the Rescue of Astronauts, the 1972 Liability Convention, the 1975 Convention on Registration of Objects Launched into Outer Space and the 1979 Moon Treaty.

[159] The EU proposal for a code of conduct for outer space activities has been supported by the Council.

[160] Draft treaty on the prevention of the placement of weapons in outer space, CD/185, 12 June 2014.

System of Systems (GEOSS), implemented by the Group on Earth Observations (GEO) established in 2005.[161] The GEO members include 102 nations and the European Commission, and aim to pool earth observation resources and coordinate the development of earth observation capacities. The Commission also represents the EU with Copernicus in the Committee on Earth Observation Satellites (CEOS).[162]

The International Committee on Global Navigation Satellite Systems (ICG)[163] was set up in 2005 under the umbrella of the United Nations to promote voluntary cooperation on matters related to satellite navigation and ensure greater compatibility, interoperability and transparency between the different systems.[164] Galileo is also an instrument used in the Search and Rescue Initiative (COSPAS-SARSAT).[165]

3.3.4. Other international activities

Other international discussions and decisions linked to space include the attribution of the radio frequencies for communications with space systems. The International Telecommunication Union (ITU), a UN agency, is in charge of the allocation of frequencies for the different usages and programmes, with the aim of avoiding interferences.[166]

Space exploration is discussed between the various space agencies at international level through the International Space Exploration Coordination Group (ISECG).[167] Some 14 space agencies work together to implement common programmes such as the international space station, or coordinate their activities to avoid duplicating programmes. The participating agencies adopted a global exploration strategy in May 2007 and a global exploration roadmap in August 2013. Space exploration is also discussed at the Global Space Exploration Conference organised by the International Astronautical Federation (IAF).[168]

4. Main issues and challenges

4.1. The increasing role of the private sector in space

In the last two decades, new private actors have invested in space, with the ambition to change the business model of a sector dominated by public agencies. The **'Newspace'** movement aims to **reduce the cost of space infrastructures and launch services** by producing, for example, large constellations of light satellites with a relatively short lifespan.[169] This development is based on a paradigm shift regarding the risk associated with space programmes. Examples of these new trends include projects such as OneWeb that envisage the production and launch of a constellation of 648 satellites to provide

[161] For more information, see the GEO website.

[162] For more information, see the CEOS website.

[163] For more information, see the ICG website.

[164] Besides the European system Galileo, navigation systems existing or under development include the GPS (USA), Glonass (Russia), Beidou and Compas (China), IRNSS (India) and QZSS (Japan).

[165] For more information, see the International Satellite System for Search and Rescue website.

[166] For more information, see the ITU website.

[167] For more information, see the ISECG website.

[168] For more information, see the IAF website.

[169] NewSpace Global, a consultancy established in 2011, lists more than 1 000 companies in the field.

high speed internet everywhere.[170] Another example of private companies replacing public institutions in the launchers sector is SpaceX.[171] This new context implies to **redefine the role and missions of public space agencies** and other public institutions funding space programmes.

4.2. Fragmentation of the European landscape

Space policy in Europe is defined and implemented by the European Union (the Commission and the EEAS), European intergovernmental organisations (ESA and EUMETSAT) and some key Member States with national space agencies (See Table 2).[172] The European organisations encompass different member states and follow different procedures for decision-making or in budget implementation (financial rules, industrial policy etc.).

This **diversity provides some flexibility** for the benefit of EU Member States. Depending on their interests and their budget, they can decide to implement their space programmes at the national level, in cooperation with other states, through ESA's optional programme or collectively through EU space programmes. National space industry support plays a key role in these decisions, given the difference between ESA's fair-return policy and the Commission's competition policy.

On the one hand, this situation has led to the involvement of more and more EU member states in the space sector and the development of a diversified and robust European space industry. On the other hand, **a complex system of governance** for the space sector in Europe results.

Great difficulties ensue in adopting key documents suggested or proposed in recent decades: an overall European space policy; an ambitious European space strategy; a comprehensive European space programme gathering national, ESA and EU programmes; a European international strategy for space; a European space exploration strategy; or a European space industrial policy.

4.3. Limitations to European space governance

4.3.1. ESA and the EU

The European Commission and ESA have worked to improve European space policy coordination over the last 15 years. The agreement signed between the EU and ESA in 2004 and the organisation of the Space Council provided a new momentum, and the ESA and the EU roles were separated:

- ESA possesses the **technical competency** to implement space programmes and its activities are mainly confined to the upstream space sector. ESA is also in charge of developing European space science and space exploration programmes.
- **The EU has the competence regarding regulation** and can develop Member State use of EU space infrastructures, services and data. The EU has the capacity to federate Member State demand, and the financial capacity to invest in large long-term space programmes (as shown with Galileo). However, the Commission does not have the competence to manage and operate these programmes (hence the creation

[170] For more information, see the website of OneWeb.

[171] SpaceX is currently under contract with NASA to resupply cargo to the international space station.

[172] The national agencies having a large independent national space programme are the CNES (France), DLR (Germany), ASI (Italy), UKSA (UK) and INTA (Spain).

of the GSA). The EU therefore provides more support to the downstream space sector.

The NewSpace movement, with the involvement of industry in new tasks (definition, funding and operation of space programmes), may further challenge this division.

The management of programmes such as Galileo between the EU, ESA and the GSA leads to a multiplication of the expertise needed to define, develop and operate the programme across all institutions. The **asymmetry of financial rules** between the EU and ESA also creates **additional constraints and difficulties in implementation of the EU flagship programmes.**

Moreover, the 2004 agreement has so far been renewed without modification, but some of its key requirements are no longer implemented. The Space Council met for the last time formally in 2012 and the Joint Secretariat is no longer active. The work on the possible evolutions for ESA, which began in 2012, has led to no decision among the different options formulated. The 2016 joint statement between the EU and ESA did not provide any further development.

Table 2 – Roles of the different actors in the European space sector

Activities	EU	ESA	EUMETSAT	GSA	Member States	National space agencies	Industry
Define space policy	●	●			●		
Define and fund space programmes	●	●	●		●		▪
Develop and implement programmes		●				●	●
Operates space programmes		●	●	●		●	▪
Fund space R&D activities	●	●			●		●
Perform space R&D activities		●				●	●
Conduct space exploration programmes		●				●	
Regulate the space sector	●				●		

Source: EPRS. ▪ The private sector is beginning to enter these activities (Newspace)

Whereas the situation seems to be **blocked at the governance level, measures could be taken at the operational level.** The adoption of a single financial framework partnership agreement with ESA, to give a common frame to the existing delegation agreements, was suggested by ESA in the strategy to facilitate EU space programme management.

4.3.2. Additional considerations

Whereas decisions are taken at the highest political level in other space faring nations, European fragmentation leads to a lack of political impulse in the field of space. The **European Council**, the EU institution in charge of providing political direction and priorities, **has not to date taken any position to develop a long-term vision or ambition for space**. Without a clear long-term vision defined at the political level, the strategy adopted by the Commission takes stock of the current situation and focuses on measures to develop the return of investment from the EU space programmes.

Whereas space has become a horizontal policy, with space programmes supporting a large number of other policies (environment, transport, agriculture, fisheries, etc.), space policy is still managed in the Commission by the Directorate General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW). The European Parliament noted, in December 2013, that the **'Commission does not yet have a horizontal approach** with a view to mainstreaming space policy and its objectives into the various fields of policy of the Union'.[173] Nevertheless, trans-Commission user groups have been set up for the different EU space programmes, to stress the potential use of the data or services provided by the programme in various policy areas. The current structure of the Commission allows for better interservice consultation for preparation of the 2016 space strategy, which was overseen by two Commission Vice-Presidents (Maroš Šefčovič and Jyrki Katainen). Space has also been integrated in recent communications adopted by the Commission on other policy areas.[174]

Fragmentation is also a key issue for European representation in space matters at international level. Depending on the international institution, Europe is represented by its individual states, by the EU and/or by ESA. The elements for a European strategy for international relations in space proposed by the Commission in 2008 did not lead to a clarification of the roles, nor to effective coordination. In December 2016, the ESA council recognised 'ESA as an appropriate forum for the Member States to exchange and coordinate positions on international space law and in acting as a permanent observer' to the COPUOS.

5. Outlook

Since the 1960s, cooperation between European states has allowed Europe to develop its capacities in the space sector, becoming a major actor in space at the global level. ESA has played a key role in supporting the development of a competitive space industry in Europe and in allowing new Member States to invest in the sector. The European Commission, by launching large scale space programmes on satellite navigation and earth observation, has also provided strong support for the establishment of space as a horizontal tool in support of a large portfolio of other policies.

However, with current space sector development at the global level, Europe's position in the field could be challenged. The fragmented governance of space and the diverse configurations and rules under which space programmes are developed in Europe can be seen as barriers when addressing key challenges: maintaining independent access to space; increasing efficiencies by developing synergies between the civil and defence space programmes; securing space infrastructures; ensuring the uptake of space data and services; or adopting a long term vision and financial commitments to increase private investment in the sector. The EU, ESA and their member states should address these limitations in order for Europe to maintain its position as a space faring power in the coming decades.

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[173] P7_TA-PROV(2013)0534, 10 December 2013, *op. cit.*

[174] For example the Joint Communication An integrated European Union policy for Arctic or the already mentioned European Defence Action Plan.

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Space has been a cooperative endeavour in Europe for over 50 years. The first collaborative structures between the Member States in the 1960s led to the establishment of the European Space Agency (ESA) in 1975. The European Union began to be involved in the field in the 1990s, especially through the design of EU space programmes – Galileo for satellite navigation and Copernicus for earth observation – implemented in cooperation with ESA.

European space policy is defined and implemented by the EU, ESA and their member states. This diversity offers some flexibility, but also creates fragmentation, leading to inefficiency in areas such as the implementation of EU programmes or the development of international relations. New developments, including the role of private actors in the field and the growing importance of security and defence aspects also challenge current European space policy governance.

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