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THE EUROPEAN SPACE AGENCY AND EU POLICIES; LEGAL AND POLITICAL PERSPECTIVES OF THE PARTICIPATION OF GREECE

Dissertation by Marianna Ilikidou | Professor: Nikolaos Zaikos | October 2020

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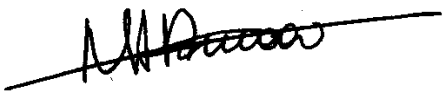

Marianna I. Ilikidou

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Abstract

This dissertation examines how the International Space Law originated from the Public International Law, in order to define the limitation of operations in outer space and the rules for its exploitation, the creation of international space institutions and the creation of the European Space Agency (ESA). The dissertation focuses on ESA as an organization, its operations and programs, and mainly its cooperation with the European Union (EU) and its institutions through the years. Finally, I present the participation of Greece in the European Space Agency as a case study in order to examine the way ESA Member States can participate in the operations of the Agency.

The European Space Agency was founded in 1975 in order for European nations to represent themselves peacefully in the international scene of space. More specifically, ESA develops and manages programs regarding space initiatives that help Europe in the fields of telecommunications, defense and security, weather monitoring and Earth observation. Currently it has 22 members that participate in the Agency's projects and initiatives, at the extend that each nation decides to contribute.

In 29 April 2004, the European Space Agency and the European Union proceeded in signing a Framework Agreement, in order to consolidate their cooperation. This cooperation, although opening new technological and fiscal chapters in the European space efforts, created sporadic tensions between the two organizations as well. ESA is an intergovernmental organization, while the EU is a supranational. This essentially means that the two organizations consist of different competences and that the Member States of each are have to follow different rules and different procedures. As we will see in detail bellow, many issues have come up over the 16 years of their cooperation and that calls for a change of plans and a renewal of the currently outdated Framework Agreement they signed back in 2004.

Finally, we will examine, step by step, the participation of Greece in the ESA, a small European nation that started, after almost a decade since the recession, to participate gradually in ESA's initiatives. Greece is used as an example to represent the smaller or less-financially abled European nations that claim a spot at the international space scene.

Space in our era is not a distant idea but a broad map of scientific and business opportunities. Space agencies from all over the world try to maintain a current position and achieve scientific firsts. Europe in order to remain o top should keep working on perfecting the relations between the two organizations, ESA and the EU.

List of Abbreviations

APSCO	Asia-Pacific Space Cooperation Organization
ASA	Austrian Space Agency
ASI	Agenzia Spaziale Italiana (Italian Space Agency)
BIRA-IASB	(Dutch: Koninklijk Belgisch Instituut voor Ruimte-Aeronomie BIRA, French: Institut royal d'Aéronomie Spatiale de Belgique – IASB) Royal Belgium Institute for Space Aeronomy
BNSC	British National Space Station
CAC	Collaborative Archiving and dissemination Centers
CBK-PAN	Space Research Center of the Polish Academy of Sciences
CERN	European Organization for Nuclear Research
CNES	Centre National d`ètudes spatiales (National Center for Space Studies)
CollDH	Collaborative Data Hub
COPERS	Commission préparatoire européenne de recherches spatiales (European Preparatory Commission for Space Research)
COPUOS	Committee on Peaceful Uses of Outer Space
CSA	Canadian Space Agency
CSC	Concept of Operations
CSEO	Cyprus Space Exploration Organization
CSG	Guiana Space Center
CSO	Czech Space Office
DG	Director General
DLR	Deutsches Zentrum fúr Luft (German Aerospace Center)
DNSC	Danish National Space Center
EAC	European Astronaut Center
ECMWF	European Center for the Medium range Weather Forecast
ECS	European Space Conference
ECS	European Cooperating State
ECSAT	European Center for Space Applications and Telecommunications
EDA	European Defense Agency
EGNOS	European Geostationary Navigation Overlay Service
ELDO	European Launcher Development Organization
ESA	European Space Agency
ESAC	European Space Astronomy Center
ESEC	European Space Security and Education Center
ESO	Estonian Space Office
ESOC	European Space Operations Center
ESP	European Space Policy
ESRIN	ESA Center for Earth Observations
ESRO	European Space Research Organization
ESTEC	European Research and Technology Center
EU	European Union
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites

GDP	Gross Domestic Product
GEANT	pan- European data network for the research and education community
GLONASS	Global Navigation Satellite System
GMES	Global Monitoring for the Environment and Security
GNSS	Global Navigation Satellite System (GSA)
GPS	Global Positioning System
GRNET	Greek National HPC ARIS (Advanced Research Information System) Infrastructure
GSRT	General Secretariat for Research and Technology
GSTP	General Support Technology Program
HSA	Hellenic Space Agency
HSC	Hellenic Space Center
HSO	Hungarian Space Office
IAASARS/NOA	Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing, National Observatory of Athens
ICT	Information and Communication Technology
IGOs	Intergovernmental Organizations
IMM18	Intermediate Ministerial Meeting of 2018
INTA	Instituto National de Tècnica Aerospacial (National Institute dor Aerospace Tevhnology)
ISS	International Space Station
IZM	Ministry of Education and Science of Latvia
JAXA	Japan Aerospace Exploration Agency
JSSAG	Joint Space Strategy Advisory Group
JTF	Joint Task Force
LSA	Luxembourg Space Agency
NASA	National Aeronautics and Space Administration
NOA	National Observatory of Athens
NOSA	Norwegian Space Agency
PECS	Plan for European Cooperating States
QCI	Quantum Communication Infrastructure
RDI	Research Driven Innovation
RND	Research and Development
RoSA	Romanian Space Agency
SMES	Small and Medium Enterprises
SNSB	Swedish National Space Board
SOSA	Slovak Organization for Space Activities
SRON	Space Research Organization Netherlands
SSA	Space Situational Awareness
SSAU	State Space Agency of Ukraine
SSO	Swiss Space Office
TÜBİTAK	Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (Scientific and Technological Research Council of Turkey)

Contents

Introduction

The International Space Law field is considered a branch of the Public International Law. When the interest for space arose, people wanted to define the rules that would apply outside the limits of the atmosphere of the Earth. The motives were not all innocent and humanitarian, and as many industries or nations wanted to profit from the lack of limitation and rules regarding the exploitation of space, the need for creation of such a branch in the Public International Law seemed crucial.

"International space law is usually defined as a branch of general (public) international law, a subset of rules, rights and obligations of states within the latter specifically related to outer space and activities in or with respect to that realm. Public international law in turn is usually defined with reference to the Statute of the International Court of Justice, as comprising at a first level treaties and customary international law, and at a secondary level general principles of law, the writings of the most respected legal experts, regulations emanating from international organizations and – arguably – what is called 'soft law'."[1]

Public International Law essentially, is the ability of states to jointly draft and vote upon treaties with the right to agree or reject one, ratify or avoid the ratification of one. This "state-oriented" concept of Public International Law sometimes collides with the National law of each state.[2] "Sovereignty and jurisdiction are legal doctrines of a complex nature". Recognized under customary international law, is the tridimensional territory of states but, there are other territories that cannot be defined as property of any political entity or nation. Outer space is one of these territories that was the center of debate and in need of delimitation as increase in satellite communications, air transportation and space exploration became a part of every-day life.[3]

After the launch of Sputnik 1, the first endeavor of humankind to reach space, on an international level, the interest in creating 'space law' became essential. A big factor in this was the Cold War and the antagonism of the two superpowers, the USSR and USA, on who will be the first one to make progress in the field of space. Since the technological and geopolitical situation started changing and evolving rapidly, in the 1950s and onward, a core body regarding International Space Law started developing.

The tension of the Cold War helped define the general understanding that space was not property of any nation to be used in harmful ways against another, but legacy of the

[1] F. Von der Dunk and F. Tronchetti, *Handbook of Space Law*, Cheltenham, UK: Edward Elgar Publishing, 2015, p. 29-30
[2]Von der Dunk and Tronchetti, *Handbook of Space Law,* p. 32
[3]G. Oduntan, *Sovereignty and Jurisdiction in Airspace and Outer Space, Legal Criteria for Spatial Delimitation*, Abingdon, UK: Routledge, 2011, p. 2

humankind, and was to be protected and only open for exploration and global scientific advancement.[4]

In 1959 the COPUOS (Committee on the Peaceful Uses of Outer Space) was created by the General Assembly of the United Nations. Its purpose is "to govern the exploration and use of space for the benefit of all humanity: for peace, security and development". Originally it was composed by 18 members but, as of 2019 it includes 92 member states.[5] The United Nations created this Committee to deal with the problems the Cold War posed in the evolution of space technology and manages to remain a peace-maker up until today and to efficiently present an international platform to discuss and monitor the rapid advances in space affairs.

COPUOS created five treaties and five principles regarding outer space that, although not legally binding, comprise a set of rules of customary international law. [6]

Treaties adopted by COPUOS:

1. *The Outer Space Treaty* or *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* of 1967 [7]

   As of June 2020, 110 countries have ratified the treaty, while 23 have signed but have not ratified it. The Treaty includes prohibition of nuclear weapons placement in space, states that the Moon and other celestial bodies are to be used only for peaceful purposes and that space shall be used for peaceful exploration by all nations but no nation can claim sovereignty of space or any celestial body. Additionally, this Treaty does not ban weaponization of space except for weapons of mass destruction.[8]

2. *The Rescue Agreement* of 1968[9]

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[4] Von der Dunk and Tronchetti, *Handbook of Space Law*, p. 34-5
[5] UNITED NATIONS Office for Outer Space Affairs, 'Committee on the Peaceful Uses of Outer Space', *United Nations Office for Outer Space Affairs*, 2020, unoosa.org/oosa/en/ourwork/copuos/index.html, accessed 20 October 2020
[6] UNITED NATIONS Office for Outer Space Affairs
[7] General Assembly resolution 2222, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, A/RES/2222, 19 December 1966, unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html, accessed 21 October 2020
[8] General Assembly resolution 2222
[9] General Assembly resolution 2345, *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, A/RES/2345, 19 December 1967, unoosa.org/oosa/en/ourwork/spacelaw/treaties/rescueagreement.html, accessed 20 October 2020

As of January 2019, 98 nations have ratified the Rescue Agreement, 23 have signed it but have not ratified it and 3 intergovernmental organizations (ESA, the European Organization for the exploitation of Meteorological Satellites and the Intersputnik Organization of Space Communications) have declared their acceptance of the terms of the Agreement.

The Rescue Agreement states that any nation that may become aware that the personnel of a spacecraft are in distress is obliged to notify the Secretary General of the United Nations and the launching authority. Additionally, the nation shall provide all possible assistance to help rescue the personnel in case the spacecraft lands within the nation's territory or extend assistance to a neighboring nation if the spacecraft lands there. In the Rescue Agreement there are included provisions regarding compensation for recovery of a space object as well as, for rescue of humans in space.

3. *The Liability Convention* or *The Convention on International Liability for Damage Caused by Space Objects* of 1972.[10]

As of January 2019, 96 nations have ratified the Liability Convention, 19 have signed but not yet ratified the Convention and 3 intergovernmental organizations (ESA, the European Organization for the exploitation of Meteorological Satellites and the Intersputnik Organization of Space Communications) have declared their acceptance of the terms of the Convention.

The Liability Convention states that nations have international responsibility for all the objects that are launched into space from within their territory. If two nations collaborate in launching a space object, then both nations are held responsible for the damage the launched object might cause. The Convention was created to add on already existing national laws that provide compensation to parties injured by space activities. Under the Liability Convention claims must be brought by one nation against another nation meaning that an individual that might be harmed by space activities must be represented by his/her country against the country that launched the object.[11]

4. *The Registration Convention or The Convention on Registration of Objects Launched into Outer Space* of 1975

As of December 2018 the Registration Convention has been ratified by 69 nations and 3 intergovernmental organizations (ESA, the European Organization for the exploitation of Meteorological Satellites and the Intersputnik Organization of Space

[10] General Assembly resolution 2777, *Convention on International Liability for Damage Caused by Space Objects*, A/RES/2777, 29 November 1971, unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html, accessed 20 October 2020

[11] General Assembly Resolution 2777

Communications) have declared their acceptance of the terms of the Convention. The Convention states that the nations have to provide the UN with details about the orbit of every space object[12]

5. *The Moon Agreement* or *The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* of 1979

As of January 2019 the Agreement has 18 parties to the Treaty but, it has not been ratified by any nation that performs self-launched human spaceflight or plans to do so. Unfortunately, this means that the Moon Agreement has little to no effect in international law.

The primary objective of the Agreement is to provide legal principles that will affect the behavior of the nations, organizations and individuals regarding exploration of celestial bodies other than Earth and the extent of said exploration. [13]

Principles that support the Treaties adopted by COPUOS

1. *The declaration of legal principles governing the activities of States in Outer Space* in 1963.

This resolution adopted in 13 December 1963 regarded the activities of states in the exploration and use of outer space and included, among others, that outer space and celestial bodies are free for exploration that will benefit all mankind and the exploration should be in accordance with international law and on a basis of equality. Outer space and celestial bodies cannot be claimed for national appropriation and that states bare international responsibility for their actions in space.[14]

2. *The principles regarding international direct television broadcasting* in 1982.

The Principles referring to the use by states of the artificial Earth satellites for international direct television were adopted by the General Assembly in 10 December 1982 and stated that the nations should follow international law in all activities regarding international direct television broadcasting by satellite. Every state has an equal right in international direct television broadcasting and all activities should

[12] General Assembly Resolution 3235, *Convention on Registration of Objects Launched into Outer Space,* A/RES/3235, 12 November 1974, unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html, accessed 20 October 2020

[13]General Assembly resolution 34/68, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, A/RES/34/68, 5 December 1979 unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html, accessed 21 October 2020

[14] General Assembly Resolution 1962, *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*, A/RES/1962, 13 December 1963, unoosa.org/oosa/en/ourwork/spacelaw/principles/legal-principles.html, accessed 21 October 2020

encourage international cooperation. States should bear international responsibilities in the field and states should protect the copyrights of themselves and their neighboring states.[15]

3. *The principles regarding remote sensing of the Earth* in 1986.

The Principles relating to remote sensing of the Earth from outer space were adopted by the General Assembly in 3 December 1986. The Principles states that the activities regarding remote sensing of the Earth from outer space should be for the benefit of all nations and should be contacted in accordance with international law, as well as, that nations carrying out remote sensing activities should promote international cooperation. Additionally, states are encouraged to "provide for the establishment and operation of data collecting and storage stations and processing and interpretation facilities" through agreements and other arrangements. Finally, remote sensing should promote the "protection of the Earth's natural environment."[16]

4. The principles on the use of nuclear power sources in 1992.

The Principles relevant to the use of nuclear power sources in outer space were adopted by the General Assembly in 14 December 1992 and mentioned, among others, that activities regarding nuclear sources in outer space should follow international law procedures and that in order to limit radioactive waste in space, the use of nuclear sources shall be possible only in the event that a space mission cannot operate by non-nuclear power sources. Nuclear reactors can operate on interplanetary missions and only in sufficiently high orbits and that states bear international responsibility for their actions in outer space.[17]

5. *The declaration of international cooperation in the exploration and use of outer space in 1996.*[18]

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[15]General Assembly Resolution 37/92, *Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting*, A/RES/37/92, 9 November 1972, unoosa.org/oosa/en/ourwork/spacelaw/principles/dbs-principles.html, accessed 21 October 2020

[16] General Assembly Resolution 41/65, *Principles Relating to Remote Sensing of the Earth from Outer Space*, A/RES/41/65, 12 November 1974, unoosa.org/oosa/en/ourwork/spacelaw/principles/remote-sensing-principles.html, accessed 21 October 2020

[17] General Assembly Resolution 47/68, *Principles Relevant to the Use of Nuclear Power Sources in Outer Space*, A/RES/47/68, 15-26 June 1992, accessed 21 October 2020 unoosa.org/oosa/en/ourwork/spacelaw/principles/nps-principles.html

[18]United Nations Office for Outer Space Affairs, 'Treaties', *United Nations Office for Outer Space Affairs*, n.d., unoosa.org/oosa/en/aboutus/history/treaties.html, accessed 21 October 2020

> This Declaration referring to the international cooperation in the exploration and use of outer space was adopted by the General Assembly in 13 December 1996 and stated that exploration of space should have peaceful motives and shall be conducted in accordance with international law. All countries, and especially those with space programs, should promote international cooperation in the fiend of space and the Committee on the Peaceful Uses of Outer Space should be supported "as a forum for the exchange of information on national and international activities in the field of international cooperation in the exploration and use of outer space".[19]

For the first part of this thesis we will examine why and how was the European Space Agency created and what, essentially, does the Agency do for Europe.

In 1964 6 European states created the European Launcher Development Organization (ELDO) based in Paris. Germany, Italy, France, the United Kingdom, Belgium, the Netherlands along with Australia as an associate member established this space research organization. During its brief life, ELDO organized 10 vehicle launches out of which, 4 were successful.[20]

In 20 March 1964 10 European nations that had mutual scientific pursues in the research of space came together and founded the European Space Research Organization (ESRO). These nations were France, Germany, Belgium, Denmark, Italy, the Netherlands, Sweden, Spain, the United Kingdom and Switzerland. ESRO was based in CERN and was an organization that focused exclusively on scientific activities.[21]

In 30 May 1975, the European members of ESRO (European Space Research Organization) and ELDO (European Launcher Development Organization), came together in Paris, at the "Convention for the Establishment of a European Space Agency"[22], and thus created a European Agency that would consolidate Europe's position in space activities. The Convention entered into force in 30 October 1980.[23]

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[19]General Assembly 51/122, *Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries*, A/RES/51/122, 9-21 August 1982, unoosa.org/oosa/en/ourwork/spacelaw/principles/space-benefits-declaration.html, accessed 21 October 2020

[20] David Darling, 'ELDO (European Launcher Development Organization)', *David Darling,* n.d., daviddarling.info/encyclopedia/E/ELDO.html, accessed 2 February 2020

[21]UNESCO, 'ESA European Space Agency', *UNESCO*, n.d., unesco.org/archives/sio/Eng/presentation_short.php?idOrg=1007, accessed 2 February 2020

[22] See "CONVENTION FOR THE ESTABLISHMENT OF A EUROPEAN SPACE AGENCY", 1975, p. 80 of the Annex

[23] F. Von Der Dunk and M. M. T. A. Brus, *The International Space Station, Commercial Utilisation from a European Legal Perspective*, Belgium: Martinus Nijhoff Publishers, 2006, p. 19-20

ESA is a regional intergovernmental organization that was created to achieve a strong European presence in space. In the past, the main actors of the global space scene where the United States and the Soviet Union. Europe, in order to represent itself, had to unite for greater success. This was the case because the national space agencies of the European countries did not have the financial capabilities that USA or the Soviet Union had to develop big projects regarding space technologies. So, in order to pursue this common goal, European countries decided to create the European Space Agency that would represent them in matters of space. Through this Agency, all the full members get to decide upon new policies and develop new space technologies and projects without jeopardizing their sovereignty.[24]

There are a few other regional intergovernmental organizations that take part in space activities like EUMETSAT (the European Organization for the Exploitation of Meteorological Satellites), Intersputnik[25] and the Asia-Pacific Space Cooperation Organization[26]. EUMETSAT is an intergovernmental organization that monitors the environment and climate change as well as provide data from its satellites regarding weather forecasting. It is based in Darmstadt, Germany and has 30 Member States (Croatia, Belgium, Austria, Bulgaria, Denmark, Czech Republic, Finland, Greece, Estonia, Hungary, Germany, France, Ireland, Iceland, Latvia, Italy, Luxembourg, Lithuania, Norway, Romania, the Netherlands, Portugal, Poland, Slovak Republic, Switzerland, Spain, Slovenia, Sweden, the United Kingdom and Turkey). EUMETSAT is a regional intergovernmental organization that cooperates with the ESA and it was established in 1986.[27]

Intersputnik or The Intersputnik International Organization of Space Communications is another example of an intergovernmental organization that relates with space activities. It was created in 1971 in Moscow by the Soviet Union in cooperation with Mongolia, Romania, Poland, Cuba, Hungary, Bulgaria, Czechoslovakia and East Germany. Today, it has 25 member states and it operates 41 transponders and 12 satellites in orbit.[28]

Finally, we have the Asia-Pacific Space Cooperation Organization (APSCO) that is located in Beijing, People's Republic of China. APSCO is a regional intergovernmental organization that runs as a non-profit body with full international legal status. Its member

[24] The European Space Agency, 'Facts', *The European Space Agency*, http://www.esa.int/About_Us/Corporate_news/ESA_facts, accessed 27 February 2020
[25] Intersputnik, 'About Intersputnik', *The Intersputnik International Organization of Space Communications*, https://intersputnik.int/about/organization/, accessed 3 March 2020
[26] Asia-Pacific Space Cooperation Organization, 'About APSCO', *Asia-Pacific Space Cooperation Organization*, http://www.apsco.int/html/comp1/content/WhatisAPSCO, accessed 3 March 2020
[27] EUMETSAT, 'Who Are We', *EUMETSAT,* https://www.eumetsat.int/about-us/who-we-are, accessed 3 March 2020
[28] Intersputnik, 'About Intersputnik'

states are The Republic of Turkey, The Kingdom of Thailand, Mongolia, The Islamic Republic of Pakistan, The Islamic Republic of Iran, The Republic of Peru, The People's Republic of China and The People's Republic of Bangladesh. The APSCO Convention was signed in 2005 and entered into force in 2008.[29]

As for the comparison of these organizations with the European Space Agency, to begin with the similarities, they are all continental intergovernmental organizations that participate in space activities. They were established in order for their member states to represent the common goals they have towards space initiatives by sharing the financial responsibilities, policy implementations and decision-making procedures.

EUMETSAT and Intersputnik are organizations that have very specific roles in space activities, while the ESA and APSCO are organizations that operate multiple programs relating to various aspects of space activities including telecommunications, satellite navigation, environment monitoring etc. Unfortunately, due to a lack of data we cannot compare the budgetary capabilities of APSCO to ESA's. But, it will suffice to say that APSCO is a somewhat newly- established space organization that is making its first steps in the past decade. Its internal structure is similar to this of ESA, as it consists of the APSCO Council which is the executive organ and the Secretary General and the Departments of the organization.[30]

The European Space Agency, therefore, represents Europe united in space. It created a platform for every European nation, big (e.g. France) or small (e.g. Greece), to participate in scientific programs and space initiatives to the extent of their capabilities and interests.

Art. XIV of "the Convention"[31] of ESA refers to the legal basis of all ESA's activities regarding international cooperation. ESA by many is considered a successful example in the field of international cooperation, as it is an intergovernmental institution that allows not only its Member States, but Cooperating States as well, to define, based on their interests and financial spectrum their participation in the various optional programs that it develops.[32]

For the second part of this thesis we will examine the cooperation or the European Space Agency with the European Union and which are the challenges of this cooperation.

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[29] Asia-Pacific Space Cooperation Organization, 'About APSCO'

[30] Asia-Pacific Space Cooperation Organization, 'APSCO Structure', *Asia-Pacific Space Cooperation Organization*, http://www.apsco.int/html/comp1/content/APSCOStructure, accessed 3 March 2020

[31] See "CONVENTION FOR THE ESTABLISHMENT OF A EUROPEAN SPACE AGENCY", 1975, p. 80 of the Annex

[32] C. Brünner and A. Soucek, *Outer Space in Society, Politics and Law*, Wien,Austria: Springer-Verlag, 2011, p. 186

The European Space Agency cooperated with the European Union since 1993, when the Commission established an advisory group that included ESA, the Western European Union and EU Member States. This advisory group regarded space matters and the coordination of the participants. After years of discussions and common participation in satellite programs, the two organizations came together and signed the Framework Agreement that came into force in May 2004.

This Agreement recognized that the differences of the two organizations would help reinforce this cooperation in the matters of space in Europe and aimed to establish a common basis for efficient cooperation and to gradually develop a European Space Policy to link the supply and demand needs of the two organizations and their respective Member States.

Since then, the two organizations worked together in many initiatives regarding space, such as the EU's flagship programs Copernicus (Earth observation program), Galileo[33] (Global Navigation Satellite System- GNSS) and Horizon 2020[34] (Research and Innovation program).

The European Union and the European Space Agency have some fundamental differences. The EU is a supranational institution while ESA is an intergovernmental one. They are both governed in different ways, by different procedures and voting rules and their Member States are not all the same.[35]

However, their different characteristics helped the creation of a unified Europe in space. ESA has a more "operational" role as it offers its resources and knowledge in the application of European initiatives in space, while the EU offers the legislative and a big part of the financial aid to the cooperation.[36]

Finally, in this thesis we will examine the accession of Greece in the European Space Agency and its programs. Greece is used as an example of the smaller EU Member States that although facing fiscal problems due to the economic crisis of 2010, gradually started to actively participate in ESA initiatives.

Greece became a member of ESA in 2001 and since then has been involved in the optional programs of ESA: ARTES (telecommunications program), Copernicus (Earth observation program) and others that we will see bellow in detail.

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[33] The European Space Agency, 'ESA and the EU', *The European Space Agency*, n.d., http://www.esa.int/About_Us/Corporate_news/ESA_and_the_EU, accessed 1 February 2020
[34] Europa.eu, 'What is Horizon 2020?', *Europa.eu.*, n.d., https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020, accessed 27 February 2020
[35] The European Space Agency, 'ESA and the EU'
[36] F. Von der Dunk and F. Tronchetti, *Handbook of Space Law*, p. 206-7

In this research, we will look into the operations of the European Space Agency and the different aspects of its relationship with the European Union, as well as, the participation of Greece in the Agency and its programs.

The reason that I chose this topic is that I was always fascinated by the vastness of space and the fact that humankind is, in the recent decades, able to make its imprint on it. Through this master's program I had the opportunity to understand how and why the international organizations operate and what is their utility in the cooperation of nations in different platforms.

I was especially intrigued by the topic of the European Space Agency because, although I am a citizen of a European country, I had little to no knowledge about it and its initiatives. Usually when we hear about space and human initiatives we automatically think of NASA.

As I started looking into ESA, I was fascinated by the impact these programs have on our day-to day lives (e.g. "Space 19+"[37] Space and 5G networks) and on our future capabilities (e.g. "Galileo"[38] Europe's own navigation satellite system).

I decided to examine ESA's relationship with the European Union because I found the relationship between those two very different international organizations very interesting, as their differences were the base of their cooperation and in case one of the two might lack of something, the other can provide it, and vice versa.

Finally, I added the participation of Greece, as a case study, because I am a Greek citizen and through my research I realised that there are very little and sporadic information regarding its participation in the Agency, so I decided to gather them and present an organized overview of the steps this small EU Member State has made over the last decade within ESA in the field of space.

[37] The European Space Agency, 'ESA on the way to Space19+ and beyond…', *The European Space Agency*, 2018, https://www.esa.int/About_Us/Corporate_news/ESA_on_the_way_to_Space19_and_beyond, accessed 2 September 2020

[38] The European Space Agency, 'Galileo begins serving the globe', *The European Space Agency*, n.d., http://www.esa.int/Applications/Navigation/Galileo_begins_serving_the_globe, accessed 13 June 2020

1. Internal Structure, Membership and Facilities of ESA

In the following subchapters we will see, in detail, what is the internal organizational structure of the Agency, the procedure nations have to follow in order to participate in the European Space Agency's programs, which are the members of ESA so far, and which are ESA's facilities.

1.1 Organizational Structure of ESA

In this sub-chapter we will see which is the hierarchical line of duties ESA follows in order to achieve the collective goals of the Agency. At the top of the organizational structure we have the Director General and the Council followed by the program boards and the Committees of the Agency that the Council overviews.

DG	**Council**
The Director General is the legal representative of the Agency, its Chief Executive Officer and the head of the administration.	The Council is a governing body of ESA.
The Director General implements initiatives, enforce policies and reports to the Council.	The Council is managed by a Chairman who is in charge for a 2-year period and is composed by representatives of each Member State.
The Director General is aided by science, administrative and clerical personnel and relevant staff to carry out the tasks.	Each Member of the Council has the right to one vote.
The Director General's staff is referred to as the "Secretariat."	The Council's aim is to decide on policies and activities of ESA.
The Director General is voted by the 2/3 of the council once in every 4 years.	The Council meets every 2-3 years at ministerial level and quarterly at a delegate level .

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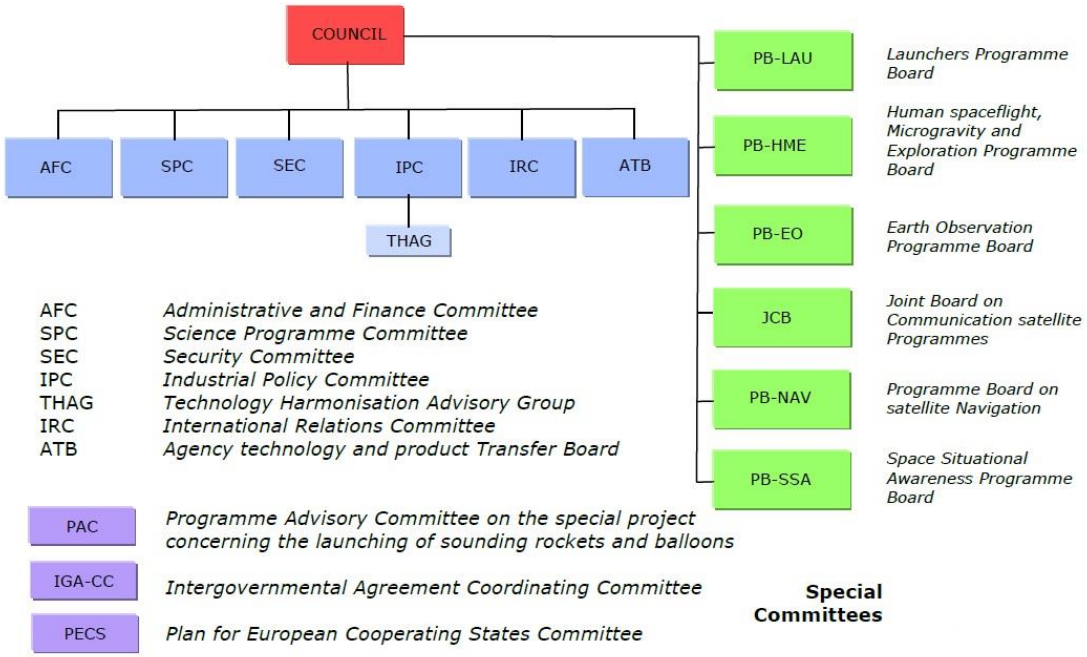
[39] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, p. 41

The Program Boards and Committees under management of the Council



[40]

Program Boards

1. PB-LAU (Launchers Program Board)
2. PB-HME (Program Board for Human Spaceflight, Microgravity and Exploration)
3. JCB (Joint Board on Communication Satellite Programs)
4. PB-NAV (Program Board on Satellite Navigation)
5. PB-EO (Earth Observation Program Board)
6. PB-SSA (Space Situationnel Awareness Program Board)

*the Program Boards role is to manage the six optional programs

Committees

1. IPC (Industrial Policy Committee)
2. AFC (Administration and Finance Committee)

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[40] Czech Space Portal, 'Organizational structure of ESA', *Czech Space Portal*, n.d., https://www.czechspaceportal.cz/en/section-2/space-policy-eu---esa/organizational-structure-of-esa/, accessed 3 March 2020

3. IRC (International Relations Committee)
4. SEC (Security Committee)
5. SPC (Science Programme Committee)
6. ATB (Agency technology and product Transfer Board)

*the committees work on the management of the mandatory activities[41]

1.2 Procedure of accession

The ESA Council came to a decision on 21/22 March regarding the procedure for accession of the European member states. To become a member of the ESA they will do so in three (3) stages.

1st: Cooperation Agreement

2nd: ECS states

3rd: associate or full membership

To enter the first stage, a country will sign a Cooperation Agreement with the ESA. In this stage the country has limited financial responsibilities. If a country wants to gain more responsibilities and involvement in the ESA, then they proceed in signing a European Cooperating State (ECS) agreement.

The ECS agreement allows the companies operating in the country qualify for participation in ESA programs. The country can take part in all ESA programs, except for the Basic Technology Research Program. At this stage, the financial responsibilities of the country towards the ESA increase, although they are still much lower than those of a full member state. The ECS agreement is usually followed by a Plan or European Cooperating State (PECS Charter).

This program last for a 5-year period of basic research and development activities(RND) that help develop the country's space industry capabilities. At the end of this program, the nation's options are to become an associated member state, a full member state, or sigh a new PECS Charter.[42]

The Convention of ESA is, within the legal structure, the highest, hierarchically, document, with five Annexes ("Annex I: Privileges and immunities, Annex II: Financial provisions,

[41]F. Von der Dunk and F. Tronchetti, *Handbook of Space Law,* p. 215

[42] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, Washington DC, USA: International Business Publications, 2016, p. 37

Annex III on optional programs and dealing with budgeting issues, in particular cost overruns, Annex IV: Internationalization of national programs, and Annex V: Industrial policy") that are integral part of the Convention. The two main organs of the Agency are also provided by the Convention: the Council and the Director General.[43]

1.3 Member States

ESA has 22 Member States that have signed and ratified the ESA Convention.

20 EU countries:

1. Austria,
2. Belgium,
3. the Czech Republic,
4. Denmark,
5. Estonia,
6. Finland,
7. France,
8. Germany,
9. Greece,
10. Hungary,
11. Ireland,
12. Italy,
13. Luxembourg,
14. the Netherlands,
15. Norway,
16. Poland,
17. Portugal,
18. Romania,
19. Spain,
20. Sweden,

plus, the United Kingdom and Switzerland;

Seven other EU countries have ESA Cooperation Agreements:

21. Bulgaria,
22. Cyprus,
23. Latvia,
24. Lithuania,
25. Slovakia,

[43] F. Von der Dunk and F. Tronchetti, *Handbook of Space Law*, p. 37

26. Malta,
and there are ongoing discussions regarding Croatia.

Canada participates in some projects and is an Associated State under a Cooperation Agreement, and Slovenia is the most recent country to enter into an Association Agreement with the European Space Agency.[44]

In order for a state to become an active member in the ESA, it is not mandated by the ESA Convention that the state should acquire the associate membership status. This status allows the associate member states to take part in ESA's deliberative bodies and decision making, as well as, in programs and activities. Firms of states with associate membership status can receive and bid for contracts to participate in programs. The accord has a provision that guarantees a fair industrial return to the associate member states.
Portugal, Luxembourg and Greece skipped associate membership and went from Cooperation Agreements to full ESA membership, while the Czech Republic although also skipping associate membership, went through the new enlargement process via Cooperation Agreement, ECS Agreement and PECS Charter implementation. Austria, Finland and Norway used to be associate members, but they all later joined as full members through their Ministry of Trade and Industry.

The ESA Convention does not include restrictions regarding the participations of non-European states, but the ESA Council applies such rule de facto and this is why currently the only non-European participant, as an associate member, is Canada. Australia used to be an ELDO associate member, but decided not to participate in the ESA. Despite this decision, in 5 March 2003, ESA's first deep space ground station in the world opened in western Australia in an inauguration ceremony.

ESA Founding Members	**Signature**	**Ratification**	**National Program**
Sweden	30 May 1975	6 April 1976	SNSB
Switzerland	30 May 1975	19 November 1976	SSO
Germany	30 May 1975	26 July 1976	DLR
Denmark	30 May 1975	15 September 1977	DNSC
Italy	30 May 1975	20 February 1978	ASI
United Kingdom	30 May 1975	28 March 1978	BNSC
Belgium	30 May 1975	3 October 1978	BIRA

[44] The European Space Agency, *January 2017 report*, 11 January 2017, p. 5

Applicant state	Cooperation Agreement	ECS Agreement	PECS Charter (s)	ESA Convention Signature	National Program
Turkey	15 July 2004				TÜBİTAK
Ukraine	25 January 2008				SSAU
Cyprus	27 August 2009		June 2015		CSEO
Slovakia	28 April 2010				Through SOSA

Netherlands	30 May 1975	6 February 1979	SRON
Spain	30 May 1975	7 February 1979	INTA
France	30 May 1975	30 October 1980	CNES
Ireland	31 December 1975	10 December 1980	(No national program)
Associate Members	**Signature**	**Entry Into Force**	**National Program**
Canada	9 December 1978	1 January 1979	CSA
ESA Convention entry into force: 30 October 1980			
Acceded members	**Cooperation Agreement**	**ESA membership**	**National Program**
Austria	1979 for associate membership	30 December 1986	ASA
Norway	1981 for associate membership	30 December 1986	NOSA
Finland	1987 for associate membership	1 January 1995	BUSINESS FINLAND
Portugal	1996	16 November 2000	PORTUGAL SPACE
Greece	January 2001	9 March 2005	IAASARS/NOA
Luxembourg	September 2000	30 June 2005	LSA
Czech Republic	1996	8 July 2008	CSO
Romania	December 1992	23 December 2011	RoSA
Poland	28 January 1994	19 November 2012	CBK-PAN
Estonia	26 June 2007	4 February 2015	ESO
Hungary	April 1991	24 February 2015	HSO
Latvia	23 July 2009	24 June 2020	IZM

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[45] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, Washington DC, USA: International Business Publications, 2016, p. 38-9

1.4 Facilities

Headquarters

ESA is based in Paris. The DG and his Cabinet are also based in Paris, as well as, some of the Program Directors of ESA. All the major decisions are taken there.

ESTEC

The largest establishment of ESA is the European Research and Technology Center in Noordwijk (the Netherlands). It is a test center for activities regarding space that provides ESA with technical support for its satellite, human spaceflight and exploration projects. Most of ESA's projects except for launchers are originated in ESTEC and it employs more than 2000 specialists on science missions, satellite navigation, human spaceflight, telecommunications and Earth observation.[46]

ESOC

The European Space Operations Center is located in Darmstadt, Germany and its goal is the smooth operation of spacecraft in orbit. Since its creation in 1967, ESOC has operated more than 50 satellites. ESOC has control rooms with ground stations all over the globe and track and control satellites, as well as, management of the ground segment infrastructure. The infrastructure includes laboratories, information systems, networks, technology departments, buildings and related facilities. ESOC and ESA work closely with European industry through contracts that help the exchange in technology and knowledge to advance space exploration and maintenance.

ESOC's Space Debris Working Group

Since Sputnik in 1957, more than 5500 satellites have been placed in orbit with 700 currently operating. ESOC's current focal point is space debris that might harm the operating satellites. In 1986 the DG of ESA Created a Space Debris Office with the goal to minimize space debris creation, minimize the risk for manned spaceflight, reduce geostationary satellites, eliminate the risks upon reentry of space objects, collect along with other space agencies, useful information on space debris, and study the consequences of their existence and the legal aspects of them.

Inter-Agency Space Debris Coordination Committee (IADC)

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[46] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, p. 54

IADC is an inter-agency Space Debris Committee created by the ESA, NASA, the Russian Federal Space Agency (ROSCOSMOS) and Japan Aerospace Exploration Agency(JAXA). They were later joined by the Italian Space Agency (ASI), United Kingdom Space Agency (UKSA), the National Center for Space Studies (CNES, France), the Chinese National Space Administration (CNSA), DLR (Germany), Korean Aerospace Research Institute (KARI), Indian Space Research Organization(ISRO) and the State Space Agency of Ukraine (SSAU). Its goal is to deal with space debris in orbit and it was founded in 1993. It contains a Steering Group and four Working Groups: Measurements, Environment and Database, Protection, Mitigation.[47]

ESRIN

The ESA Center for Earth Observation is located in Franscati, Italy and manages the ground operations of ESA's observation satellites. ESRIN was established in 1966 and contains a substantial amount of environmental data in Europe that is being gathered since the 1970s. ESRIN manages more than 20 ground facilities all over Europe and hosts the team coordinating the Vega small-launcher program. ESRIN hosts as well the Telecom lab (it provides access to space telecommunication infrastructure to European institutions and industries), the European Center for Space Records (the complete records of ESA's projects), the ESA Web Portal and Information Systems as well as a Virtual Reality Theater (it holds Earth observation presentations to student groups and specialists). The center collaborates with the EU, the European Commission, ministries of agriculture and environment of the Members States of ESA and among other international organizations the UN. It is a part of the Geosphere/Biosphere Program, the International Charter on Space and Major Disasters and the Committee for Earth Observation Systems.[48]

EAC

The European Astronaut Center is based in Cologne, Germany and was established in 1990. EAC is a training facility for European astronauts including preparations for the ISS through the International Space Station Program. The personnel of EAC is composed of the astronauts constituting the European Astronauts Corps and the center is divided in four groups:

- The Astronaut Training Division
- The Astronaut Division

[47] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, p. 61
[48] *European Space Agency and Programs Handbook: Strategic Information and Contacts,* p. 56-7

- The Medical Crew Support Office
- Management and Support[49]

ESAC

The European Space Astronomy Center is located in Villanueva de la Canada in Spain. The purpose of ESAC is to operate ESA's planetary and astronomy projects and their data.[50]

CSG

Guiana Space Center is based in Kourou, French Guiana and it is the European launch base to space. It operates since 1968 and it is the best possible location to launch satellites since it is so close to the equator. ESA owns and manages the launch base and its facilities.[51]

ESEC

In Redu, Belgium we can locate the European Space Security and Education Center. The purpose of this center is to manage the space cyber security services, Proba missions, the Space Weather Data Center, ESA's ground station network and ESA's Education Training Center. ESEC operates since 1968 and hosts 43 steerable antennas operating in a variety of frequency bands that aid in-orbit testing for telecommunication and navigation satellites used to test the Galileo signal.[52]

ECSAT

The European Center for Space Applications and Telecommunications, located in Harwell, Oxfordshire, UK. It was created in 2009 and moved to its current location in 2013. ECSAT aims to attend to missions and projects regarding climate change, technology, telecommunications, integrated applications and science. The center is the headquarters of

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[49] *European Space Agency and Programs Handbook: Strategic Information and Contacts,* p. 57-8

[50] The European Space Agency, 'About ESAC', *The European Space Agency,* n.d., esa.int/About_Us/ESAC, The European Space Agency, accessed 3 March 2020

[51] European Space Agency, *Soyuz at the Guiana Space Center*, June 2005, p. 4-5

[52] The European Space Agency, 'ESEC', *The European Space Agency,* n.d., esa.int/About_Us/Corporate_news/ESEC, accessed 24 February 2020

ARTES program (Advance Research in Telecommunications Systems) and cooperates with personnel from ESTEC in the Netherlands. Among other projects, ECSAT handles the Climate Change Initiative program through the Earth Observation Climate Office which aids the UN Framework Convention on Climate Change.[53]

Worldwide, ESA owns and operates a number of ground stations, offices and outposts although it may have limited presence in some of these:

- Toulouse, Les Mureaux, Evry, Cannes –France
- Cologne, Oberpfaffenhofen- Germany
- Cerebros, Maspalomas, Madrid, Valencia, Barcelona- Spain
- Brussels- Belgium
- Washington, Houston, Greenbelt, Baltimore, Pasadina –the United States
- Geneva-Seitzerland
- Kiruna- Sweden
- Moscow- Russia
- Europe's Spaceport in Kourou, French Guiana[54]

[53] The European Space Agency, 'ECSAT', *The European Space Agency*, n.d., esa.int/About_Us/Corporate_news/ECSAT, accessed 24 February 2020

[54] The European Space Agency, 'Establishments and facilities', *The European Space Agency*, n.d., esa.int/About_Us/Corporate_news/Establishments_and_facilities, accessed 24 February 2020

2. Funding and Budget

In the following subchapters we will examine how ESA divided its fiscal activities in Mandatory and Optional and what that means for the participating states, how the budget of the Agency is divided and what is ESA's industrial policy. Additionally, we will see how and why it performs national audits and what are ESA's business applications.

2.1 Mandatory and Optional Activities

ESA's fiscal activities are divided into three main categories (mandatory and optional programs and third party activities). Under the General Budget and Space Sciences we find the mandatory programs. In the mandatory programs are included ESA's basic activities such as research on technology, information systems and training programs, plans for future missions and projects and shared technical investments.[55] Those programs that are mandatory for all the Member States are:

- The Technology Development Program
- The General Study Program
- The Science Core Technology Program
- The European Component Initiative[56]

The member states of ESA submit funds that are relative to their GDP (Gross Domestic Product).[57]

Those funds represent almost 20% of ESA's annual funds collected by its Member States. The main mandatory program is the Science program, which receives most of the funding.[58]

As for the ***optional programs***, they concern some of the member states and it is up to them to decide the extent of their involvement. Optional are the programs that include the satellite navigation, telecommunications and space transportation. The ISS and microgravity research are funded by optional program budget.[59]

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[55] The European Space Agency, 'Funding', *The European Space Agency*, n.d., https://www.esa.int/About_Us/Corporate_news/Funding, accessed 1 June 2020

[56]Czech Space Portal, 'Mandatory Activities of ESA', *Czech Space Portal*, https://www.czechspaceportal.cz/en/section-2/space-policy-eu---esa/mandatory-activities/, accessed 1 June 2020

[57] The European Space Agency, 'Funding'

[58]The European Space Agency, 'ESA an intergovernmental customer', *The European Space Agency*, n.d., https://www.esa.int/About_Us/Business_with_ESA/Business_Opportunities/ESA_an_intergovernmental_customer, accessed 30 March 2020

[59] The European Space Agency, 'Funding'

Specifically, optional for participation are the following fields:

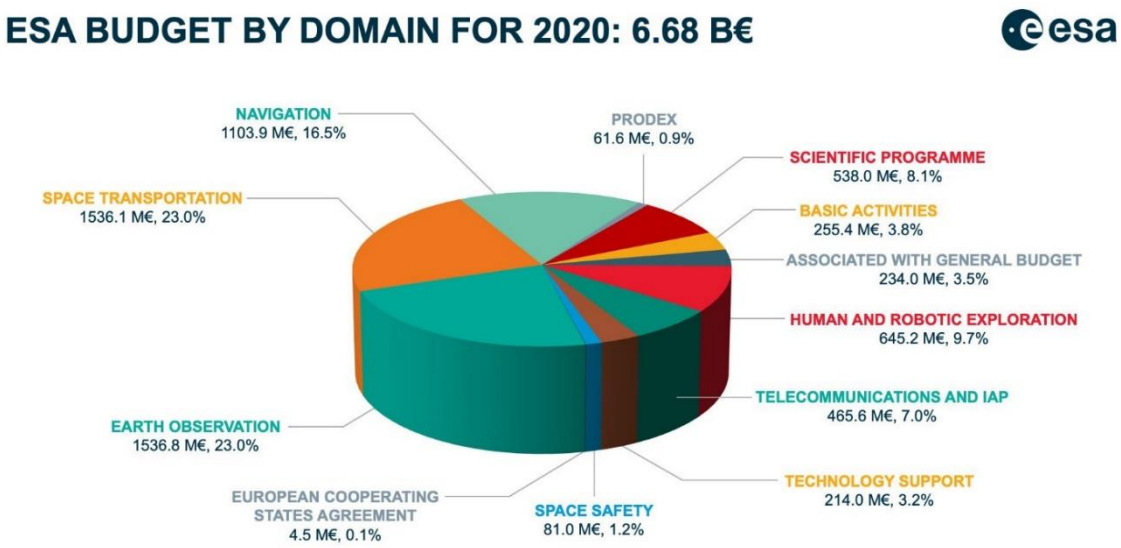
- Technology
- Navigation
- Space Situational Awareness
- Launchers
- Human Spaceflight Exploration
- Telecommunications
- Earth Observation[60]

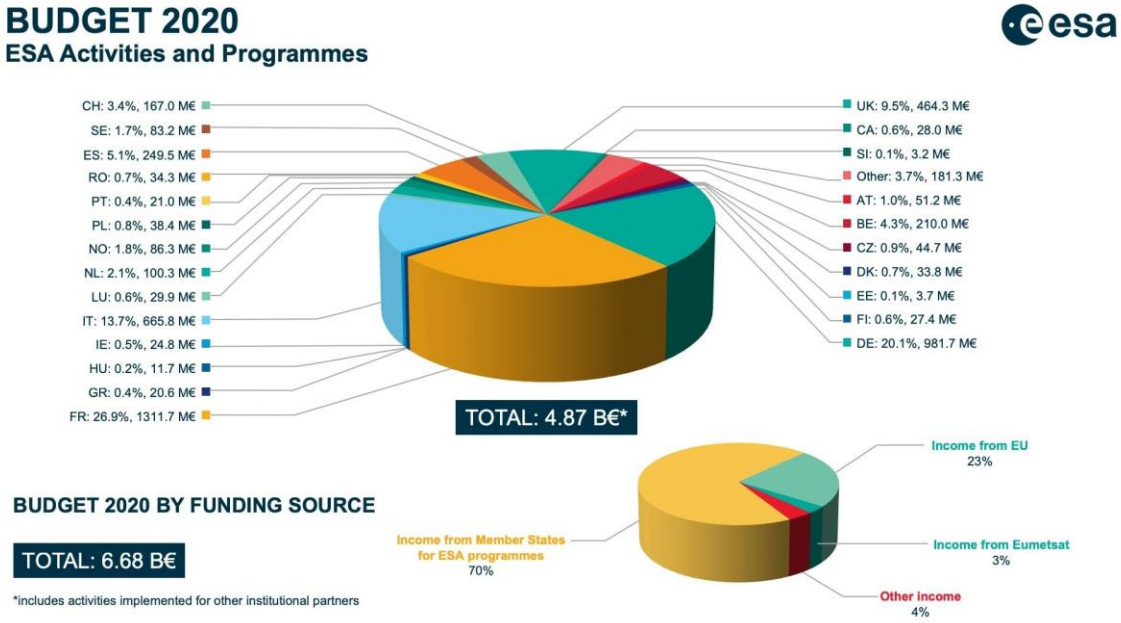
80% of the funding that is collected by ESA from its Member States goes to the optional programs.[61]

Organizations like EUMETSAT or the EU contribute to ESA's funds and ESA manages their space related activities. Those fall under the category of ***third party activities.*** Some of those projects are Meteosat and MetOp weather satellites, a portion of Copernicus project and Galileo. Industrial involvement in these activities is based on the provisions of each respective agreement.

The industrial activity in each Member State must be proportional to the financing of each project by the State in both the optional and the mandatory programs. This means that each program is independent and surplus in one project cannot substitute poor participation in another in terms of funding.[62]

[60] The European Space Agency, 'FACT SHEET', *The European Space Agency*, 2012, http://www.esa.int/About_Us/Ministerial_Council_2012/FACT_SHEET, accessed 1 June 2020
[61] The European Space Agency, 'ESA an intergovernmental customer'
[62] The European Space Agency, 'ESA an intergovernmental customer'





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[63]The European Space Agency, 'Funding'

2.2 ESA's Industrial Policy

Along with other objectives, ESA has an industrial policy that ensures participation of all Member States in the European space program and associated progress of space technologies respectfully and in proportion to their financial contributions. ESA should invite industry in all Member States to participate in the execution of its programs. "In order to be able to monitor and, where appropriate, adapt the Agency's industrial policy, ESA permanently reviews the industrial potential and industrial structure in relation to the Agency's activities, and in particular:

a. the general structure of industry, and industrial groupings;

b. the degree of specialization desirable in industry and methods of achieving it;

c. the coordination of relevant national industrial policies;

d. interaction with any relevant industrial policies of other international bodies;

e. the relationship between industrial production capacity and potential markets;

f. the organization of contacts with industry." [64]

The Geographical Return Principle

All of ESA's contracts regarding their geographical distribution follow a few general rules:

- "A Member State's overall return coefficient is the ratio between its percentage share of the total value of all contracts awarded among all Member States and its total percentage contributions."
- "For the purpose of calculating return coefficients, weighting factors are applied to the value of contracts on the basis of their technological interest."
- "Ideally the distribution of contracts placed by the Agency should result in all countries having an overall return coefficient of 1."

"The geographical return" is calculated separately for every one of ESA's programs, in comparison to the overall return coefficient. There have been set limits for the minimum return to be reached in each program group.[65]

As a result of the concept of "geographical return", when setting up an industrial team in the process of developing a proposal, the participation companies must take into careful consideration "their nationalities and shares in the activities" so as to have a balanced

[64] The European Space Agency, 'ESA an intergovernmental customer'
[65]The European Space Agency, 'ESA an intergovernmental customer'

geographical structure that is proportionate "to the contributions made by the participating Member States" to the project. ESA often contains in the letter of invitation specific requirements concerning the nationality of the companies which are permitted to tender. If this occurs, the industrial team should only include companies from the countries concerned.

Some other requirements of ESA's industrial policy included in "the letter of invitation to tender" (or special conditions of tender), among others, might be the clauses C1 to C4 that have as a purpose to reduce the participation of large system integrators and promote participation to independent companies and small to medium enterprises.

2.3 National Audits

ESA evaluates frequently the companies that are involved in the Agency's programs in order to assess that the work is carried out on the terms of the contract. There are controls in place to focus on managerial and financial aspects, as well as, frequent meetings regarding the quality and technical aspects. The Agency audits companies to evaluate nationality regarding to geographical return, focusing specifically to companies in under-returned countries and subsidiaries.

ESA follows some criteria to determine if a company should be deemed to belong to one of the Member States for a particular project, and to which it belongs and those are: the location of the company's registered office, research and decision making centers and location in which the project will be carried out.[66]

2.4 ESA Business Applications

Businesses from any sector that are interested in using space applications such as satellite telecommunications and navigation, earth observation, space weather and technologies, can be funded by ESA's Business Applications to design new commercial projects and services. They can apply all year long to a thematic opportunity or submit an open application. Currently Romania, Portugal, Sweden, Switzerland, the UK, Czech Republic, Austria, Finland, Belgium, Denmark, France, Germany, Ireland, Italy, Luxemburg, the Netherlands, Norway, Poland and Greece have already subscribed.

[66] The European Space Agency, 'ESA an intergovernmental customer'

The National Delegations are responsible of determining the extent of the financial involvement of each applicant, so prior to submitting a Full Proposal, the bidding teams should present a Letter of Authorization from every national delegation.

ESA can fund up to 100% of studies by universities and research institutes that participate in Feasibility Studies and have no further commercial interest in the project. Also, small and medium-sized enterprises that participate in Feasibility Studies or Demonstration Projects could be funded up to 75% by the ESA.[67]

[67] The European Space Agency, 'Funding Schemes', *The European Space Agency*, n.d., https://business.esa.int/funding-schemes, accessed 1 June 2020

3. ESA's Programs

Bellow, I have listed an overview of ESA's programs in order to better understand the purpose and works of the Agency, as well as the practical aspects of the Agency's cooperation with the European Union and other cooperating organizations. [68]

3.1 List of ESA's programs:

1. The Copernicus Program

Copernicus is a European Union earth observation program in collaboration with ESA, the European Commission, EUMETSAT (the European Organization for the Exploitation of Meteorological Satellites), ECMWF (the European Center for Medium Range Weather Forecast, EU Agencies, Mercator Ocean and the Member States of the EU. The Copernicus program was launched in 2014, based on the previous European earth observation initiatives. The purpose of the program is to observe the Earth and provide the European citizens with accurate information regarding the environment and what are the causes and possible solution for climate change, so as to achieve civil security. The data is accessible to the public free of charge.[69]

2. ExoMars 2016-2022

ESA with Roscosmos developed the ExoMars program to study the Martian environment and the possibility of life on the planet. ExoMars consists of two missions, the first of which was launched on 14 March 2016 and consisted of the Trace Gas Orbiter and an EDM ("Entry, Descent and landing demonstrator Module"), known as Sciaparelli. The second one is the launch of a rover on Mars and is due to be launched in 2022.[70]

3. Cosmic Vision

Cosmic Vision is the third space exploration campaign organized by ESA. It was created in 2005 and its predecessors were Horizon 2000 with Planck satellite and astronomy observatory Herschel, and Horizon 2000Plus with Gaia, Lisa Pathfinder and BepiColombo. Now, Cosmic Vision mission seeks answers to the following questions: "How did the universe originate and what is it made of? How does the Solar System work? What are the conditions for planet formation and the emergence of life? What are the fundamental

[68] See Art.V regarding the ESA programs and activities in the "CONVENTION FOR THE ESTABLISHMENT OF A EUROPEAN SPACE AGENCY", 1975, p. 81 of the Annex

[69] Copernicus, 'What is Copernicus?', *Copernicus: Europe's eyes on Earth*, n.d., web.archive.org/web/20181103182626/http://www.copernicus.eu/main/overview, accessed 12 June 2020

[70] The European Space Agency, 'Programme Overview', *The European Space Agency*, n.d., https://exploration.esa.int/web/mars/-/46048-programme-overview, accessed 11 June 2020

physical laws of the universe?" To answer these questions, ESA created a new fleet of spacecraft.

In 2019 ESA launched Cheops (the CHaracterizing ExOPlanet Satellite) that will be followed in the next decade by Plato and Ariel. Also, this year, ESA launched the Solar Orbiter that will gather information about the Sun's polar regions as to educate us regarding its link to space weather. After that, in 2022, ESA will launch the Jupiter Icy Moons Explorer to study the Jovian system and its biggest ocean-bearing moons: Calisto, Europa and Ganymede. Additionally, Euclid satellite is a space telescope that explores the dark universe and last by not least, Cosmic Vision develops the observatory Athena along with the gravitational-wave observatory Lisa for future observation of black holes and energetic phenomena of the universe.[71]

4. FAST20XX

FAST20XX or Future High-Altitude High Speed Transport 20XX is a program that run from 2009 to 2012 with financial cooperation by the European Commission, under European Commissions Seventh Framework Program. The purpose of the program was to develop technological foundation for the advanced hypersonic suborbital spaceplanes. The focus was on mastering the technology and not spacecraft. FAST20XX included two concepts: the first was ALPHA, a hybrid propelled vehicle for short-range flights, launched at high altitude and the second was the SpaceLiner, an all-rocket powered vehicle that would be able to transport up to 50 people across long distances in a very short period of time (e.g. From Australia to Europe in 90 minutes).[72]

5. Horizon 2000

The Horizon 2000 Program, as was mentioned above in the Cosmic Vision section, was a long-term space exploration program. It was created in 1983 by the ESA in collaboration with CERN, the European Science Foundation, the International Astronomical Union and the European Southern Observatory. In 1986 NASA decided to join in order to reduce the cost of the studies. The first mission that was decided prior to Horizon 2000 by ESA and it was a Titan Probe that would be carried by the American Cassini spacecraft.

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[71] The European Space Agency, 'ESA's Cosmic Vision' , *The European Space Agency,* n.d., http://www.esa.int/Science_Exploration/Space_Science/ESA_s_Cosmic_Vision, accessed 12 June 2020

[72]The European Space Agency, 'FAST20XX', *The European Space Agency,* n.d., http://www.esa.int/Enabling_Support/Space_Engineering_Technology/FAST20XX_Future_High-Altitude_High-Speed_Transport_20XX, accessed 12 June 2020

The second mission was again a collaboration of ESA and NASA, a gamma-ray observatory named INTEGRAL designed in 1989. In 1994, after disagreements, NASA resolved its involvement in Horizon 2000 and CNES assumed the financial burden.

Rosetta and FIRST (later named Herschel Space Observatory) and COBRA/SAMBA (later renamed Plack) were the next missions of Horizon 2000. In the mid-90s the Horizon 2000 program was extended into the Horizon 2000 Plus with further cornerstone missions that included Gaia, BepiColombo and LISA Pathfinder launched in 2015.[73]

6. Horizon 2020

"Horizon 2020 is the biggest EU Research and Innovation program ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market."

This program is the way to achieve the financial goals of Innovation Union and Europe 2020, the flagship initiatives that aim to secure Europe's position in the global competitive market.

"Seen as a means to drive economic growth and create jobs, Horizon 2020 has the political backing of Europe's leaders and the Members of the European Parliament." The goal is for Europe to achieve excellence in space science and take the industrial lead as well as face challenges in the society. The EU Framework program for Research and Innovation will add more measures to achieve removing barriers to innovation and science. "Horizon 2020 is open to everyone, with a simple structure that reduces red tape and time so participants can focus on what is really important. This approach makes sure new projects get off the ground quickly – and achieve results faster."[74]

EU contributes in space research through the Horizon 2020 framework program regarding innovation and research. The program has 4 points of 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."

The budget contributed in space research within this project is around €1.4 billion, which is 1.8 % of the Horizon 2020 budget. According to the Horizon 2020 work programs, space research is divided in 4 categories:

[73]The European Space Agency, 'ESA's Cosmic Vision'
[74]The European Space Agency, 'Horizon 2020', *The European Space Agency*, n.d., https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020, accessed 12 June 2020

- "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 program, and additional activities regarding the SSA programs (space weather etc.)".[75]

7. Living Planet Program (LPP)

The Living Planet Program is an ESA program managed by the Earth Observation Programs Directorate. It contains two groups of Earth observation missions, the ones known as the Earth Explorers and the Earth Watch group of missions. The aim is to develop support operational applications to better understand the earth, develop better weather forecasting systems and achieve efficient resource management.[76]

8. Galileo

Galileo, Europe's own Global Navigation Satellite System (GNSS), is a joint project between ESA and the European Commission. Galileo is a satellite constellation that consists of 27 operational satellites plus three spares along with the regional augmentation system EGNOS. It was created through the European GNSS Agency (GSA) with ground operations in Oberpfaffenhofen, Germany and in Fucino, Italy. The satellites circle the Earth in three circular medium- Earth orbits at an 23222km altitude.[77]

The initiative was developed in 2008 and went live in 2016. The aim is to collect data that will help with air traffic control, road and rail traffic monitoring, management of ship and

[75] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 28-9
[76]Stephen Briggs, *ESA's Living Planet Programme*, ESA Earth Observation
Science, Applications and Future Technologies Department, ECMWF, 3 September 2007, PPT

[77] The European Space Agency, 'Galileo begins serving the globe', *The European Space Agency*, n.d., http://www.esa.int/Applications/Navigation/Galileo_begins_serving_the_globe, accessed 13 June 2020

truck fleets, the mobilization of emergency services and tracking of goods carried by multimodal transport. Also, future goal is the collection of data that will assist with warnings of dangerous materials, locating oil and gas deposits, guidance of the visually impaired, locating wreck sites and identifying fishing areas.

Galileo was created so Europe will have an independent high-precision positioning system without relying on the US (GPS) or Russia (GLONASS).[78]

9. Aurora

The Aurora Exploration Program is a human spaceflight initiative of ESA, established in 2001. The aim of the program is to develop a plan for long-term exploration of the Solar System by robotic spacecraft along with human spaceflight, in search for life beyond Earth. The missions of the Aurora Exploration Program will become more and more complex overtime, and the top goal to reach is a 2030 human expedition to Mars and before that, exploration of the Moon.

ESA's Member States participate in Aurora Exploration Program in five-year-long terms, after which they are free to choose the level of participation in the program or stop participating altogether. Aurora includes European and international industry, as among others, it cooperates with Roscosmos and Canada is an active participant of the program.[79]

[78] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, p. 75-7

[79] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, p. 74-5

4. Cooperation with other Space Agencies

In the following subchapters we will see with which Space Agencies ESA cooperates globally and in which projects. This chapter is presented so as to understand the importance of international cooperation in outer space.

Europe as a part of ESA is one of the five partners that assist the development of the International Space Station. Those five partners are:

- NASA
- Russian Federal Space Agency
- ESA
- JAXA
- CSA[80]

4.1 ESA and NASA

The European Space Agency and the National Aeronautics and Space Administration (NASA), are intertwined in many projects for the past three decades. The first project they worked together was the Space Shuttle, which was a partially reusable low earth launch vehicle. It was a project developed by NASA, and it was used by ESA astronauts to go to space. In the 1980s and 1990s, in a joined research program of NASA and ESA, ESA developed the Spacelab program, orbital labs for the Space Shuttle in which ESA astronauts took part in experiments.[81]

In exploration and robotic science missions, NASA is the closest partner of ESA, with the most recent collaboration in the Cassini-Huygens mission along with the Italian Space Agency. NASA's Cassini spacecraft, reached Saturn in 2004 and circled around the planet and its moons. ESA then plunged the Huygens probe on Saturn's moon Titan to study the cloudy atmosphere and surface composition of the moon.[82]

One of the greatest contributions to mankind by this collaboration is the Hubble Space Telescope launched on 24 April 1990. It is the first large, space based optical telescope and

[80] *European Space Agency and Programs Handbook: Strategic Information and Contacts*, p. 32-4

[81] John M. Logsdon et. al, *Exploring the Unknown Selected Documents in the History of the U.S. Civil Space Program*, Volume IV: Accessing Space, Washington DC: Nasa History Office, 2001, p. 293

[82] California Institute of Technology, 'Cassini- Huygens', *Jet Propulsion Laboratory, California Institute of Technology*, n.d. https://www.jpl.nasa.gov/missions/cassini-huygens/, 12 June 2020

it was named after the American astronomer Edwin P. Hubble (1889-1953). It was built in the US by NASA with the contributions of the ESA and it is operated by NASA, ESA, the Space Telescope Science Institute (STScI) and the Goddard Space Flight Center.[83]

Future projects include the James Webb Space Telescope, the Laser Interferometer Space Antenna, NASA's contribution in ESA's MarcoPolo-R mission and possible participation in ESA's Mars Sample Return mission.

As it is natural while speaking about space agencies, NASA is the first one that comes to everyone's mind. NASA still remains the leading organization in space activities for two simple reasons: first of all, NASA has more than 60 years of experience in space activities, while ESA is a much younger organization with 40 years of existence. Secondly, and most importantly I might add, they have a huge budgetary difference. To put it into numbers, NASA's budget for 2020 was $22.6 billion[84], while ESA's for the same year was € 6.6 billion[85]. But, the European citizen of an ESA member state pays in taxes "about the same as the price of a cinema ticket, whether a US citizen pays almost four times as much"[86].

4.2 ESA and the Russian Federal Space Agency

On 19 January 2005 ESA and the Russian Federal Space Agency signed a framework agreement for peaceful exploration of outer space. This partnership allows the Soyuz launchers that are created by the Russian Federal Space Agency to launch from ESA's Spaceport in French Guiana. The first launch of the Soyuz capsule was on 21 October 2011.[87]

4.3 ESA and JAXA

On 3 March 2018 the Japan Aerospace Exploration Agency (JAXA) and ESA extended their collaboration at the International Space Exploration Forum (ISEF2), including their

[83] Hubblesite, Mission and Telescope, 'Hubble's Journey and the technology that makes it possible', *Hubblesite, Mission and Telescope*, n.d., hubblesite.org/mission-and-telescope, accessed 13 June 2020

[84] The Planetary Society, 'NASA's FY 2020', *The Planetary Society*, https://www.planetary.org/space-policy/nasas-fy-2020-budget, accessed 3 July 2020

[85] The European Space Agency, 'Funding'

[86] The European Space Agency, 'Facts'

[87] The European Space Agency, 'International Cooperation', *The European Space Agency*, n.d., esa.int/Enabling_Support/Space_Transportation/International_cooperation, accessed 12 June 2020

cooperation parameters and future joint partnership. Japan and Europe aim for Moon exploration and together they are researching ways for humans to return to the Moon and bring back samples of the soil of the Moon via a Lunar Orbital Platform- Gateway. The initial studies regarding the possibility of such a mission will soon be concluded, and if the results are positive, the idea will be included in ESA's next European Exploration Envelope Program (E3P).

JAXA and ESA are partners in the BepiColombo mission as well. BepiColombo is a mission to Mercury, comprised by two satellites launched together, the Mercury Planetary Orbiter (MPO) and Mio (Mercury Magnetospheric Orbiter, MMO). The project was launched on 20 October 2018 on an Ariane 5 rocket and will arrive to Mercury in December 2025.[88]

4.4 ESA and CSA

ESA and the Canadian Space Agency have been partners for the past 30 years in numerus projects including Earth observation projects such as ERS, Global Monitoring for Environment and Security (GMES) and Envisat; telecommunications projects like Olympus, ARTES (Advanced Research in Telecommunications Systems and Artemis; navigation programs including Galileo and the General Support Technology Program. Europe and Canada first started to cooperate with each other in the 1970s in the Communications Technology Satellite. Their first agreement was signed in 1979 and since then Canada contributes in ESA as a Participating State.[89]

[88]The European Space Agency, 'ESA and JAXA confirm further cooperation in space', *The European Space Agency*, n.d., esa.int/Science_Exploration/Human_and_Robotic_Exploration/ESA_and_JAXA_confirm_further_cooperation_in_space, accessed 26 June 2020

[89]https://www.esa.int/About_Us/Corporate_news/ESA_and_Canada_renew_partnership_in_space_science_and_technology, the European Space Agency, ESA and Canada renew partnership in space science and technology

5. ESA and the European Union

ESA and the EU have some obvious differences: the EU is a supranational organization and ESA is an intergovernmental one, they are governed by different procedures and rules and their Member States are not the same ones.[90]

ESA's responsibilities include the development and implementation of the European space policy, when the EU has competencies in the political, economic, legal and social fields that influences the regulation that regards the space related markets. Furthermore, ESA, under resolution of the ESA Convention, supports its Director General in his/her decisions, with a goal of coordination in European space policy.[91]

Although they have their differences, they have a single and common goal: serving the European citizens.

ESA and the EU although they are separate organizations, gradually they work more and more in unison towards their common goals. Due to the collaboration between ESA and EU in the flagship programs Galileo and Copernicus and RND (Research and Development) program Horizon 2000, almost 20% of ESA's budget comes directly from the EU.

In May 2004, the two organizations were bound legally by a Framework Agreement that aims in reinforcing the European Space Sector. In 2016 the European Commission and ESA signed a Joint Statement on their common goal. This Statement is list of mutual milestones that aim to strengthen the collaboration between ESA and EU. In Brussels there is a liaison office that manages the relations between the European institutions and ESA.[92]

In this chapter we will go through a detailed timeline regarding the cooperation of the European Space Agency and the European Union and finally I will summarise the overall challenges the two organizations face in their in-between relations.

5.1 ESA- EU Relationship Historical Overview

1961-In the past and up to the 1960s, space activities were a national matter, and leading in the European space sector were France and the United Kingdom. The European Preparatory Commission for Space Research or COPERS (*Commission Préparatoire Européenne de Recherche Spatiale),* was the first larger scale European attempt, in March

[90] The European Space Agency, 'ESA and the EU', *the European Space Agency,* n.d., esa.int/About_Us/Corporate_news/ESA_and_the_EU, accessed 11 May 2020

[91]Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p.12

[92] The European Space Agency, 'ESA and the EU'

1961. COPERS initiative led to the formation of ESRO (European Space Research Organization) by 10 European states, that signed the convention in 1962.

Also, in 1961 Eurospace was established, a European trade association that represented the interests of 14 ESA member states in the space manufacturing industry. The association aimed in "the importance of an independent, reliable, safe and cost-effective European capacity to conceive, develop, launch, operate and exploit space systems" and "for further synergies to be developed between space and other EU public policies".

1962- At the same time of the creation of ESRO, 6 European states, while attempting to develop launchers, formed the European Launcher Organization or ELDO that entered into force in 1962.

1966- Under ELDO there was established the European Space Conference (ESC), and it was the main forum for European states to confer on space matters.

1972-As ELDO started failing and managing both organizations seemed more and more challenging, the European Space Conference suggested the merging of ELDO and ESRO into one more inclusive organization.

1975- The 10 states of ESRO and 6 of ELDO signed the convention that created the European Space Agency or ESA on 30 March.

1980-The "Convention for the Establishment of a European Space Agency" entered into force in 30 October.

1993- The Commission established an advisory group for space matters that included ESA, EU Member States and the Western European Union, so as to manage the coordination of the participants.

1994- The Commission discussed in April the possibility of the use of satellite navigation in order to develop a trans-European network. The European Parliament then, recommended to the Commission to create a European Strategy for Satellite Navigation so as to involve the European industry in the creation of Global Navigation Satellite Systems or GNSS.

The European Parliament, in May 1994, called for the Commission to renew the relationship between the EU and ESA and other European institutions by forming a European Space Council.

The Commission published a communication in June "First European approach to satellite navigation services". The first step suggested was for Europe to create a navigation service that focuses on enhancing resolution of the signal that is provided by the American Global Positioning System (GPS). Secondly, the European Union should build its own satellite system for independent satellite navigation. This communication was approved by the Council in November.

1995- The Commission became more involved in space matters and so the ESA Council wanted to adjust its own policies to the new developments.

1996-In December, after the 1995 European space forum, the Commission decided upon a new policy of communication for the European Union and space. This new policy didn't

limit the space activities to only RND (research and development) missions. “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.” Defense matters and satellite navigation projects were the new goals.[93]

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.”[94]

The Commission also called on the need for different partners that will develop the space applications and technologies in the EU. National space agencies and the European Space Agency were to play an important role in the creation and management of space infrastructure, RND mission and launcher activities. The European Community was to devote to a progressive understanding of common European values, cultivating business growth and manage and demonstrate programs.

1997- In September the Council recognized the need for optimization of European investment in space activities and suggested that the Commission will strengthen its relations with ESA and assures its internal coordination regarding the space projects.

1998- In January, the European Parliament called upon the “urgent need for reshaping the European Union’s space policy” and suggested that “a European Council meeting be set up in the near future to deal specifically with European space policy”.

In June began the implementation of the first satellite navigation system, the European Geostationary Navigation Overlay Service or EGNOS, after the agreement between ESA, the European Community and Eurocontrol. EGNOS has 3 geostationary satellites and more than 40 ground stations, and is mainly used for ship aircraft navigation through narrow channels.

Additionally, this year in Baveno (Italy), ESA, the Commission, EUMETSAT and national space agencies initiated a manifesto regarding the development of an earth observation

[93]Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p.3-8

[94] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p.8

program. The purpose of the program would be global monitoring for environment and security (GMES).

1999- The ESA council in May adopted two new resolutions: the first one was on developing future European projects in space, for which the ESA council mentioned that "deepening relationship between ESA and the European Union will be a key element". The work of ESA's DG along with the Commission towards a European space policy was welcomed and called for "a fully developed strategy to be prepared". Regarding this resolution, the ESA council asked for a report "identifying the measures for adapting the Agency's rules and procedures" and "its legal framework", so as for ESA to get adjusted to the new and changing environment.

At the same time, the Commission prepared in June a document "Towards a coherent European approach for space". This working document elaborated that "Europe shows a lack of consensus amongst the main actors in the space sector, which has led to delays designing, financing and launching future projects or applications" in comparison to other space organizations such as NASA.

In December, the Council called for the Commission to create with ESA, by the end of 2000, a joint European strategy regarding space.

Furthermore, after communication with the Commission, the establishment of an independent infrastructure for satellite navigation under the name Galileo began, although through discussions it was underway since 1994. In order to obtain funding for Galileo, the partners decided on a public-private collaboration.

2000- In May the Commission expressed their intentions to establish a policy framework for future projects regarding space, which was welcomed by the European Parliament. In September, the Commission adopted a communication "Europe and space: turning a new chapter", in which they strongly recognized the need for space-based data in a wide range of EU policies. The challenging part for the Commission was to manage the multitude of activities in institutional and legal settings in the best way possible.

"Europe and space: turning a new chapter"

"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 and the ESA council welcomed the three lines of action identified by the Commission and ESA for a European space strategy, in November 2000."[95]

[95] EU Commission, '*Communication from the Commission to the Council and the European Parliament - Europe and Space: Turning to a new chapter'*, /* COM/2000/0597 final */, 1999,

The ESA council supported "the objective of establishing a cooperative structure, bringing together the ESA executive and the European Commission". It also expressed "the political willingness and technical readiness of the Agency… to act as the implementing organization for the development and procurement of the space segment… associated with the EU's projects and initiatives". The Council called upon the Commission to create a joint task force with ESA (JTF).

In a document directed to the ESA Director General, experts mentioned that "Europe must integrate its space activities into the wider political and economic strategy". They also proposed that Europe should "reinforce the political role of the European Union when it comes to space policy", "the European Council should define European space policy and the guidelines for its implementation", "the ESA should be the space agency of Europe setting and implementing cooperative programs…within the treaty framework of the European Union" and that the "Commission should define the regulatory framework under which space activities are conducted…and bring together user interests around common objectives". Also that the European Parliament should have the opportunity to discuss on a regular basis as well as review the European space policy.

2001- The Councils of the European Union and ESA conferred for the first time in order to plan common visions supporting the jointly created European Strategy for Space. They also supported the creation of a joint structure that would draw together the ESA Executive and the Commission, a high-lever bilateral taskforce to put forward recommendations for the constant growth and application of the European Strategy for Space.

Also, in November, the ESA council was positive that there should be some steps taken to make sure that space issues are addressed "at the highest political level in Europe". The council also mentioned that ESA was capable of becoming a great instrument that would bring European space projects to greatness. The ESA council, in order to design a well formed space program, decided that ESA would have the leading role in creating a long-term European space plan and would integrate all the projects in Europe.

2002- The joint collaboration of public-private partners on the Galileo project was established in May.

2003- In January the Commission outlined the "Green Paper on European Space Policy" in collaboration with ESA. This Green Paper examined Europe's space sector's strengths and vulnerabilities so as to initiate a discussion on Europe's space policy with all the stakeholders, including the national and international institutions, Europe's scientific community, European space industry and its users, as well as the European citizens.

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eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2000%3A0597%3AFIN, accessed 11 May 2020

In November 2003 the Commission along with ESA, prepared the White Paper that contained guidelines for mutual ESA and EU space projects, and used the Framework Agreement as its implementation basis.

In 25 November of the same year the Council of ESA implemented the Framework Agreement approved by the EU Council and it entered into force in 28 May 2004. This Framework Agreement was the pillar of a strategic partnership between ESA, that represented the supply part for space infrastructure, and the EU, that represented the demand part for space infrastructure. In this agreement, the JTF was replaced by the Space Council that was a joint secretariat, and the JSSAG that was a high level policy group. The Framework Agreement would last for 4 years but it could be renewed automatically for consecutive 4-year periods. ESA would be "the implementing agency of the Union for space matters" and "be positioned within the EU framework and its convention modified accordingly".

"The Framework Agreement recognizes that both parties have specific complementary and mutually reinforcing strengths, and commits them to work together to avoid duplication of effort. The framework has two main aims:

- to establish a common basis and appropriate practical arrangements for efficient and mutually beneficial cooperation between ESA and the EU;
- to progressively develop a European space policy to link the demand for services and applications in support of EU policies with the supply, through ESA, of the space systems and infrastructure needed to meet that demand. The European Space Policy was adopted in May 2007."[96]

The EU's duty would be the creation of a European space policy and a space program. Additionally, the EU should develop strong ties with ESA and should acknowledge ESA's existence in the treaty. The Constitutional Treaty, however, was rejected in 2005. Because of the EU enlargement in 2004 and, the constantly evolving space in Europe and international competition that was increasing, the ESA council adopted a resolution regarding its internal operations in December 2005. The ESA council was very welcoming towards implementing the program for the European Cooperating States that had begun in 2003 and aimed to involve the newly added EU Member States in the Agency as well.

2004- Under the Framework Agreement it was determined that there would be concurrent meetings between the EU Council and the ESA Council and these meetings were known as the "Space Council". This newly formed Council allowed all EU and ESA members and

[96] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p.14-5

the cooperating states to come together in order to converse upon the improvement of the European Space policy.

The Space Council met for the first time in 2004. The guidelines that were approved by the 2nd Space Council meeting in June 2005 called for the concept of sharing of duties and responsibilities, as well as goals and guidelines. In November 2005, at the 3rd Space Council session, they agreed upon GMES as the second flagship project after the Galileo program. In May 2007, at the 4th session, the Space Council supported the European Space Policy. At the 5th and 6th meetings the Space Council suggested ways for further development of the European Space Policy as well as for the GMES program. At the 7th session in November 2010, after the entry into force of the Lisbon Treaty, the Council reiterated its goal for a leading role of Europe in space.[97] In 2019 in Brussels the Space Council had their first session since 2011, after an 8-year gap, calling for a closer collaboration of the two organizations and their members.[98]

In 2004 the EU created an agency that manages the programs EGNOS and Galileo on their part, the GNSS Agency or GSA.

European GNSS Agency (GSA)
"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."[99]

2007- At the 4th Space Council, 29 European nations voiced their approval of the European Space Policy, uniting the ESA and EU strategies with the ones of their member states. That was the first time that Europe had developed a shared political strategy for space activities.

The European Space Policy, drafted jointly by ESA and the Commission, outlines a clear vision and objectives for the field of space, addressing concerns such as defense and security issues, space access and exploration.[100]

European Space Policy

[97]The European Space Agency, 'European milestones', *The European Space Agency*, n.d., esa.int/About_Us/Corporate_news/European_milestones, accessed 14 June 2020

[98] C. Henry, 'EU, ESA revive joint Space Council after eight-year pause', *Space News*, 28 May 2019, https://spacenews.com/eu-esa-revive-joint-space-council-after-eight-year-pause/, accessed 3 August 2020

[99] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 10-1

[100] The European Space Agency, 'European milestones'

"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 defense 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."[101]

The activities were distinctly divided as so: ESA would take upstream activities, whereas the EU would be responsible for the downstream ones. The Commission commented that "the different approaches, separate legal processes and divergent membership of the EU and ESA can lead to cumbersome decision-making processes". The Council was supportive towards renewing the 2004 Framework Agreement even beyond 2008, and asked the ESA DG and the Commission "to propose an implementation plan for the European Space Policy." Other than reviewing the European space policy, the Commission suggested international cooperation in space, meaning to make the European front a united voice on the international scene.

2008- In November the ESA Council approved a decision on the role that space has in achieving global goals for Europe. It acknowledged the requirements established in the European space policy and ESA's role in achieving these objectives. It also defined the need for improvement in the decision-making process of ESA and in the rules of industrial and procurement policy, and adopted a resolution on the improvement of those issues by the Agency.

The Space Council, at its 8th meeting, mentioned that "space assets can contribute significantly to the objectives of the common security and defense policy" and announced the signing of an agreement, in June 2011, between the European Defense Agency and ESA.

As for the Galileo joint initiative, after facing challenges regarding the public-private partnership they initially decided upon, ESA and the EU decided to develop the project through public contribution alone. This decision forced the program development to delay significantly.[102]

2009- The Lisbon Treaty (or the Treaty of the Functioning of the European Union), endorses the case for space in Europe by placing it at the highest level on the political

[101] ESA Director General's Proposal for the European Space Agency, *Resolution on the European Space Policy*, ESA BR-269, 26 April 2007, p. 10-12

[102]Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 18

agenda, and makes explicit mention of ESA. Article 189 of the Lisbon Treaty sets out the spatial competence of the EU which operates in conjunction with that of the EU Member States. Also, it makes provision for the EU to formulate a partnership with ESA.

The EU Council later incorporated space into the EU Competitiveness Council's terms of reference. The Space Working Party, to which ESA can be invited to observe, supports this.[103]

Article 189

"1. To promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space.

2. To contribute to attaining the objectives referred to in paragraph 1, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall establish the necessary measures, which may take the form of a European space programme, excluding any harmonisation of the laws and regulations of the Member States.

3. The Union shall establish any appropriate relations with the European Space Agency.

4. This Article shall be without prejudice to the other provisions of this Title."[104]

The Lisbon Treaty made possible for the EU the development and implementation of an industrial policy in the sector of space. This development was endorsed by the Council in 2011 and by the European Parliament in 2012.

On 1 October, the EGNOS open service went into operation.

2010- In October, the Commission called upon the EU to organize a European SSA (Space Situational Awareness) system that would be based on the existing capacity of its member

[103] The European Space Agency, 'European milestones'

[104] European Union, *CONSOLIDATED VERSION OF THE TREATY ON THE FUNCTIONING OF THE EUROPEAN UNION*, OJ C 326, 26 October 2012, p. 131-2, pdf, eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=EN, accessed 15 February 2020

states. The Space Council agreed with the Commission in November, on this initiative. The development of this project started in 2011.

Furthermore, the Commission pointed out that they needed to review the terms of their relationship with ESA. In November of the same year the Space Council invited ESA and the Commission to discuss under the framework agreement their collaboration.

In September 2010, the Council and the European Parliament decided upon a regulation for the initial operation of the Global Monitoring for Environment and Security (GMES) program.

2011- The Commission suggested that the EU should strengthen the ties with the Member States and ESA. The EU under the Commission's suggestions should improve the political aspects of space. Also, ESA should maintain its role as an intergovernmental institution that cooperates with the EU, meaning that the framework agreement between them should be reviewed and the civil and military programs needed to be able to coexist. Lastly, the Commission pointed out that "the space program management remains fragmented" and needed to be reevaluated.

This year, the EGNOS safety of life service became certified for civil aviation. Also, regarding the Galileo program, in October the first two satellites were launched.

Finally, in November, the Council called upon the Commission, along with ESA, to launch the GMES program.

2012- The European Parliament in January called for "the need for clear governance in relation to space policy" and stressed the need that EU relations "with ESA and national agencies to be redefined". In November of the same year the Commission suggested that "the growing importance of EU space programs 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". The EU and ESA have different rules regarding finances, voting and membership, as well as, in defense and security issues. As a matter of fact, the Commission believed that ESA didn't have a structural connection with the EU, no formal connection to the European Parliament and therefore no political accountability due to the 2004 agreement.[105] The Commission focused on developing further the relations between ESA and the EU by 2013 with "improved cooperation under the "status quo", bringing ESA as an intergovernmental organization under the authority of the EU… or transforming ESA into an EU agency". The ESA Council however stated that "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"

[105] Doug Messier, 'ESA Agrees to Explore Closer Cooperation With European Union', *Parabolic Arc*, 2012, http://www.parabolicarc.com/2012/12/30/esa-agrees-to-explore-closer-cooperation-with-european-union/, accessed 15 October 2020

and that "ESA must further evolve ... towards the European space agency that best serves Europe". In its ninth meeting on December the Space Council conferred about the cooperation between the EU and ESA, but didn't reach any outcome.

2013- In February, the Commission suggested the creation of an SST system (Space Surveillance and Tracking). The program was launched in April 2014, aiming to connect national SST assets in order to "monitor space debris and thus protect European space infrastructures". This program represents one section of the SSA system that was being developed by ESA since 2009. The second is forecasting and monitoring of space weather and the third is the assessment of near-earth objects

The Space Council in February 2013 decided on "the important role which ESA as an independent intergovernmental organization plays in space matters and in relation to European space programmes". The Space Council acknowledged 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 also urged the Commission to cooperate with the DG of ESA to formulate proposals for 2014 on common future projects and relations.

In December the European Parliament mentioned that "'the political weight of the EU Member States in national terms may no longer suffice to address the challenges ahead in this sector", that "there is still not sufficient coordination of measures in the field of space policy between the EU, the Member States and ESA" and that ESA "has no formal relationship with the European Parliament". It also asked the Commission to evaluate if ESA could "be linked to the Union's governance structures" and suggested that ESA, the Commission and the Member States establish a group dedicated to the management of their in-between relations.

Also in February, the Commission supported its EU space industrial policy. It mentioned that space "always had, and will continue to have, a strong political dimension which has not been developed properly at European level so far". Finally, the Commission set 5 objectives regarding the industrial policy of the EU:

- "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."[106]

[106] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 19

The European Council, in December 2013, announced the "preparation for the next generation of governmental satellite communication through close cooperation between the Member States, the Commission and the European Space Agency", asking for the creation of a user group to be set up in 2014. This effort continued the work already done by the EDA (European Defense Agency).

European Defense Agency

"The European Defense 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 Defense Ministers of the participating states and defines the annual budget, the three-year work program and the annual work plan. The EDA Chief Executive is appointed by the steering board and implements the decisions."[107]

Last but not least, this year, support was renewed regarding the programs Galileo and EGNOS. ESA and the Commission came to the conclusion that the Galileo will include 30 satellites in total, 24 operational satellites and six spare ones.

2014- The Commission published in February a progress report regarding the cooperation of the EU and ESA. The EU and ESA formed a financial framework for the period 2014-2020. This framework regarded the space research activities in which the EU invested €12 billion in the programs Copernicus and Galileo, the two flagship programs that link the EU and ESA, and in this way the EU became ESA's largest contributor.

The number one concern in this partnership was the rules under which the ESA would manage the EU programs. In 2012 the Commission prompted an "EU Pillar" in ESA or ESA as an EU agency in order to improve issues in structural problems, operational imbalances and the budget needed to implement new ideas. The first suggestion to correct the abovementioned issues was to add an amendment in the already-existing framework agreement or sign a new one. The second was that the EU with legislative aid would specify EU pillar duties within ESA. Finally, the last suggestion was the formation of an EU agency that would cause the transfer of power from the existing intergovernmental organization to that new one.

As it is clear to assume, the last two options presented certain limitations. The Commission pointed that "additional work is necessary to assess the options in terms of effectiveness of

[107] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 24

policy coordination and implementation" and that "the selected way forward should bring added value to the benefit of both organizations, EU and ESA, and avoid a blurring of responsibilities". The Council agreed with the Commission in May 2014, noting that "it is essential to establish appropriate, sustainable and transparent relations between the EU and ESA" and considered the first two suggestions the Commission made, as it agreed with "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". However, the Council pointed out that both options needed more development.

In December the Council designed a long-term plan that would make ESA "one of the world-leading institutions within the fields of space science, earth observation, space exploration and related technology development". It also recognized 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 organization" and "makes of ESA the long-term partner of choice for the EU for jointly defining and implementing European space policy". The Council also suggested for the ESA DG "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" and for the Commission to make headway "on the ongoing assessment of institutional relations between the EU and ESA".

The EU and ESA signed a bilateral statement on the common vision and priorities for Europe's future in space, as they agreed that "the space sector is becoming more diverse and complex" 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". Both ESA and the EU have a common vision "that Europe remains a world-class actor in space and a partner of choice on the international scene" and they share the common ambition to maximize "the integration of space into European society and economy" creating "a globally competitive European space sector" that ensures "European autonomy in accessing and using space in a safe and secure environment". Although ESA and the EU highlighted the desire to improve their partnership in the future, revision of their 2004 agreement was not stated.

Additionally, in April, the as of yet known GMES program was renamed Copernicus after suggestion of the EU in discussions for further support to the program.[108]

"The European Council conclusions of December 2013 on defense supported the projects developed by the European Defense Agency (EDA) on four priorities: remotely piloted aircraft systems (drones), air-to-air refueling, satellite communication and cybersecurity. All these priorities have direct links with space. The European Galileo and Copernicus programs can provide security and defense capabilities."

[108] For more information regarding Copernicus see p. 31.

2015- Europe needed to have free and independent access to space but is not in a position to accomplish this 'non-dependence' yet due to lack of unrestricted access to space technology. The Commission, EDA and ESA collaborated in order to find new space technologies that would help in the manufacturing of satellites and launchers. In March, there was adopted an action plan that would open the way for European independence in the field of space. This action plan was drafted for the period of 2015-2017.[109]

Technologies for European non-dependence and competitiveness

"Scope:
Research in technologies for European non-dependence and competitiveness has been undertaken within the frame of the Joint EC-ESA-EDA Task Force on Critical Technologies for European Non-Dependence, launched in 2008. The Joint Task Force recently updated the list of actions for 2015-2017."

"Activities shall address technologies identified on the list of Actions for 2015/2017 focusing on those areas that have not so far benefitted from prior Framework Program funding and representing the highest potential for being implemented through the types of action available in Horizon 2020.

Accordingly, the following priority technologies have been identified:

- U09 – Cost effective multi - junction solar cells for space applications.
- U16 – Space qualified GaN components and demonstrators.
- U17 – High density (up to 1000 pins and beyond) assemblies on PCB and PCBs.
- U21 – Very high speed serial interfaces.
- U23 – Development of large deployable structures for antennas.
- U26 – Space qualified carbon fibre and pre-impregnated material sources for launchers and satellite subsystems.

Technological spin in and/or bilateral collaborations should be enhanced between European non-space and space industries and proposals are expected to provide advanced critical technologies that are of common interest to different space application domains (e.g. telecom, Earth observation, science, etc.), or even with applicability to terrestrial domains.

Proposals should strive to go beyond the present state-of-the-art or, preferably, the expected state of the art at the time of completion if alternative technologies are being developed outside Europe. High level specifications and key requirements can be found in the list of actions for 2015-2017.

[109] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 20-1

Proposals should include a work package dedicated to the development of a commercial evaluation of the technology, and should address how to access the commercial market with a full range (preload) of recurring products.
A maximum of one proposal per identified priority technology line will be selected for funding.

In projects to be funded under this topic participation of industry, in particular SMEs, is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 5 million would allow this specific topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Reduce the dependence on critical technologies and capabilities from outside Europe for future space applications, as identified in the list of Actions for 2015/2017 as part of the Joint EC-ESA-EDA task force on Critical Technologies;
- Develop, or regain in the mid-term, the European capacity to operate independently in space, e.g. by developing in a timely manner reliable and affordable space technologies that in some cases may already exist outside Europe or in European terrestrial applications;
- Enhance the technical capabilities and overall competitiveness of European space industry satellite vendors on the worldwide market;
- Open new competition opportunities for European manufacturers by reducing the dependency on export restricted technologies that are of strategic importance to future European space efforts;
- Enable the European industry to get non-restricted access to high performance technologies that will allow increasing its competitiveness and expertise in the space domain;
- Improve the overall European space technology landscape and complement the activities of European and national space programs;
- Greater industrial relevance of research actions and output as demonstrated by deeper involvement of industry, including SMEs, and stronger take-up of research results;
- Fostering links between academia and industry, accelerating and broadening technology transfer."[110]

[110] Europa.eu, 'Horizon 2020', *Europa.eu*, n.d., https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/compet-1-2017, accessed 15 June 2020

2016- The European Parliament, in June, issued two new resolutions regarding space. The first one regarded defense and security on space and focused on space-based facilities. It urged the European Union to establish European independence in access to space technology and space in general. To achieve that, the European Parliament urged ESA and its member states along with the Commission to develop and coordinate space projects, RND missions and launch facilities with the help of public/private European partners. The second resolution called for the support of the EU on the space market uptake. The information obtained by the projects of Copernicus and Galileo would assist in the beneficial development of infrastructure and services in future EU projects in space.

In October, the Commission issued the European Space Strategy. This strategy expresses the importance of space development in the EU and the fact that space infrastructure should become a priority for the Union. The goals suggested by the Commission were:

- "Maximizing 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 programs, 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'. (exploration falls under the ESA remit)".[111]

The Council, on 29 November, organized a public debate to discuss this proposal before drawing conclusions. The ESA council, in December, welcomed this proposal and agreed with the suggestion for ESA to "efficiently implement EU-funded space programs and activities".

Additionally, ESA presented in November its plan for the future under the concept of "Space 4.0" with a goal to become more innovative, informative, inspirational and interactive. In December, the ESA Council endorsed this plan, calling ESA's Director General "to further shape and promote ESA as THE space agency for Europe". In addition

[111] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 22

to enhancing the relations with the EU and its institutions, the Council noted that "ESA elaborates and implements a long-term European space policy".

Also this year, in October, the Commission set up an "inception impact assessment procedure" so as to determine if launching an EU project on Govsatcom was possible.

Lastly, In December 2016, under the Galileo joint initiative, 18 satellites were in orbit that offered, as a result, early operational capabilities, as full operation of the program was expected by 2019 and completion of the system by 2020.[112]

2018-The ESA council met in 25 October in Villanueva de la Cañada, Madrid, at a ministerial level, to build the road for the 2019 Ministerial Council, called "Space19+", with the goal of "Addressing the challenges facing not only the European space sector, but also European society as a whole".

At the IMM18(Intermediate Ministerial Meeting of 2018),[113] the ESA Ministers discussed "Space19+", the plan to develop new space programs and opportunities in space in the next decade that will address the challenges the European society faced so far. The DG of ESA, General Jan Wörner, supported the Space19+ initiative and suggested that the programs carried out by ESA from 2019 and beyond will include: access to space, RND missions, operations, applications, science and exploration. Finally, an important role will be given in the development of programs that concern security and safety that will protect the planet from near-Earth objects and space debris and forecasting space weather. This new sector, also, will provide security in food control, cybersecurity, border hazards and migration, disaster management and maritime security.[114]

2019- In 28 November the ESA Council met at ministerial level, in Seville, Spain to set the guidelines of the "Space19+" initiative. ESA's member states approved a series of programs that will provide Europe with non-dependent access to space in the next decade, will help European economy and boost European science and discoveries regarding our

[112] Briefing European Parliamentary Research Service, *In-depth analysis*, January 2017, p. 21

[113] The European Space Agency, 'Intermediate Ministerial Meeting press conference', *The European Space Agency*, 2018, https://www.esa.int/About_Us/Corporate_news/Intermediate_Ministerial_Meeting_press_conference, accessed 20 August 2020

[114]The European Space Agency, 'ESA on the way to Space19+ and beyond…', *The European Space Agency*, 2018, https://www.esa.int/About_Us/Corporate_news/ESA_on_the_way_to_Space19_and_beyond, accessed 2 September 2020

planet, the solar system and the universe, while at the same time focusing on Earth's defense and security.

ESA plans on developing the first satellite systems that will connect with 5G networks and next generation optical technologies for a "network in the sky" that will be fiber-like, that will be revolutionary in the communications industry. The satellite communications will begin cooperating with navigation to start satellite navigation on the Moon. Back on Earth, companies will start developing new navigation technology through the NAVISP project. Also, ESA prepared the transition towards the new generation of launchers Ariane 6 and Vega-C, and have approved Space Rider, the new reusable spaceship of ESA.

Earth observation is boosted as 11 new missions are underway mainly regarding climate change, Africa and the Arctic.

Furthermore, Space Safety is the main point of Space19+ as the new programs will keep the space environment safe and operational by removing the debris that might be dangerous and automating space traffic controls. As a result, there will be earlier warnings of space hazards, such as asteroids and solar flares, regarding Earth. ESA in a collaboration with NASA will take on the Hera mission that will test capabilities of asteroid deflection and there have been confirmed investments in cyber resilience and cyber training fields.

Finally, ESA pointed out that they intent on reinforcing the relationship with the EU in order to succeed on the upcoming goals and increase the effectiveness and efficiency.

"Bringing together our Member States, 22 governments that change regularly, and agreeing on such inspirational projects to share a joint future in space might seem an impossible task on paper. But in two days in Seville, we have proved it is possible," said ESA Director General Jan Wörner. "It is possible because we work together to develop good programs, and it is possible because people are dedicated, and invest all their effort in a long and thorough decision process involving the scientific community, industry and national delegations."[115]

[115] The European Space Agency, 'ESA ministers commit to biggest ever budget', *The European Space Agency*, 2019, http://www.esa.int/About_Us/Corporate_news/ESA_ministers_commit_to_biggest_ever_budget, accessed 5 September 2020

5.2 Challenges in the relations between ESA and the EU

The European space policy landscape is visibly divided in the European Union institutions (the Commission and the European External Action Service), the European intergovernmental institutions such as ESA and EUMETSAT, and important member states with their respective national space agencies. All the different institutions express differently in the aspects of membership, decision making procedures and budgetary decisions.

This diverse environment provides some benefiting flexibility to the European Union member states as, factoring their interest in a project and the available budget, they can decide the extent of their involvement in ESA programs. It is possible for them to develop programs at a national level and cooperate with other member states, through the optional program section of ESA or, collectively take part in EU space projects. The national industry regarding space is playing a major role in the outcome of the decision as the Commission has a competition policy, while ESA implements a fair return policy.

The good news is that this has led to the involvement of increasingly more European Union member states in space programs and this creates a diverse and growing European space industry but, due to the complexity of the governance system regarding space in Europe, it is very difficult to implement proposing documents in the past few years. The goal is a unified and strong European space policy that covers all the matters regarding space: the industrial policy, the space exploration, the international strategy and the collaboration of EU, ESA and national agencies in the space programs.

ESA and the Commission have collaborated in improving the European space policy over the past 15 years or so. A new momentum was created in 2004 with the signing of the Framework Agreement between the two and the creation of the Space Council. These steps helped dividing the duties of the EU and ESA.

- ESA can implement space programs through its technical competency and its projects are mostly regarding the ‘upstream space sector’. The Agency, also, is responsible for the development of the European space exploration programs and European space science.
- The European Union is responsible for the regulation and development of use by the Member States of the EU space services, data and infrastructure. The EU can federate demand of the Member States and the financial capability they have so as to invest in the programs that are long-term such as the Galileo program. Nevertheless, the EU cannot be involved in the management of these programs or their operation (this is why GSA was created) and thus, supports the ‘downstream space sector’.

Challenges in the matter can be caused by the NewSpace movement and the fact that the industry is more involved in the definition, operation and financing of the space programs.

Complexity is created by the fact that big projects such as Galileo are managed by the EU, ESA and GSA with multiple different opinions of expertise. ESA and the EU have very different financial rules that create further difficulty in implementing these EU flagship programs.

Additionally, the Framework Agreement that was signed by the EU and ESA in 2004 has since been renewed but unsuccessfully, as there have been no modifications since 2004 and some of the core requirements are no longer being implemented. In 2012 the Space Council met formally for the last time. The Joint Secretariat is not active any more. The plans for further advancement of ESA that began in 2012 have not yet generated new proposals or decisions, In the joint statement of the EU and ESA in 2016 there were no new outcomes.

The problems seem to come from blockage in the governance level but that does not mean that some solutions could not come from the operational level. ESA suggested the implementation of a 'single financial framework partnership agreement' between ESA and the European Union, in order to evolve the management of their common projects.

The two organizations seem to have overlapping responsibilities regarding the continent's activities in space. The EU Commission, in 2012, stated to the European Council and the Parliament that the problematic areas in the cooperation with ESA are regarding many different aspects. More specifically there are financial differences, membership issues, security and policy coordination matters and lack of political accountability on the part of ESA.

The Commission reported that the largest projects of ESA need geographic return, meaning that they should receive in contracts the same amount of budget that they put in. ESA, when implementing an EU project, should find the best contractors regardless of their location. This, therefore, causes controversy between the two agencies when they both fund a program.

As regards to the membership of the Agency, ESA cooperates with Norway and Switzerland, and occasionally Canada. These states are not members of the European Union and the fact that ESA's policy is to give each member state the right to one vote means for EU that these states have "a disproportionate leverage over matters that may affect the EU." Regarding this issue, the Commission suggested that the procedure would be changed from a unanimous vote to qualified majority. Also, the Commission was concerned about asymmetrical defense and security issues due to the participation of non-EU members in ESA, although according to the Lisbon Treaty, the EU has the upper hand in matters of defense and security.

Additionally, the Commission stated to the European Council and the Parliament, that "ESA's space activities lack a structural connection and coordination mechanism within

the wider policy-making of the European Union…. Specific mechanisms for coordination and cooperation need to be agreed in time-consuming negotiations at program level. There is no formal mechanism at policy level to ensure that initiatives taken within ESA are consistent with EU policies."

Finally, the Commission suggested that ESA lacked political accountability, because ESA reports to national governments, while the EU has direct accountability, through an elected Parliament, to citizens.[116]

Furthermore, the lack of political impulses in the space sector derives from the fact that the European space sector is fragmented. On the contrary, in other space faring nations, the decisions are made at the highest political level. The European Council that is considered to be the institution that is responsible for giving political direction and setting priorities, has been unable up to now to take any decisions regarding the long-term approach towards 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 programs."

In December 2013, the European Parliament mentioned 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".

However, there have been set up trans- Commission user groups regarding the various EU space projects, to note the importance of the services and data produced by these projects in various areas of policy. The 2016 space strategy was assisted by the inter-service the current formation of the Commission provided and it was overseen by Maroš Šefcovic and Jyrki Katainen, the two former Commission Vice-Presidents. In later discussions on other areas of policy, the matter of space was added by the Commission.

Moreover, fragmentation causes issues in international matters regarding the European space representation. Europe, depending on the international organization, is represented by its individual member states, by ESA or by the EU. The proposal of the Commission in 2008 regarding the role of Europe in the international stage in space did not clarify the duties or actions that should be taken. The ESA council in 2016 acknowledged "ESA as an appropriate forum for the Member States to exchange and coordinate positions on the international space law and in acting as a permanent observer" to the COPUOS.[117]

[116] Doug Messier, 'ESA Agrees to Explore Closer Cooperation With European Union'
[117] Briefing European Parliamentary Research Service, In-depth analysis, January 2017, p. 33-4

6. The participation of Greece in ESA

In this chapter we will see all the details regarding the participation of Greece in the Agency and what this entails for the Greek nation.

6.1 Accession of Greece in ESA

In 17 January 2001 in Athens, Greece and the European Space Agency signed a framework cooperation agreement. Through this agreement Greece participated in three optional programs of ESA: ARTES telecommunications program, Copernicus (formerly named GMES) Earth observation program and General Support Technology Program (GSTP).[118]

The Cooperation Agreement between Greece and ESA was signed by the Greek Minister of industry, Energy and Technology and the Director General of ESA in the presence of the Greek Minister of Transport and Communications.[119]

In 18 January 2005, Greece signed the ESA Convention and became a full member of the European Space Agency. The Convention was signed by the Minister for Development (Nikos Christodoulakis) and ESA Director General (Antonia Rodatá). This document of cooperation between Greece and ESA covers the space activities of Earth observation, satellite navigation, telecommunications, research in microgravity, space science and ground segment utilization and engineering.[120]

Greece accessed ESA for the same reasons as any other Member State. ESA, in return for the financial contributions of the Member States, provides inclusion of the country's industry in the Agency's projects in correlation to their contributions. Greece, by participating is promoting the industrial capabilities of the nation and declares that it is a capable Member State, qualified to handle big projects as a part of the European community.

Greece plans for the future to be even more active in ESA as it has increased its contributions to ESA's mandatory and optional programs. For the years 2017-2019 Greece submitted in ESA €30 million for mandatory programs and €8.5 million for

[118]The European Space Agency, 'International Relations', *The European Space Agency*, n.d., pdf http://www.esa.int/esapub/annuals/annual02/Annrep02Activities/AnnRep02InterRel.pdf, accessed 2 September 2020

[119]The European Space Agency, 'ESA/Greece Cooperation Agreement', *The European Space Agency*, n.d., https://www.esa.int/Newsroom/Press_Releases/ESA_Greece_Cooperation_AgreementESA/Greece Cooperation Agreement, accessed 2 September 2020

[120]CORDIS EU, 'Greece moves closer to ESA', *CORDIS EU research results*, n.d., https://cordis.europa.eu/article/id/16215-greece-moves-closer-to-esa, accessed 3 September 2020

optional. For the period 2020-2023 Greece will submit twice as much: €30 million for the mandatory programs and €33 million for the optional. ESA on its part, is planning to assign a larger number of projects to Greek companies and universities that it has so far.[121]

Space exploration is an infinite source of knowledge and the European citizens can access all this knowledge thanks to their cooperation to ESA. Greece signed the first cooperation agreement in 1994 with ESA, but became a full member in 2005. Since then, Greece gradually broadens its participation in European space programs and activities.

The General Secretariat for Research and Technology is the competent authority that manages the Greek participation in ESA.[122]

"Mandate and Background of the General Secretariat for Research and Technology"

"The General Secretariat for Research and Technology (GSRT) is a modern public service assigned with the task of defining, as well as coordinating the implementation of, the national policy for Research, Technological Development and Innovation. It supports the activities of research and industry bodies through competitive research programs highlighting economic performance and a socially fair allocation of outcomes. Furthermore, it supervises research and technology bodies, which provide local communities with the skills necessary for producing knowledge and boosting innovation. GSRT actively follows EU and international developments in the field of RDI and represents the country to the EU and International Organizations within its competence.

In the face of the current economic conjecture, investing in science, research and technology becomes a key strategic priority towards a socially and economically sustainable model of development, based on highly-qualified human resources and novel ideas.
The GSRT mandate consists in:
Defining and promoting a comprehensive strategy for research, technology and innovation;
Fully exploiting the highly-qualified research staff to boost economic growth, generate new employment and reverse the current trend of expert Greek scientists migrating abroad;
Transferring and facilitating the uptake of innovative technologies by the country's industry, through targeted use of research outcomes;
Supporting initiatives to raise awareness among Greek people in the fields of Research and Technology;
Supervising and funding Research and Technology Bodies across the country;

[121]Teti Igoumenidi, 'Με αυξημένα κονδύλια η συμμετοχή της Ελλάδας στον ESA', *Infocom.gr*, 3/2/2020, https://www.infocom.gr/2020/02/03/afksimena-kondylia-symmetochi-tis-elladas-ston-esa/50844/, accessed March 14 2020
[122] ESA multimedia, 'Οι δραστηριότητες της ESA', *ESA multimedia*, n.d., pdf https://esamultimedia.esa.int/docs/corporate/AAESA_GK_120611.pdf, accessed 2 September 2020

Promoting international S&T cooperation with EU and third countries and making best use of the opportunities to participate in relevant EU, bilateral and international initiatives.
Evaluating the outcomes of research & innovation projects, with a view to adjusting research policy on an ongoing basis.

Programming Period 2014-2020:
GSRT Policy and Actions

The **Strategy for Smart Specialization** constitutes the main guidance for defining and promoting the Research and Innovation Policy for the programming period 2014-2020. It highlights areas where Greece has already achieved, or can achieve, a competitive advantage. Priorities emerge as a result of the so-called entrepreneurial discovery process aimed at identifying new business opportunities to put into use newly-produced knowledge and integrate it into value chains. This process is carried out through continuous and active consultation of all actors involved in the innovation "ecosystem" (including private enterprises, higher education institutions and research centers, ministries, regional authorities, etc.), with private enterprises and the industry at large also playing a central role.

Smart Specialization Strategy Priority Areas:
Agro-food sector
Bioscience and Healthcare / Pharmaceuticals
Information and Communication Technology (ICT)
Energy
Environment and Sustainable Development – Climate Change
Transport and Logistics
Materials – Manufacturing
Cultural and Creative industries – Tourism

Actions planned by GSRT in each of the above areas are aimed at developing innovative products and services, transferring knowledge, supporting research staff and further developing and using research infrastructure. The European dimension (synergies and complementarity with the "Horizon 2020" strategy and other activities within the European Research Area) is strongly promoted; top priorities also include fostering an innovation culture and broadening the participation of social partners in research institutions.

Research and Technology Bodies
The Research and Technology Bodies supervised by GSRT boast a considerable range of scientific and research achievement in the fields of Medicine and Biomedicine, Astrophysics, Physical Science, Humanities and Social Sciences, Marine Research, innovative product development, Technology, Information Technology and Telecommunications."[123]

[123] GSRT,'GSRT Mission and Background', *GSRT General Secretariat for Research and Technology*, n.d. http://www.gsrt.gr/central.aspx?sId=106I432I1092I323I437051, accessed 3 September 2020

6.2 “ARTES” and Greece

In October 2003, ESA and Greece cooperated for the first time in a project. This project, within the ARTES telecommunications program, was funded by ESA and developed by the Greek company ATTISAT. The goal of the project was to “develop Ku-band receive-only planar-arrays for reception of High Power satellites”. These arrays are able to receive little interference from other orbiting satellites and they are flat-shaped. This design was appealing for Greece, as the aim was to lave low visibility dishes that do not interfere with the attractiveness of the cityscapes.

In the past, Greece had mostly terrestrial networks and this was a big issue as Greece is mainly composed by islands and mountains. These somewhat isolated areas obstructed the connectivity. Also, Greece is infamous for its severe earthquakes and during the earthquakes terrestrial networks were being destroyed.

In July 2003, HELLAS-SAT was launched to aid all the problems Greek telecommunications faced in the past. [124]

6.3 “Copernicus” and Greece

In 12 May 2014, right after the launch of Sentinel-1A satellite, ESA and Greece signed an agreement that enables access to data produced by the Sentinel satellites. The Sentinel group of satellites belongs to the Copernicus environment monitoring program.

ESA and Greece signed an “Understanding for the Collaborative Ground Segment Cooperation”. Greece’s representative was the President of NOA (the National Observatory of Athens), Kanaris Tsiganos. The signing of the agreement took place at the two-day conference in Athens, “Copernicus Sentinels Serving Society and Environment”.[125]

The intend of the National Observatory of Athens is to install a “national mirror site” that will contain Sentinel data. Professor Tsiganos stated that “The objective of this activity is to provide data for priority national activities with a prospect to serve the needs of

[124] The European Space Agency, ‘ESA Telecom starts first project with Greece, telecom artes 4.0 programme’, *The European Space Agency*, n.d., artes.esa.int/news/esa-telecom-starts-first-project-greece, accessed 4 September 2020

[125] See full “Annex to the Understanding for the cooperation in the frame of the Sentinel Collaborative Ground Segment between ESA and the National Observatory of Athens, acting in its capacity of Greece’s National Point of Contact” in the Annex p.115

transnational cooperation between Greece and neighboring southeastern Mediterranean and Balkan countries, as well as the Black Sea Region".

The Director of ESA's Earth Observation Programs, Volker Liebig stated that "The Understanding we just signed with Greece, which holds the current presidency of the EU, is the first of its kind. We are looking forward to future agreements with other Member States to establish successful data access to and the exploitation of Sentinel data on national levels" and that "This is an important step forward in the exploitation of the Sentinel data".[126]

6.4 "Space19+" and Greece

In 2019, Greece participated actively in the development of a new generation of satellite technologies and applications through ESA's optional programs.

In an effort to increase the productivity of the national industry is space projects, Greece along with the ESA council formed a plan for the period 2021-2023. Greece's participation in this optional program aims in contributing in the development of next generation satellite technologies and applications in Europe and through that, assist national networks through 5G services (Space & 5G) and Earth observation services.

Mr. Georgakakis mentioned that "we begin with realism and prudence this journey of forwarding investments and relevant markets in this competitive, complex and explosively growing field of space applications. The European market displays a total turnover of € 66.5 billion and Greece, in cooperation with ESA, claims her part, by utilizing its national potential in science and business respectively." He also pointed that "even though it might not seem expected, Greece is about to complete its own governmental closed-network satellite communications system that is recognized as a high-level European practice".

The field of space is in constant growth globally with its applications being used by the civilians, the industry and the public sector in fields like the shipping industry, energy and the environment, transportation of all sorts, weather forecasting, prevention of natural disasters, in the agricultural field and in defense and security. Greece is one of the 7 nations of the EU that has its own governmental satellite communications system, that is durable

[126] The European Space Agency, 'Greece guaranteed access to Sentinel data', *The European Space Agency*, n.d., https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Greece_guaranteed_access_to_Sentinel_data, accessed 5 September 2020

in cases of emergency and in telecommunications for the purpose of defense and security.[127]

6.5 "Fiber in the sky" and Greece

In July 2020, ESA included Greece in the initiative "fiber in the sky" through the program ARTES ScyLight. This ESA initiative has a total budget of €180 million and regards high-speed data transfer through satellites. It is expected to be launched in 2024.

The General Secretariat for Research and Technology of the Greek Ministry for Digital Governance announced that ESA was considering two Greek Observatories. The first one is Aristarchus Observatory in mount Chelmos and the second one is Kryoneri Observatory in Corinth.[128] In August 2020, ESA decided to assign the project to the Observatory Aristarchus in Chelmos.[129]

This project considers a ground station in Greece that is estimated to cost €6-8 million. Greece will be among a few EU countries that has a functioning closed-network satellite communications system that is being used by public services, a fact that contributed in the decision of ESA to choose Greece for the first ground station.

After the completion of the updates, the ground station based at the Greek Observatory will become a key point in Europe's new generation of networks. These networks will be a combination of ground infrastructure with satellite networks, that will provide telecommunication services with speed over 1Gbps to public services, civilians and businesses. These combined telecommunication technologies replace radio waves with laser systems and are known as "fiber in the sky". Also, they help provide more reliable telecommunication services in remote areas. At the same time, the ground infrastructures such as the optical fiber networks and the 5G mobile networks create a complete environment in regards to uninterrupted data transfer in extreme conditions.

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[127] Eleutheros Typos,'Η Ελλάδα επανέρχεται μετά το 2005 στον Ευρωπαϊκό Οργανισμό Διαστήματος', *eleftheros typos*, 2019 https://eleftherostypos.gr/tech/493899-i-ellada-epanerxetai-meta-to-2005-ston-eyropaiko-organismo-diastimatos/, accessed 1 October 2020

[128] Teti Igoumenidi, 'Στην Ελλάδα ο πρώτος επίγειος σταθμός fiber in the sky της ESA', *infocom*, 2020, infocom.gr,/2020/07/08/stin-ellada-protos-epigeios-stathmos-fiber-the-sky-tis-esa/51788/, accessed 2 October 2020

[129]Kostas Delezos, 'Η ESA επιλέγει το Αστεροσκοπείο Χελμού για το «ευρυζωνικό δίκτυο του Διαστήματος»', *ta nea*, 2020, tanea.gr/2020/08/31/science-technology/h-esa-epilegei-to-asteroskopeio-xelmou-gia-to-eyryzoniko-diktyo-tou-diastimatos/, accessed 1 October 2020

The development of this ground station in Greece creates new possibilities in the scientific field of the nation and it is estimated that it could attract investment interest from Greek and foreign private industry in the field of telecommunications.

The suggestion between the two Observatories is an outcome of Greece's choice to participate more actively in the 5G telecommunications and Earth observation projects of ESA. This strategic plan was developed in the Intermediate Ministerial Meeting of the ESA council called "Space 19+" in November of 2019. In December of the same year, the Minister for Digital Governance Kyriakos Pierrakis signed the declaration Euro QCI (Quantum Communication Infrastructure), under which Greece becomes a member of the European team of countries that participate actively in the development of high-tech telecommunication services.

Aristarchus Observatory in Chelmos in located at 2.340m altitude, 240km from Athens. It opened in 2007 and in one of the biggest contributors of the National Observatory in Athens. It is the largest Observatory in the Balkan region and the second largest in the continental Europe. It contains the biggest telescope ever manufactured by Zeiss enterprise.

Kryoneri Observatory is located on the top of mount Kyllini in Corinth at an altitude of 905m and 130km away from Athens. It was founded in 1972 and its mirror telescope was manufactured in 1975 and was updated through the ESA program NELIOTA, to register "primordial objects", i.e. asteroids and comets that collide with the Moon.[130]

6.6 The Hellenic Space Center

Formerly known as the "Hellenic Space Agency", that was founded in 2017, during the government of 'Syriza' with a goal of actualizing the Greek policy in space and managing national operation of space technologies. In August 2019 HSA was replaced by the "Hellenic Space Center" or HSC.

The HSC is an institution that operates as a 'Legal Person governed by Private Law', but it operates as a quasi-public entity. Its operations are based in Athens and it is monitored by the Hellenic Ministry of Digital Governance. [131]

In April 2019 HSC signed an agreement with NASA in Colorado Springs, USA, with a twofold purpose: to include a Greek astronaut in the International Space Station and the participation of Greece in future missions to Mars.

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[130] Teti Igoumenidi, 'Στην Ελλάδα ο πρώτος επίγειος σταθμός fiber in the sky της ESA'

[131] See full Art. 60 for the establishment and function of the Legal Person Governed by Private Law "Hellenic Space Center" in the Annex p.119

These decisions were a part of the development of the National Space Policy. The inclusion of a Greek astronaut in ISS is part of the European plan to maintain a leading role in space that is coordinated by the European Space Agency.[132]

[132] ΑΡΕ-ΜΡΕ, 'Επόμενος στόχος της Ελλάδας η συμμετοχή σε αποστολή στον Άρη', *APE-MPE*, 2019, https://www.amna.gr/home/article/353834/Epomenos-stochos-tis-Elladas-i-summetochi-se-apostoli-ston-Ari-, accessed 3 October 2020

Conclusions

After WWII and during the Cold War, the rivalry of the two superpowers brought in the spotlight the human attempts to conquer space and define the limits of human intervention to it. As the years go by, the technologies evolve and the human needs grow, making space a major actor in the development of telecommunications, satellite navigation, Earth observation and weather forecasting.

Europe, other than national space agencies, made a collaboration effort possible in 1975 by combining the European Space Research Organization and its Member States and the European Launcher Development Organization and its Member States in the European Space Agency, by signing the "Convention for the Establishment of a European Space Agency" that entered into force in 30 October 1980.

Since then, more and more European countries joined ESA, some through participation in optional programs and others by becoming full members. ESA's flexibility in the task allocation made it possible for European countries to determine their role in the development of ESA's initiatives.

The collaboration between the European countries since the 1960s made European development in space possible and helped Europe play a major part in the international stage in space. More importantly, the collaboration between the two institutions -ESA and the EU- made Europe's advancement in space all the more functional.

ESA has been a big asset in making Europe a competitive force in the space industry and in allowing the member states to invest in it. The Commission launched large-scale space projects on earth observation and satellite navigation and in that way contributed and continues to contribute to other policies from the data that it collects through these projects.

Nevertheless, due to the ever-evolving international development in the space sector, Europe is constantly being challenged. The issue of fragmentation in the governance plans for space and the diversity of the institutions in the rules and operations in space programs are forming barriers when it comes to important challenges.

In 1999, the Commission stated, regarding ESA, that the Agency lacked consensus and that lead to delays in financing, designing and launching programs compared to NASA. Later on, in 2004, when they came together and signed the Framework Agreement in an effort to jointly create and run space programs. But the relationship between the two organizations was and still is constantly challenged.

In a 2012 communication to the European Parliament and Council the Commission expressed concerns regarding ESA's handling of the financial contracts, of the defense and security loopholes due to the fact that ESA collaborates with non-EU states, the lack of political accountability on ESA's part and the absence of policy coordination mechanisms.

Additional challenges can be securing infrastructures regarding space, developing civil and defense space programs, keeping their independence in space access, monitoring space services and collected data or establishing long-term plans and budgetary commitments in the private industry etc.

The two organizations are in constant back-and-forth communication to resolve any occurring issues. Up to 2012 the EU Commission suggested that in order to resolve the operational and financial issues they faced, ESA should become an "EU Pillar" or an EU Agency. But, in 2013 the Space Council recognized the importance of ESA as an independent intergovernmental organization and acknowledged that ESA and the European Union should review their relationship and update the Framework Agreement they signed back in 2004.

In 2015 the issue of non-dependent access in space arose. Europe needed independent access to space and space technology. To resolve this problem, ESA, the EU and EDA (European Defense Agency) adopted an action plan for 2015-2017 under a Joint Task Force.

The final question that needs to be answered is: *Does ESA fulfil its purpose so far?*

ESA is an intergovernmental organization that was created to serve the common interests of its Member States and represent a united Europe in space activities. I believe that it managed to allocate fairly responsibilities and tasks to its Member States, proportionally to their financial contributions and the extent of their interest of involvement.

It does represent the European countries, with a lot of successful endeavors, such as the European representation at the International Space Station by ESA astronauts but, there are some issues that still need to be addressed in my opinion. First of all, in order for ESA to be considered an equally powerful organization as NASA, for example, (as it is still considered the leading agency for space programs), it would need much larger contributions from its Member States than it does now for the mandatory and optional programs. Bigger budget would result in creating manned spaceflight projects that ESA has not pursued solo yet, as well as, enlargement of its current programs and facilities, more staff and lager financial aid towards space research and technology.

Secondly, regarding the European space representation, ESA should assume the role of the of the permanent observer to the COPUOS as it already suggested in 2016. Additionally, the Agency should create an internal formal coordination mechanism to maintain that ESA initiatives are consistent with EU policies. Finally, another important suggestion I have, second to the increase of budget, would be the review and update of the 2004 Framework Agreement between ESA and the EU so as to create a solid foundation for their future common endeavors in space without facing the same challenges as they did in the past. To my observation, ESA is not unwilling to alter some operational issues that trouble the EU, but changes on their policies need to be made from both sides.

The key is for ESA, the EU and their respective member states to address these barriers so as to keep Europe's status in the international space scene as a space faring power in the future.

Finally, this dissertation examines the participation of Greece in ESA. Greece, as a small country, took slow and careful steps towards space participation. The discussions begun in the 1990s, gradually in 2003 Greece participated, without committing as a full Member State to ESA, by developing planar arrays through the optional program ARTES. In

January 2005, Greece signed the ESA Convention and became a full member of the Agency.

After signing the Convention, Greece remained dormant for a few years but, in the last decade increased the efforts of participation and undertook many new projects that will actively help Greek and European development.

Greece's first participating effort was in 2003 with the "ARTES" telecommunications program. ESA funded the program and the Greek company ATTISAT developed planar-arrays, that would receive less interference from other orbiting satellites. Later, in 2014, Greece took part in the ESA/EU project "Copernicus". ESA and Greece signed the "Understanding for the Collaborative Ground Segment Cooperation. Greece would have access to data produced by the Sentinel satellites. The base of this operation was set at the National Observatory of Athens, where a "national mirror site" was created containing the Sentinel data collected.

More recently, in 2019, Greece took part in the project "Space19+", an optional program regarding a new generation of satellite technologies. The project is set to launch in 2021-2023 and the purpose is to develop satellites that will assist 5G networks. Greece was chosen because it is one of the seven European states that has its own governmental satellite communications system that would be durable in case of an emergency. Finally, a few months ago, in July 2020, Greece entered a new ESA initiative through ARTES SkyLight, "Fiber in the Sky". The project is expected to launch in 2024 and is based at the Observatory Aristarchus in Chelmos. The purpose of the project is a ground station in the country for a closed-network satellite communications system that will replace the old one of radio waves with laser systems. Combined with ground infrastructure of 5G mobile networks and optical fiber networks, this project promises uninterrupted data transfer in extreme conditions and a goal of 1Gbps data speed not only for public services but citizens and businesses as well.

Finally, Greece doubled its contributions to ESA for the next three-year period, with a goal of undertaking bigger tasks for its industry and universities, thus enhancing the nation's industrial capabilities in space technologies and its educational system's research potentials.

The steps that Greece took in the recent years seem promising for the nation and it creates a solid effort not only for the nation, but for ESA and EU, for a leap to the future of advancement in the space sector. It is a proof of the importance of all the member states of the two organizations and the fact that participation is the key for Europe to maintain a solid place in the matters of space.

Greece is a small example of the many, small or big, pieces of the European puzzle that, even though might be rough around the edges sometimes, sticks perfectly together and creates a strong actor in the international stage regarding the field of space.

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Annex

- **ESA Convention**

ESA Convention

"CONVENTION FOR THE ESTABLISHMENT OF A EUROPEAN SPACE AGENCY

The text of the Convention was approved by the Conference of Plenipotentiaries, held in Paris on 30 May 1975. The ESA Convention entered into force on 30 October 1980.

The States parties to this Convention:

Considering that the magnitude of the human, technical and financial resources required for activities in the space field is such that these resources lie beyond the means of any single European country;

Considering the Resolution adopted by the European Space Conference on 20 December 1972 and confirmed by the European Space Conference on 31 July 1973, which decided that a new organisation, called the European Space Agency, would be formed out of the European Space Research Organisation and the European Organisation for the Development and Construction of Space Vehicle Launchers, and that the aim would be to integrate the European national space programmes into a European space programme as far and as fast as reasonably possible;

Desiring to pursue and to strengthen European cooperation, for exclusively peaceful purposes, in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems;

Desiring, in order to achieve these aims, to establish a single European space organisation to increase the efficiency of the total of European space efforts by making better use of the resources at present devoted to space and to define a European space programme for exclusively peaceful purposes;
have agreed as follows:

Article I
Establishment of the Agency
1 - A European organisation called the European Space Agency, hereinafter referred to as the Agency, is hereby established.
2 - The members of the Agency hereinafter referred to as Member States, shall be the States which are parties to this Convention in accordance with articles XX and XXII.
3 - All Member States shall participate in the mandatory activities referred to in article V, 1, a), and shall contribute to the fixed common costs of the Agency, referred to in annex II.

4 - The Headquarters of the Agency shall be situated in the Paris area.

Article II

Purpose

The purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems: a) By elaborating and implementing a long-term European space policy, by recommending space objectives to the Member States, and by, concerting the policies of the Member States with respect to other national and international organisations and institutions; b) By elaborating and implementing activities and programmes in the space field; c) By coordinating the European space programme and national programmes, and by integrating the latter progressively and as completely as possible into the European space programme, in particular as regards the development of applications satellites; d) By elaborating and implementing the industrial policy appropriate to its programme and by recommending a coherent industrial policy to the Member States.

Article III

Information and data

1 - Member States and the Agency shall facilitate the exchange of scientific and technical information pertaining to the fields of space research and technology and their space applications, provided that a Member State shall not be required to communicate any information obtained outside the Agency if it considers that such communication would be inconsistent with the interests of its own security or its own agreements with third parties, or the conditions under which such information has been obtained.

2 - In carrying out its activities under article V, the Agency shall ensure that any scientific results shall be published or otherwise made widely available after prior use by the scientists responsible for the experiments. The resulting reduced data shall be the property of the Agency.

3 - When placing contracts or entering into agreements, the Agency shall, with regard to the resulting inventions and technical data, secure such rights as may be appropriate for the protection of its interests, of those of the Member States participating in the relevant programme, and of those of persons and bodies under their jurisdiction. These rights shall include in particular the rights of access, of disclosure, and of use. Such inventions and technical data shall be communicated to the participating States.

4 - Those inventions and technical data that are the property of the Agency shall be disclosed to the Member States and may be used for their own purposes by these Member States and by persons and bodies under their jurisdiction, free of charge.

5 - The detailed rules for the application of the foregoing provisions shall be adopted by the Council, by a two-thirds majority of all Member States.

Article IV

Exchange of persons

Member States shall facilitate the exchange of persons concerned with work within the competence of the Agency, consistent with the application to any person of their laws and regulations relating to entry into, stay in, or departure from, their territories.

Article V

Activities and programmes

1 - The activities of the Agency shall include mandatory activities, in which all Member States participate, and optional activities, in which all Member States participate apart from those that formally declare themselves not interested in participating therein.

a) With respect to the mandatory activities, the Agency shall:

i) Ensure the execution of basic activities, such as education, documentation, studies of future projects and technological research work;

ii) Ensure the elaboration and execution of a scientific programme including satellites and other space systems;

iii) Collect relevant information and disseminate it to Member States, draw attention to gaps and duplication, and provide advice and assistance, for the harmonisation of international and national programmes;

iv) Maintain regular contact with the users of space techniques and keep' itself informed of their requirements.

b) With respect to the optional activities, the Agency shall ensure, in accordance with the provisions of annex III, the execution of programmes which may, in particular, include:

i) The design, development, construction, launching, placing in orbit, and control of satellites and other space systems;

ii) The design, development, construction, and operation of launch facilities and space transport systems.

2 - In the area of space applications the Agency may, should the occasion arise, carry out operational activities under conditions to be defined by the Council by a majority of all Member States. When so doing the Agency shall:

a) Place at the disposal of the operating agencies concerned such of its own facilities as may be useful to them;

b) Ensure as required, on behalf of the operating agencies concerned, the launching, placing in orbit and control of operational application satellites;

c) Carry out any other activity requested by users and approved by the Council. The cost of such operational activities shall be borne by the users concerned.

3 - With respect to the coordination and integration of programmes referred to in article II, c), the Agency shall receive in good time from Member States information on projects relating to new space programmes, facilitate consultations among the Member States, undertake any necessary evaluation and formulate appropriate rules to be adopted by the Council by a unanimous vote of all Member States. The objectives and procedures of the internationalisation of programmes are set out in annex IV.

Article VI

Facilities and services

1 - For the execution of the programmes entrusted to it, the Agency:

a) Shall maintain the internal capability required for the preparation and supervision of its tasks and, to this end, shall establish and operate such establishments and facilities as are required for its activities;

b) May enter into special arrangements for the execution of certain parts of its programmes by, or in cooperation with, national institutions of the Member States, or for the management by the Agency itself of certain national facilities.

2 - In implementing their programmes, the Member States and the Agency shall endeavour to make the best use of their existing facilities and available services as a first priority, and to rationalise them; accordingly they shall not set up new facilities or services without having first examined the possibility of using the existing means.

Article VII

Industrial policy

1 - The industrial policy which the Agency is to elaborate and apply by virtue of article II, d), shall be designed in particular to:

a) Meet the requirements of the European space programme and the coordinated national space programmes in a cost-effective manner;

b) Improve the world-wide competitiveness of European industry by maintaining and developing space technology and by encouraging the rationalisation and development of an industrial structure appropriate to market requirements, making use in the first place of the existing industrial potential of all Member States;

c) Ensure that all Member States participate in an equitable manner, having regard to their financial contribution, in implementing the European space programme and in the associated development of space technology; in particular the Agency shall, for the execution of its programmes, grant preference to the fullest extent possible to industry in all Member States, which shall be given the maximum opportunity to participate in the work of technological interest undertaken for the Agency;

d) Exploit the advantages of free competitive bidding in all cases, except where this would be incompatible with other defined objectives of industrial policy.

Other objectives may be defined by the Council by an unanimous decision of all Member States. The detailed arrangements for the attainment of these objectives shall be those set out in annex V and in rules which shall be adopted by the Council by a two-thirds majority of all Member States and reviewed periodically.

2 - For the execution of its programmes, the Agency shall make the maximum use of external contractors consistent with the maintenance of the internal capability referred to in article VI, 1.

Article VIII

Launchers and other space transport systems

1 - When defining its missions, the Agency shall take into account the launchers or other space transport systems developed within the framework of its programmes, or by a Member State, or with a significant Agency contribution, and shall grant preference to their utilisation for appropriate payloads if this does not present an unreasonable disadvantage compared with other launchers or space transport means available at the envisaged time, in respect of cost, reliability and mission suitability.

2 - If activities or programmes under article V include the use of launchers or other space transport systems, the participating States shall, when the programme in question is submitted for approval or acceptance, inform the Council of the launcher or space transport system envisaged. If during the execution of a programme the participating States wish to use a launcher or space transport system other than the one originally adopted, the Council shall make a decision on this change in accordance with the same rules as those applied in respect of the initial approval or acceptance of the programme.

Article IX

Use of facilities assistance to Member States, and supply of products

1 - Provided that their use for its own activities and programmes is not thereby prejudiced, the Agency shall make its facilities available, at the cost of the State concerned, to any Member State that asks to use them for its own programmes. The Council shall determine, by a two-thirds majority of all Member States, the practical arrangements under which the facilities will be made available.

2 - If, outside the activities and programmes referred to in article V but within the purpose of the Agency, one or more Member States wish to engage in a project, the Council may decide by a two-thirds majority of all Member States to make available the assistance of the Agency. The resulting cost to the Agency shall be met by the Member State or States concerned.

3 - a) Products developed under a programme of the Agency shall be supplied to any Member State that has taken part in the funding of the programme in question and asks for such products to the supplied for its own purposes.

The Council shall determine by a two-thirds majority of all Member States the practical arrangements under which such products will be supplied and in particular the measures to be taken by the Agency in regard to its contractors to enable the requesting Member State to obtain those products.

b) This Member State may ask the Agency to state whether it considers that the prices proposed by the contractors are fair and reasonable and whether, under similar circumstances, it would consider them acceptable for the purposes of its own requirements.

c) The fulfilment of the requests referred to in this paragraph shall not involve the Agency in any additional costs, and all costs resulting from such requests shall be borne by the requesting Member State.

Article X

Organs

The organs of the Agency shall be the Council, and the Director General assisted by a staff.

Article XI

The Council

1 - The Council shall be composed of representatives of the Member States.

2 - The Council shall meet as and when required, either at delegate level or at ministerial level. The meetings shall be held at the Agency's Headquarters unless the Council decides otherwise.

3 - a) The Council shall elect for two years a Chairman and vice-chairmen, who may be reelected once for a further year. The Chairman shall direct the proceedings of the Council and ensure the preparation of its decisions; he shall inform the Member States of proposals for the execution of an optional programme; he shall assist in coordinating the activities of the organs of the Agency. He shall maintain liaison with the Member States through their delegates to the Council, on general policy matters affecting the Agency and shall endeavour to harmonise their views thereon. In the interval between meetings he shall advise the Director General and shall obtain from him all necessary information.

b) The Chairman shall be assisted by a Bureau, the composition of which shall be decided by the Council and which shall be convened by the Chairman. The Bureau shall advise the Chairman in the preparation of Council meetings.
4 - When the Council meets at ministerial level it shall elect a chairman for the meeting. The next ministerial meeting shall be convened by him.
5 - In addition to the functions set forth elsewhere in this Convention and in accordance with its provisions, the Council shall:
a) As regards the activities and programme referred to in article V, 1, a), i) and ii):
i) Approve the activities and programme by a majority of all Member States; decisions to this effect may only be changed by new decisions adopted by a two-thirds majority of all Member States;
ii) Determine, by a unanimous decision of all Member States, the level of resources to be made available to the Agency for the coming five-year period;
iii) Determine, by a unanimous decision of all Member States, toward the end of the third year of each five-year period and after a review of the situation, the level of resources to be made available to the Agency for the new fiveyear period starting at the end of this third year;
b) As regards the activities referred to in article V, 1, a), iii) and iv):
i) Define the policy to be followed by the Agency in pursuit of its purpose;
ii) Adopt, by a two-thirds majority of all Member States, recommendations addressed to Member States;
c) As regards the optional programmes referred to in article V, 1, b):
i) Accept each programme by a majority of all Member States;
ii) Determine, as appropriate, in the course of their implementation, the order of priority of programmes;
d) Adopt the annual work plans of the Agency;
e) As regards the budgets as defined in annex II:
i) Adopt the annual general budget of the Agency by a two-thirds majority of all Member States;
ii) Adopt each programme budget by a twothirds majority of the participating States;
f) Adopt, by a two-thirds majority of all Member States, the Financial Regulations and all other financial arrangements of the Agency;
g) Keep under review expenditure on the mandatory and optional activities referred to in article V, 1;
h) Approve and publish the audited annual accounts of the Agency;
i) Adopt the Staff Regulations by a two-thirds majority of all Member States;
j) Adopt, by a two-thirds majority of all Member States, rules under which authorisation will be given, bearing in mind the peaceful purposes of the Agency, for the transfer outside the territories of the Member States of technology and products developed under the activities of the Agency or with its help;
k) Decide on the admission of new Member States in accordance with article XXII;
l) Decide on the arrangements to be made in accordance with article XXIV in the event of a Member State's denouncing this Convention or ceasing to be a member under article XVIII;

m) Take all other measures necessary for the fulfilment of the purpose of the Agency within the framework of this Convention.
6 - a) Each Member State shall have one vote in the Council. However, a Member State shall not have the right to vote on matters concerning exclusively an accepted programme in which it does not take part.
b) A Member State shall have no vote in the Council if the amount of its arrears of contributions to the Agency in respect of all activities and programmes covered by article V in which it participates exceeds the assessed amount of its contributions for the current financial year. Moreover, if the amount of a Member State's arrears of contributions to any one of the programmes under article V, 1, a, ii), or V, 1, b), in which it participates exceeds the assessed amount of its contributions to that programme for the current financial year, then that Member State shall have no vote in the Council on questions relating exclusively to that programme. In any such case, the Member State may nevertheless be authorised to vote in the Council if a two-thirds majority of all Member States considers that the non-payment of contributions is due to circumstances beyond its control.
c) The presence of delegates from a majority of all Member States shall be necessary to constitute a quorum at any meeting of the Council.
d) Except where this Convention provides otherwise decisions of the Council shall be taken by a simple majority of Member States represented and voting.
e) In determining the unanimity or majorities provided for in this Convention, account shall not be taken of a Member State which has no vote.
7 - The Council shall adopt its own rules of procedure.
8 - a) The Council shall establish a Science Programme Committee, to which it shall refer any matter relating to the mandatory scientific programme under article V, 1, a), ii). It shall authorise that Committee to take decisions regarding that programme, subject always to the Council's functions of determining the level of resources and adopting the annual budget. The terms of reference of the Science Programme Committee shall be determined by the Council by a two-thirds majority of all Member States and in accordance with this article.
b) The Council may establish such other subordinate bodies as may be necessary for the purpose of the Agency. The establishment and terms of reference of such bodies, and the cases in which they have powers of decision, shall be determined by the Council by a two-thirds majority of all Member States.
c) When a subordinate body examines a question relating exclusively to one of the optional programmes referred to in article V, 1, b), non-participating States shall have no vote unless all participating States decide otherwise.
Article XII
Director General and staff
1 - a) The Council shall, by a two-thirds majority of all Member States, appoint a Director General for a defined period and may, by the same majority, terminate his appointment.
b) The Director General shall be the chief executive officer of the Agency and its legal representative. He shall take all measures necessary for the management of the Agency, the execution of its programmes, the implementation of its policy and the fulfilment of its purpose, in accordance with the directives issued by the Council. He shall have

authority over the establishments of the Agency. He shall, in regard to the financial administration of the Agency, act in accordance with the provisions of annex II. He shall make an annual report to the Council, and this report shall be published. He may also submit proposals concerning activities and programmes as well as measures designed to ensure the fulfilment of the Agency's purpose. He attends meetings of the Agency without the right to vote.

c) The Council may postpone the appointment of the Director General for such period as it considers necessary either upon the entry into force of this Convention or in the event of a subsequent vacancy. In this event, it shall appoint a person to act in his place, who shall have such powers and responsibilities as the Council may determine.

2 - The Director General shall be assisted by such scientific, technical, administrative and clerical staff as he may consider necessary, within the limits authorised by the Council.

3 - a) Senior management staff, as defined by the Council, shall be appointed and may be dismissed by the Council on the recommendation of the Director General. Appointments and dismissals made by the Council shall require a two-thirds majority of all Member States.

b) Other staff members shall be appointed and may be dismissed by the Director General, acting on the authority of the Council.

c) All staff shall be recruited on the basis of their qualifications, taking into account an adequate distribution of posts among nationals of the Member States. Appointments and their termination shall be in accordance with the Staff Regulations.

d) Scientists who are not members of the staff and who carry out research in the establishments of the Agency shall be subject to the authority of the Director General and to any general rules adopted by the Council.

4 - The responsibilities of the Director General and the staff in regard to the Agency shall be exclusively international in character. In the discharge of their duties they shall not seek or receive instructions from any government or from any authority external to the Agency. Each Member State shall respect the international character of the responsibilities of the Director General and the staff, and shall not seek to influence them in the discharge of their duties.

Article XIII

Financial contributions

1 - Each Member State shall contribute to the costs of the activities and programme referred to in article V, 1, a) and in accordance with annex II, to the common costs of the Agency, in accordance with a scale adopted by the Council, by a two-thirds majority of all Member States, either every three years at the time of the review referred to in article XI, 5, a), iii), or whenever the Council by an unanimous vote of all Member States decides to establish a new scale. The scale of contributions shall be based on the average national income of each Member State for the three latest years for which statistics are available. Nevertheless:

a) No Member State shall be required to pay contributions in excess of twenty-five percent of the total amount of contributions assessed by the Council to meet these costs;

b) The Council may, by a two-thirds majority of all Member States, decide in the light of any special circumstances of a Member State to reduce its contribution for a limited

period. In particular, when the annual per capita income of a Member State is less than an amount to be decided by the Council by the same majority, this shall be considered as a special circumstance within the meaning of this provision.
2 - Each Member State shall contribute to the costs of each optional programme covered by article V, 1, b), unless it has formally declared itself not interested in participating therein and is therefore not a participant. Unless all participating States decide otherwise, the scale of contributions to a given programme shall be based on the average national income of each participating State for the three latest years for which statistics are available. This scale shall be revised either every three years or whenever the Council decides to establish a new scale in accordance with paragraph 1. However, no participating State shall, by the operation of this scale, be required to pay contributions in excess of twenty-five percent of the total amount of contributions to the programme concerned. Nevertheless, the percentage contribution to be made by each participating State shall be equivalent to at least twenty-five percent of its percentage contribution established under the provisions of paragraph 1, unless all the participating States decide otherwise when adopting the programme or during the execution of the programme.
3 - The statistical systems to be used for establishing the scales of contribution referred to in paragraphs 1 and 2 shall be the same, and shall be determined in the Financial Regulations.
4 - a) Any State that was not a party to the Convention for the establishment of a European Space Research Organisation or to the Convention for the establishment of a European Organisation for the Development and Construction of Space Vehicle Launchers and which becomes a party to this Convention shall make, in addition to its contributions, a special payment related to the current value of the assets of the Agency. The amount of this special payment shall be fixed by the Council by a two-thirds majority of all Member States.
b) Payments made in accordance with the provisions of sub-paragraph a) shall be used to reduce the contributions of the other Member States unless the Council decides otherwise by a two-thirds majority of all Member States.
5 - Contributions due under this article shall be paid in accordance with annex II.
6 - Subject to any directions given by the Council, the Director General may accept gifts or legacies to the Agency provided that they are not subject to any conditions inconsistent with the purpose of the Agency.
Article XIV
Cooperation
1 - The Agency may, upon decisions of the Council taken by unanimous votes of all Member States, cooperate with other international organisations and institutions and with Governments, organisations and institutions of nonmember States, and conclude agreements with them to this effect.
2 - Such cooperation may take the form of participation by non-member States or international organisations in one or more of the programmes under article V, 1, a), ii) and V, 1, b). Subject to the decisions to be taken under paragraph 1, the detailed arrangements for such cooperation shall be defined in each case by the Council by a twothirds majority of the States participating in the programme in question. These arrangements may provide that a non-member State shall have a vote in the Council

when the latter examines matters pertaining exclusively to the programme in which that State participates.

3 - Such cooperation may also take the form of according associate membership to non-member States which undertake to contribute at least to the studies of future projects under article V, 1, a), i). The detailed arrangements for each such associate membership shall be defined by the Council by a two-thirds majority of all Member States.

Article XV

Legal status, privileges and immunities

1 - The Agency shall have legal personality.

2 - The Agency, its staff members and experts, and the representatives of its Member States, shall enjoy the legal capacity, privileges and immunities provided for in annex I.

3 - Agreements concerning the Headquarters of the Agency and the establishments set up in accordance with article VI, shall be concluded between the Agency and the Member States on whose territories the Headquarters and establishments are situated.

Article XVI

Amendments

1 - The Council may recommend to Member States amendments to this Convention and to annex I thereto. Any Member State that wishes to propose an amendment shall notify the Director General thereof. The Direct General shall inform the Member States of any amendment so notified at least three months before it is discussed by the Council.

2 - Any amendment recommended by the Council shall enter into force thirty days after the Government of France has received notification of acceptance from all Member States. The Government of France shall notify all Member States of the date of entry into force of any such amendment.

3 - The Council may, by an unanimous vote of all Member States, amend any of the other annexes to this Convention, provided that such amendments do not conflict with the Convention. Any such amendment shall enter into force on a date to be decided by the Council by an unanimous vote of all Member States. The Director General shall inform all Member States of any such amendment and of the date on which it will enter into force.

Article XVII

Disputes

1 - Any dispute between two or more Member States, or between any of them and the Agency, concerning the interpretation or application of this Convention or its Annexes, and likewise any dispute referred to in article XXVI of annex I, which is not settled by or through the Council, shall, at the request of any party to the dispute, be submitted to arbitration.

2 - Unless the parties to the dispute decide otherwise, the arbitration procedure shall be in accordance with this article and with additional rules to be adopted by the Council by a two-thirds majority of all Member States.

3 - The Arbitration Tribunal shall consist of three members. Each party to the dispute shall nominate one arbitrator; the first two arbitrators shall nominate the third arbitrator, who shall be the chairman of the Arbitration Tribunal. The additional rules referred to in paragraph 2 shall determine the procedure to be followed if the nominations have not taken place within a specified time.

4 - Member States or the Agency, not being parties to the dispute, may intervene in the proceedings with the consent of the Arbitration Tribunal if it considers that they have a substantial interest in the decision of the case.
5 - The Arbitration Tribunal shall determine its seat and establish its own rules of procedure.
6 - The award of the Arbitration Tribunal shall be made by a majority of its members, who may not abstain from voting. This award shall be final and binding on all parties to the dispute and no appeal shall lie against it. The parties shall comply with the award without delay. In the event of a dispute as to its meaning or scope, the Arbitration Tribunal shall interpret it at the request of any party to the dispute.
Article XVIII
Non-fulfilment of obligations
Any Member State which fails to fulfil its obligations under this Convention shall cease to be a member of the Agency on a decision of the Council taken by a two-thirds majority of all Member States. The provisions of article XXIV shall apply in such a case.
Article XIX
Continuity of rights and obligations
On the date when this Convention enters into force, the Agency shall take over all rights and obligations of the European Space, Research Organisation and of the European Organisation for the Development and Construction of Space Vehicle Launchers.
Article XX
Signature and ratification
1 - This Convention shall be open until 31 December 1975 for signature by the States which are members of the European Space Conference. The annexes to this Convention shall form an integral part thereof.
2 - This Convention shall be subject to ratification or acceptance. Instruments of ratification or acceptance shall be deposited with the Government of France.
3 - After the entry into force of the Convention and pending the deposit of its instrument of ratification or acceptance, a signatory State may take part in the meetings of the Agency, without the right to vote.
Article XXI
Entry into force
1 - This Convention shall enter into force when the following States, being members of' the European Space Research Organisation or the European Organisation for the Development and Construction of Space Vehicle Launchers, have signed it and have deposited with the Government of France their instruments of ratification or acceptance: the Kingdom of Belgium, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Italian Republic, the Kingdom of the Netherlands, Spain, the Kingdom of Sweden, the Swiss Confederation and the United Kingdom of Great Britain and Northern Ireland. For any State ratifying, accepting or acceding to this Convention after its entry into force, the Convention shall become effective on the date of deposit by such State of its instrument of ratification, acceptance or accession.
2 - The Convention for the establishment of a European Space Research Organisation and the Convention for the establishment of a European Organisation for the Development and Construction of Space Vehicle Launchers shall terminate on the date

of the entry into force of this Convention. Article XXII Accession 1 - After the entry into force of this Convention, any State may accede thereto following a decision of the Council taken by a unanimous vote of all Member States. 2 - A State that wishes to accede to this Convention shall notify the Director General, who shall inform the Member States of this request at least three months before it is submitted to the Council for decision.
3 - Instruments of accession shall be deposited with the Government of France.
Article XXIII
Notifications
The Government of France shall notify all signatory and acceding States of:
a) The date of deposit of each instrument of ratification, acceptance or accession;
b) The date of entry into force of this Convention and of amendments covered by article XVI, 2;
c) The denunciation of the Convention by a Member State.
Article XXIV
Denunciation
1 - After this Convention has been in force for six years, any Member State may denounce it by notifying the Government of France, which shall notify the other Member States and the Director General. The denunciation shall take effect at the end of the financial year following that during which it was notified to the Government of France. After the denunciation has taken effect, the State concerned shall remain bound to honour its due share of the payment appropriations corresponding to approved contract authority used both under the budgets to which it was contributing denunciation was notified to the Government of France, and under previous budgets.
2 - A Member State denouncing the Convention shall indemnify the Agency for any loss of property on its territory, unless a special agreement can be concluded with the Agency for the continued use of this property by the Agency or the continuation of certain activities of the Agency on the territory of the said State. Any such special agreement shall determine in particular to what extent and on what conditions the provisions of this Convention shall continue to apply, after the denunciation has taken effect, to the continued use of this property and the continuation of these activities.
3 - A Member State denouncing the Convention, and the Agency, shall jointly determine any additional obligations to be borne by the said State. 4 - The State concerned shall retain the rights it has acquired up to the date on which the denunciation takes effect.
Article XXV
Dissolution
1 - The Agency shall be dissolved if the number of Member States becomes less than five. It may be dissolved at any time by agreement between the Member States.
2 - In the event of dissolution the Council shall appoint a liquidation authority, which will negotiate with the States on whose territories the Headquarters and establishments of the Agency are situated at the time. The legal personality of the Agency shall subsist for the purpose of the liquidation.
3 - Any surplus shall be distributed among those States that are members of the Agency at the time of the dissolution, in proportion to the contributions actually made by them from the dates of their becoming parties to this Convention. In the event of a deficit, this

shall be met by the same States in proportion to their contributions as assessed for the financial year then current.

Article XXVI

Registration

Upon the entry into force of this Convention the Government of France shall register it with the Secretariat of the United Nations in accordance with article 102 of the Charter of the United Nations.

ANNEX I

Privileges and immunities

Article I

The Agency shall have legal personality. It shall in particular have the capacity to contract, to acquire and dispose of movable and immovable property, and to be a party to legal proceedings.

Article II

Without prejudice to articles XXII and XXIII, the buildings and premises of the Agency shall be inviolable.

Article III

The archives of the Agency shall be inviolable.

Article IV

1 - The Agency shall have immunity from jurisdiction and execution, except:

a) To the extent that it shall, by decision of the Council, have expressly waived such immunity in a particular case; the Council has the duty to waive this immunity in all cases where reliance upon it would impede the course of justice and it can be waived without prejudicing the interests of the Agency;

b) In respect of a civil action by a third party for damage arising from an accident caused by a motor vehicle belonging to, or operated on behalf of, the Agency, or in respect of a motor traffic offence involving such a vehicle;

c) In respect of an enforcement of an arbitration award made under either article XXV or article XXVI;

d) In the event of the attachment, pursuant to a decision by the judicial authorities, of the salaries and emoluments owed by the Agency to a staff member.

2 - The Agency's property and assets, wherever situated, shall be immune from any form of requisition, confiscation, expropriation and sequestration. They shall also be immune from any form of administrative or provisional judicial constraint, except insofar as may be temporarily necessary in connection with the prevention and investigation of accidents involving motor vehicles belonging to, or operated on behalf of, the Agency.

Article V

1 - Within the scope of its official activities, the Agency, its property and income shall be exempt from direct taxes.

2 - When purchases or services of substantial value and strictly necessary for the exercise of the official activities of the Agency are made or used by or on behalf of the Agency, and when the price of such purchases or services includes taxes or duties, appropriate measures shall whenever possible be taken by the Member States to grant exemption from such taxes or duties or to provide for their reimbursement.

Article VI

Goods imported or exported by the Agency or on its behalf, and strictly necessary for the exercise of its official activities, shall be exempt from all import and export duties and taxes and from all import or export prohibitions and restrictions.

Article VII

1 - For the purpose of articles V and VI, the official activities of the Agency shall include its administrative activities, including its operations in connection with the social security scheme, and activities undertaken in the field of space research and technology and their space applications in pursuance of the purpose of the Agency as defined in the Convention.

2 - The extent to which other applications of such research and technology and activities carried out under articles V, 2, and IX of the Convention may be considered part of the Agency's official activities shall be decided in each case by the Council after consultation with the competent authorities of the Member States concerned. 3 - The provisions of articles V and VI shall not apply to taxes and duties that are no more than charges for public utility services.

Article VIII

No exemption shall be granted under articles V or VI in respect of goods purchased or imported, or services provided, for the personal benefit of the staff members of the Agency.

Article IX

1 - Goods acquired under article V or imported under article VI shall not be sold or given away except in accordance with conditions laid down by the Member States which have granted exemptions.

2 - The transfer of goods and services between the headquarters and the establishments of the Agency, and between its various establishments, or for the purpose of implementing a programme of the Agency, between them and a national institution of a Member State, shall be free of charges or restrictions of any kind; if necessary, the Member States shall take all appropriate measures to grant exemption from or reimbursement of such charges or to lift such restrictions.

Article X

The circulation of publications and other information material sent by or to the Agency shall not be restricted in any way.

Article XI

The Agency may receive and hold any kind of funds, currency, cash or securities; it may dispose of them freely for any purpose provided for in the Convention and hold accounts in any currency to the extend required to met its obligations.

Article XII

1 - For its official communications and the transfer of all its documents, the Agency shall enjoy treatment not less favourable than that accorded by each Member State to other international organisations.

2 - No censorship shall be applied to official communications of the Agency by whatever means of communication.

Article XIII

Member States shall take all appropriate measures to facilitate the entry into, stay in, or departure from their territories of staff members of the Agency.

Article XIV

1 - Representatives of Member States shall, while exercising their functions and in the course of their journeys to and from the place of meeting, enjoy the following privileges and immunities:

a) Immunity from arrest and detention, and from seizure of their personal luggage;

b) Immunity from jurisdiction, even after the termination of their mission, in respect of acts, including words spoken and written, done by them in the exercise of their functions; this immunity shall not apply, however, in the case of a motor traffic offence committed by a representative of a Member State, nor in the case of damage caused by a motor vehicle belonging to or driven by him;

c) Inviolability for all their official papers and documents;

d) The right to use codes and to receive documents or correspondence by special courier or sealed bag;

e) Exemption for themselves and their spouses from all measures restricting entry and from aliens' registration formalities;

f) The same facilities in the matter of currency and exchange control as are accorded to the representatives of foreign governments on temporary official missions;

g) The same customs facilities as regards their personal luggage as are accorded to diplomatic agents.

2 - Privileges and immunities are accorded to representatives of Member States, not for their personal advantage, but in order to ensure complete independence in the exercise of their functions in connection with the Agency. Consequently, a Member State has the duty to waive the immunity of a representative wherever retaining it would impede the course of justice and it can be waived without prejudicing the purposes for which it was accorded.

Article XV

In addition to the privileges and immunities provided for in article XVI, the Director General of the Agency and, when the office is vacant, the person appointed to act in his place shall enjoy the privileges and immunities to which diplomatic agents of comparable rank are entitled.

Article XVI

The staff members of the Agency: a) Shall have, even after they have left the service of the Agency, immunity from jurisdiction in respect of acts, including words written and spoken, done by them in the exercise of their functions; this immunity shall not apply, however, in the case of a motor traffic offence committed by a staff member of the Agency, nor in the case of damage caused by a motor vehicle belonging to or driven by him;

b) Shall be exempt from all obligations in respect of military service;

c) Shall enjoy inviolability for all their official papers and documents;

d) Shall enjoy the same facilities as regards exemption from all measures restricting immigration and governing aliens' registration as are normally accorded to staff members of international organisations, and members of their families forming part of their households shall enjoy the same facilities;

e) Shall enjoy the same privileges in respect of exchange regulations as are normally accorded to staff members of international organisations;

f) Shall, in time of international crisis, enjoy the same facilities as to repatriation as diplomatic Agents, and the members of their families forming part of their households shall enjoy the same facilities;
g) Shall have the right to import duty-free their furniture and personal effects at the time of first taking up their post in the Member State concerned, and the right on the termination of their functions in that Member State to export free of duty their furniture and personal effects, subject, in both cases, to the conditions considered necessary by the Member State on whose territory the right is exercised.

Article XVII

Experts other than the staff members referred to in article XVI, in the exercise of their functions in connection with the Agency or in carrying out missions for the Agency, shall enjoy the following privileges and immunities, to the extent that these are necessary for the exercise of their functions, including during journeys made in the exercise of their functions and in the course of such missions:
a) Immunity from jurisdiction in respect of acts, including words written and spoken, done by them in the exercise of their functions, except in the case of a motor traffic offence committed by an expert or in the case of damage caused by a motor vehicle belonging to or driven by him; experts shall continue to enjoy this immunity after they have ceased to be employed by the Agency;
b) Inviolability for all their official papers and documents;
c) The same facilities as regards monetary and exchange regulations and as regards their personal luggage as are accorded to the officials of foreign governments on temporary official missions.

Article XVIII

1 - Subject to the conditions and following the procedure laid down by the Council, the Director General and the staff members of the Agency shall be subject to a tax, for the benefit of the Agency, on salaries and emoluments paid by the Agency. Such salaries and emoluments shall be exempt from national income tax; but the Member States shall retain the right to take these salaries and emoluments into account for the purpose of assessing the amount of taxation to be applied to income from other sources.
2 - The provisions of paragraph 1 shall not apply to annuities and pensions paid by the Agency to its former Directors General and staff members.

Article XIX

Articles XVI and XVIII shall apply to all categories of staff members to which the Staff Regulations of the Agency apply. The Council shall decide the categories of experts to which article XVII shall apply. The, names, titles and addresses of the staff members and experts referred to in the present article shall be communicated from time to time to the Member States.

Article XX

In the event that it establishes its own social security scheme, the Agency, its Director General and staff members shall be exempt from all compulsory contributions to national social security bodies, subject to agreements concluded with the Member States in accordance with article XXVIII.

Article XXI

1 - The privileges and immunities provided for in this annex are not granted to the Director General, staff members and experts of the Agency for their personal advantage. They are provided solely to ensure, in all circumstances. the unimpeded functioning of the Agency and the complete independence of the persons to whom they are accorded.
2 - The Director General has the duty to waive any relevant immunity in all cases wherever retaining it would impede the course of justice and it can be waived without prejudicing the interests of the Agency. In the case of the Director General, the Council is competent to waive such immunity.
Article XXII
1 - The Agency shall cooperate at all times with the competent authorities of Member States in order to facilitate the proper administration of justice, to ensure the observance of police regulations and regulations concerning the handling of explosives and inflammable material, public health, labour inspection or other similar national legislation, and to prevent any abuse of the privileges, immunities and facilities provided for in this Annex.
2 - The procedure for the cooperation referred to in paragraph 1 may be laid down in the complementary agreements referred to in article XXVIII.
Article XXIII
Each Member State shall retain the right to take all precautionary measures in the interests of its security.
Article XXIV
No Member State shall be obliged to accord the privileges and immunities referred to in articles XIV, XV, XVI, b), e) and g) and XVII, c), to its own nationals or persons who, at the moment of taking up their duties in that Member State, are permanent residents thereof.
Article XXV
1 - When concluding written contracts, other than those concluded in accordance with the Staff Regulations, the Agency shall provide for arbitration. The arbitration clause or the special arbitration agreement concluded to this end shall specify the law applicable and the country where the arbitrators sit. The arbitration procedure shall be that of that country.
2 - The enforcement of the arbitration award shall be governed by the rules in force in the State on whose territory the award is to be executed. Article XXVI Any Member State may submit to the international Arbitration Tribunal referred to in article XVII of the Convention any dispute: a) Arising out of damage caused by the Agency;
b) Involving any other non-contractual responsibility of the Agency;
c) Involving the Director General, a staff member or an expert of the Agency and in which the person concerned can claim immunity from jurisdiction under articles XV, XVI, a), or XVII, a), if this immunity is not waived in accordance with article XXI. In such disputes where the claim for immunity from jurisdiction arises under articles XVI, a), or XVII, a), the responsibility of the Agency shall in such arbitration be substituted for that of the persons referred to in those articles.
Article XXVII

The Agency shall make suitable provision for the satisfactory settlement of disputes arising between the Agency and the Director General, staff members or experts in respect of their conditions of service.

Article XXVIII

The Agency may, on a decision of the Council, conclude with one or more Member States complementary agreements to give effect to the provisions of this annex as regards such State or States, and other arrangements to ensure the efficient functioning of the Agency and the safeguarding of its interests.

ANNEX II

Financial provisions

Article I

1 - The financial year of the Agency shall run from the first of January to the thirty-first of December following.

2 - The Director General shall, not later than the first of September of each year, forward to the Member States:

a) A draft general budget;

b) Draft programme budgets.

3 - The general budget shall comprise:

a) An expenditure part, showing the estimated expenditure relating to the activities referred to in article V, 1, a), i), iii) and iv), of the Convention, including the fixed common costs, as well as to the non-fixed common costs and the support costs concerning the programmes referred to in article V, 1, a), ii), and V, 1,

b), of the Convention; the fixed and non-fixed common costs and the support costs shall be defined in the Financial Regulations; the estimates shall be broken down by type of activity and by general heading; b) An income part, showing:

i) The contributions of all Member States towards the expenditure relating to the activities referred to in article V, 1, a), i), iii) and iv), of the Convention, including the fixed common costs;

ii) The contributions of participating States to the non-fixed common costs and support costs allocated, in accordance with the Financial Regulations, to the programmes referred to in article V, 1, a), ii), and V, 1, b), of the Convention;

iii) Other income.

4 - Each programme budget shall comprise:

a) An expenditure part, showing:

i) The estimated direct expenditure relating to the programme and broken down by general heading as defined in the Financial Regulations;

ii) The estimated non-fixed common costs and support costs allocated to the programme;

b) An income article showing:

i) The contributions of participating States to the direct expenditure referred to in subparagraph a), i).

ii) Other income;

iii) For information, the contributions of participating States to the non-fixed common costs and the support costs referred to in subparagraph a), ii), as provided for in the general budget.
5 - The approval of the general budget and of each programme budget by the Council shall take place before the beginning of each financial year.
6 - The general budget and the programme budgets shall be prepared and executed in accordance with the Financial Regulations.
Article II
1 - If circumstances so require, the Council may ask the Director General to present a revised budget to it. 2 - No decision involving additional expenditure shall be deemed to have been approved until the Council has approved the Director General's estimate of the additional expenditure involved.
Article III
1 - The Director General shall, if so requested by the Council, include in the general budget or in the programme budget concerned the estimates of expenditure for subsequent years.
2 - In connection with the adoption of the annual budgets of the Agency, the Council shall re-examine the level of resources and make the necessary adjustments in the light of price-level variations and any unforeseen changes during the execution of the programmes.
Article IV
1 - The expenditure approved for activities covered by article V of the Convention shall be met by contributions assessed in accordance with article XIII of the Convention.
2 - When a State accedes to the Convention in accordance with article XXII thereof, the contributions of the other Member States shall be reassessed. A new scale, which shall take effect on a date to be decided by the Council, shall be established on the basis of the national income statistics for the years used in calculating the existing scale. Where appropriate, reimbursements shall be made to ensure that the contributions paid by all Member States for the current year are in accordance with the decision of the Council.
3 - a) The arrangements by which contributions are to be made, which shall ensure the proper financing of the Agency, shall be determined in the Financial Regulations.
b) The Director General shall notify Member States of the amount of their contributions and of the dates on which payments shall be made.
Article V
1 - The budgets of the Agency shall be expressed in accounting units. The accounting unit is defined by 0.88867088 of fine gold; the Council may, by a unanimous decision of all Member States, adopt another definition of the accounting unit. 2 - Each Member State shall pay its contributions in its own currency. Article VI 1 - The Director General shall keep an accurate account of all income and expenditure. At the end of each financial year the Director General shall, in accordance with the Financial Regulations, draw up separate annual accounts for each programme covered by article V of the Convention.
2 - Budgetary accounts, the budget and the financial management, as well as any other measure having financial implications shall be examined by an Audit Commission. The Council shall designate, by a two-thirds majority of all Member States, the Member States which, in rotation on an equitable basis, shall be invited to nominate, preferably

from among their own senior officials, auditors to serve on this Commission, and shall nominate by the same majority, from among the auditors, a Chairman of the Commission for a period not exceeding three years.
3 - The purpose of the audit, which shall be based on records and, if necessary, done on the spot, shall be to verify that expenditure has conformed with the budget estimates and that the records are lawful and correct. The Commission shall also report on the economic management of the Agency's financial resources. At the end of each financial year, the Commission shall draw up a report, which shall be adopted by the majority of its members and thereupon transmitted to the Council.
4 - The Audit Commission shall discharge such other functions as are set out in the Financial Regulations.
5 - The Director General shall furnish the auditors with such information and help as they may require to carry out their duties.

ANNEX III
Optional programmes covered by article V, 1, b), of the Convention

Article I
1 - If a proposal for the carrying out of an optional programme covered by article V, 1, b), of the Convention is made, the Chairman of the Council shall communicate it to all Member States for examination.
2 - Once the Council has, in accordance with article XI, 5, c), i), of the Convention, accepted the carrying out of an optional programme within the framework of the Agency, any Member State that does not intend to take part in the programme shall, within three months, formally declare that it is not interested in participating therein; the participating States shall draw up a declaration which, subject to article III, 1, shall set out their undertaking in respect of:
a) The phases of the programme;
b) The conditions under which it is to be carried out, including the timing, the indicative financial envelope and subenvelopes relating to phases of the programme, and any other provisions for its management and execution;
c) The scale of contributions determined in accordance with article XIII, 2, of the Convention;
d) The duration and amount of the first binding financial commitment. 3 - The declaration shall be transmitted to the Council for information, together with draft implementing rules submitted to it for approval.
4 - If a participating State is unable to accept the provisions set out in the declaration and implementing rules within the time limit laid down in the declaration, it shall cease to be a participating State. Other Member States may subsequently become participating States by accepting these provisions in accordance with conditions to be determined with the participating States.
Article II
1 - The programme shall be executed in accordance with the provisions of the Convention and, unless otherwise stipulated in this annex or in the implementing rules, with the rules and procedures in force in the Agency. Decisions of the Council shall be

taken in accordance with this annex and the implementing rules. Failing any specific provisions in this annex or in the implementing rules, the voting rules laid down in the Convention or the rules of procedure of the Council shall apply.

2 - Decisions on the start of a new phase shall be taken by a two-thirds majority of all participating States, provided that this majority represents at least two-thirds of the contributions to the programme. If the decision to start a new phase cannot be taken, the participating States that wish, nevertheless, to continue with the programme shall consult among themselves and determine arrangements for such continuation. They shall report accordingly to the Council, which shall take any measures that may be required.

Article III

1 - If the programme includes a project definition phase, the participating States shall, at the end of the phase, reassess the cost of the programme. If the reassessment shows that there is a cost overrun greater than 20% of the indicative financial envelope referred to in article I, any participating State may withdraw from the programme. The participating States that wish, nevertheless, to continue with the programme shall consult among themselves and determine the arrangements for such continuation. They shall report accordingly to the Council, which shall take any measures that may be required.

2 - During each phase, as defined in the declaration, the Council shall, by a two-thirds majority of all participating States, adopt annual budgets within the relevant financial envelope or sub-envelopes.

3 - The Council shall lay down a procedure enabling the financial envelope or sub-envelopes to be revised in the event of price level variations.

4 - When the financial envelope or a financial sub-envelope has to be revised for reasons other than those referred to in paragraphs 1 and 3, the participating States shall apply the following procedure:

a) No participating State shall be entitled to withdraw from the programme unless the cumulative cost overrun is greater than 20% of the initial financial envelope, or of the revised envelope defined in accordance with the procedure laid down in paragraph 1; b) If the cumulative cost overrun is greater than 20% of the relevant financial envelope, any participating State may withdraw from the programme. Those States that wish, nevertheless, to continue with the programme shall consult among themselves, determine the arrangements for such continuation and report accordingly to the Council, which shall take any measures that may be required.

Article IV

The Agency, acting on behalf of the participating States, shall be the owner of the satellites, space systems and other items product under the programme as well as of the facilities and equipment acquired for its execution. Any transfer of ownership shall be decided on by the Council.

Article V

1 - Denunciation of the Convention by a Member State shall entail the withdrawal of that Member State from all the programmes in which it participates. Article XXIV of the Convention shall apply to the rights and obligations arising out of these programmes.

2 - Discontinuations under article II, 2, and withdrawals under article III, 1, and III, 4, b), shall take effect on the date on which the Council receives the information referred to in those articles.

3 - A participating State that decides not to continue with a programme under article ii, 2, or withdraws from a programme under article III, 1, and III, 4, b), shall retain the rights acquired by the participating States up to the effective date of its withdrawal. Thereafter, no further right or obligation shall arise from the remaining part of the programme in which it no longer participates. It shall remain bound to finance its share of the payment appropriations corresponding to contract authority approved under the budget for the current or previous financial years and relating to the programme phase whose execution is in progress. However, the participating States may unanimously agree, in the declaration that a State which decides not to continue with, or withdraws from, a programme shall be bound to finance its total share of the initial envelope or the sub-envelopes of the programme.

Article VI

1 - The participating States may decide to discontinue a programme by a two-thirds majority of all participating States representing at least two-thirds of the contributions to the programme.

2 - The Agency shall notify the participating States of the completion of the programme in accordance with the implementing rules; these implementing rules shall cease to be in force upon receipt of such notification.

ANNEX IV

Internationalisation of national programmes

Article I

The principal objective of the internationalisation of national programmes shall be that each Member State shall make available for participation by other Member States, within the framework of the Agency, any new civil space project which it intends to undertake, either alone or in collaboration with another Member State. With this end in view:

a) Each Member State shall notify to the Director General of the Agency any such project before the beginning of its phase B (project definition phase);

b) The timing and content of proposals for participation in a project should make it possible for other Member States to undertake a significant share of the work involved, an early indication shall be given to the Agency of any reasons which make this impracticable and of any conditions which the initiating Member State may wish to place on the allocation of work to other Member States;

c) The initiating Member State shall explain the arrangements it proposes for the technical management of the project and indicate the reasons for them;

d) The initiating Member State shall use its best endeavours to accommodate all reasonable responses, subject to agreement being reached, within the time scale demanded by project decisions, on the level of the cost and the way in which the cost and work are shared; it shall subsequently submit a formal proposal under annex III where the project is to be executed in accordance with the terms of that annex;

e) The execution of a project within the framework of the Agency shall not be excluded merely because that project has failed to attract the participation of other Member States to the extent originally proposed by the initiating Member State. Article II Member States shall use their best endeavours to ensure that the bilateral and multilateral space

projects which they undertake with non-member States do not prejudice the scientific, economic or industrial objectives of the Agency. In particular, they shall: a) Inform the Agency of such projects, in so far as they judge that this would not prejudice the projects; b) Discuss with the other Member States projects so communicated, with the object of establishing the scope for wider participation. If wider participation proves possible, the procedures laid down in article I, b), to
e) shall apply.

ANNEX V
Industrial policy

Article I
1 - In implementing the industrial policy referred to in article VII of the Convention, the Director General shall act in conformity with the provisions of this annex and with the directives of the Council.
2 - The Council shall keep under review the industrial potential and industrial structure in relation to the Agency's activities, and in particular:
a) The general structure of industry, and industrial groupings;
b) The degree of specialisation desirable in industry and methods of achieving it;
c) The coordination of relevant national industrial policies;
d) Interaction with any relevant industrial policies of other international bodies;
e) The relationship between industrial production capacity and potential markets;
f) The organisation of contacts with industry; in order to be able to monitor and, where appropriate, adapt the Agency's industrial policy.
Article II
1 - In the placing of all contracts, the Agency shall give preference to industry and organisations of the Member States. However, within each optional programme covered by article V, 1, b), of the Convention, particular preference shall be given to industry and organisations in the participating States.
2 - The Council shall determine whether and to what extent the Agency may derogate from the above preference clause.
3 - The question whether an enterprise should be considered to belong to one of the Member States shall be settled in the light of the following criteria: location of the enterprise's registered office, decision-making centres and research centres, and territory on which the work is to be carried out. In doubtful cases the Council shall decide whether an enterprise shall be considered to belong to one of the Member States, or not.
Article III
1 - The Director General shall, at an early stage in the contract action and before invitations to tender are sent out, submit for the approval of the Council his proposal on the procurement policy to be followed, for any contract which either:
a) Has an estimated value above limits which shall be defined in the rules concerning industrial policy and which will depend on the nature of the work; or
b) Is, in the opinion of the Director General, not adequately covered by the rules concerning industrial policy or by additional guidelines established by the Council, or might give rise to a conflict with those rules or guidelines.

2 - The additional guidelines referred to in paragraph 1, b), shall be established from time to time by the Council if it considers them helpful for the purpose of distinguishing those areas where prior submission under paragraph 1 is necessary.
3 - The Agency's contracts shall be awarded directly by the Director General without further reference to the Council except in the following cases:
a) When the evaluation of the offers received suggests a recommendation for the choice of a contractor which would be contrary either to the prior instructions issued by the Council under the terms of paragraph 1, or to any general guidelines on industrial policy adopted as a result of the Council's studies under article I, 2; the Director General shall then submit the case to the Council for decision, explaining why he considers a deviation to be necessary and indicating also whether another decision by the Council would constitute, technically, operationally or otherwise, an advisable alternative;
b) Where the Council has decided for specific reasons to undertake a review before a contract is awarded.
4 - The Director General shall report to the Council, at regular intervals to be specified, on the contracts awarded during the previous period, and on the contract actions planned for the subsequent period, in order that the Council may monitor the implementation of the Agency's industrial policy.
Article IV
The geographical distribution of all the Agency's contracts shall be governed by the following general rules:
1) A Member State's overall return coefficient shall be the ratio between its percentage share of the total value of all contracts awarded among all Member States and its total percentage contributions. However, in the calculation of this overall return coefficient, no account shall be taken of contracts placed in, or contributions made by, Member States in a programme undertaken:
a) Under article VIII of the Convention for the establishment of a European Space Research Organisation, provided that the relevant arrangement contains provisions to this effect or that all participating States subsequently unanimously so agree;
b) Under article V, 1, b), of the present Convention provided that all original participating States unanimously so agree;
2) For the purpose of calculating return coefficients, weighting factors shall be applied to the value of contracts on the basis of their technological interest. These weighting factors shall be defined by the Council. Within a single contract having a significant value, more than one weighting factor may be applied;
3) Ideally the distribution of contracts placed by the Agency should result in all countries having an overall return coefficient of 1;
4) The return coefficients shall be computed quarterly and shown cumulatively for the purpose of the formal reviews referred to in paragraph 5;
5) Formal reviews of the situation of geographical distribution of contracts shall take place every three years;
6) The distribution of contracts between format reviews of the situation should be such that, at the time of each formal review, the cumulative overall return coefficient of each Member State does not substantially deviate from the ideal value. For the first three-year period, the lower limit for the cumulative return coefficient is fixed at 0.8. At the time

of each formal review, the Council may revise the value of this lower limit for the subsequent three-year period, provided that it shall never be lower than 0.8;

7) Separate assessments shall be made, and reported to the Council, of the return coefficients for various categories of contract to be defined by it, in particular advanced research and development contracts and contracts for projectrelated technology. The Director General shall discuss these assessments with the Council, at regular intervals to be specified, with the aim of identifying the action needed to redress any imbalances.

Article V

1 - If, at one of the formal reviews to be held at the end of each three-year period, the overall return coefficient of any Member State is found to be below the lower limit defined in article IV, 6, the Director General shall submit to the Council proposals designed to redress the situation within one year. These proposals shall keep within the Agency's rules governing the placing of contracts.

2 - If, after this period of one year, the imbalance still persists, the Director General shall submit to the Council proposals in which the need to remedy the situation takes precedence over the Agency's rules governing the placing of contracts.

Article VI

Any decision taken on industrial policy grounds which has the effect of excluding a particular firm or organisation of a Member State from competing for the Agency's contracts in a particular field shall require the agreement of that Member State.

In witness whereof, the undersigned plenipotentiaries, having been duly authorised thereto, have signed this Convention.

Done at Paris, on 30 May 1975, in the German, English, Spanish, French, Italian, Dutch and Swedish languages, all these texts being equally authentic, in a single original, which shall be deposited in the archives of the Government of France, which shall transmit certified copies to all signatory and acceding States.

Texts of this Convention drawn up in other official languages of the Member States of the Agency shall be authenticated by an unanimous decision of all Member States. Such texts shall be deposited in the archives of the Government of France, which shall transmit certified copies to all signatory and acceding States.

For the Federal Republic of Germany:
Sigismund Freiherr Von Braun.
Hans Matthöfer.

For the Kingdom of Belgium:
Ch. de Kerchove.

For the Kingdom of Denmark:
Paul Fischer.

For Spain:
Miguel de Lojendio.

For the French Republic:
Michel d'Ornano.

For Ireland:
David Neligan.

For the Italian Republic:
Mario Pedini.

For the Kingdom of Norway:

For the Kingdom of the Netherlands (onder voorbehoud van aanvaarding):
J. A. de Ranitz.

For the United Kingdom of Great Britain and Northern Ireland:
Beswick.

For the Kingdom of Sweden (sous reserve de ratification):
Ingemar Hägglöf.

For the Swiss Confederation:
Pierre Dupont."[133]

- **ESA/EU Framework Agreement**

"COUNCIL DECISION

of 29 April 2004

on the conclusion of the Framework Agreement between the European Community and the European Space Agency

(2004/578/EC)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 170, in conjunction with the first sentence of the first subparagraph of Article 300(2) and the first subparagraph of Article 300(3) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament [1],

[133] https://www.riigiteataja.ee/aktilisa/2070/7201/5002/ESA_Convention.pdf

Whereas:

(1)The Commission has negotiated on behalf of the Community an Agreement with the European Space Agency.

(2)The Agreement was signed on behalf of the Community on 25 November 2003 subject to its possible conclusion at a later date.

(3) This Agreement should be approved,

HAS DECIDED AS FOLLOWS:

Article 1

The Agreement between the European Community and the European Space Agency is hereby approved on behalf of the Community.

The text of the Agreement is attached to this Decision.

Article 2

The President of the Council is hereby authorized to designate the person empowered to deposit on behalf of the Community the act of approval, as provided for in Article 12(1) of the Framework Agreement, in order to express the consent of the Community to be bound.

Done at Luxembourg, 29 April 2004.

For the Council

The President

M. McDOWELL

([1]) Opinion delivered on 20 April 2004 (not yet published in the Official Journal).

FRAMEWORK AGREEMENT

between the European Community and the European Space Agency

THE EUROPEAN COMMUNITY,

and

THE EUROPEAN SPACE AGENCY,

(hereafter also collectively referred to as the Parties)

HAVE AGREED AS FOLLOWS:

Article 1

Purpose of the cooperation

The aim of this Framework Agreement is to address the following issues:

1. The coherent and progressive development of an overall European Space Policy. Specifically, this policy shall seek to link demand for services and applications using space systems in support of the Community policies with the supply of space systems and infrastructure necessary to meet that demand.

2. The establishment of a framework providing a common basis and appropriate operational arrangements for an efficient and mutually beneficial cooperation between the Parties with regard to space activities in accordance with their respective tasks and responsibilities and fully respecting their institutional settings and operational frameworks. The cooperation under this Framework Agreement between the Parties aims at:

   (a) securing Europe's independent and cost-effective access to space and the development of other fields of strategic interest necessary for the independent use and application of space technologies in Europe;

   (b) ensuring that the overall European Space Policy takes into particular account the general policies pursued by the European Community;

   (c) supporting Community policies by using space technologies and space infrastructures where appropriate and promoting the use of space systems in support of sustainable development, economic growth and employment;

   (d) optimizing the use of expertise and available resources and contributing to the consolidation of the close cooperation between the European Community and ESA, thereby linking the demand and supply of space systems within a strategic partnership;

   (e) achieving greater coherence and synergy of research and development in order to optimize the use of resources available in Europe, including the network of technical centres.

Article 2

Principles of cooperation

1. The cooperation between the Parties shall be pursued in the light of the common objectives as defined under Article 1, with due regard to their respective tasks and responsibilities and their respective institutional settings and operational frameworks.

2. Each Party shall take the decisions necessary for the implementation of this Agreement, as described in Article 4, in accordance with its own internal procedures.

3. Bearing in mind the nature of space technologies and infrastructures, both Parties, in implementing this Agreement, shall take into account their security dimension.

Article 3

Fields of cooperation

1. The Parties have identified the following specific fields of cooperation:

— science,

— technology,

— earth observation,

— navigation,

— communication by satellite,

— human space flight and micro-gravity,

— launchers,

— spectrum policy related to space.

2. The Parties may identify and develop new fields for cooperation.

Article 4

Implementation

1. For the implementation of this Agreement each Party shall undertake, in compliance with its own prerogatives, legal instruments and procedures, such actions as are required to achieve the purpose of the cooperation provided for in Article 1.

2. Such actions shall aim at fostering the utilization of space research and development and space applications in the public and private sectors, the promotion of the adoption of legislative, regulatory and standardization measures in this sector, the funding and carrying out of joint initiatives pursuant to Article 5.

3. Each Party shall refer to the competencies and capabilities of the other, whenever an action is necessary, to pursue the purpose of the cooperation, and shall provide the other Party with expertise and support in its own specific fields of competence.

Article 5

Joint initiatives

1. Subject to paragraph 3, the joint initiatives to be carried out by the Parties may take, without being limited to, the following forms:

(a) the management by the ESA of European Community space-related activities in accordance with the rules of the European Community;

(b) the participation by the European Community in an optional programme of the European Space Agency, in accordance with Article V.I.b of the ESA Convention;

(c) the carrying out of activities which are coordinated, implemented and funded by both Parties;

(d) the creation by the Parties of bodies charged with pursuing initiatives complementary to research and development activities, such as the provision of services, the promotion of operators formation and the management of infrastructures;

(e) the carrying out of studies, the organisation of scientific seminars, conferences, symposia and workshops, the training of scientists and technical experts, the exchange or sharing of equipment and materials, the access to facilities, and the support of visits and exchanges of scientists, engineers or other specialists.

2. When the implementation of a joint initiative requires a detailed definition, it shall be provided for in specific arrangements to be entered into between the Parties. Whenever applicable, such specific arrangements should include at least:

(a) the overall mission definition;

(b) a description of the objectives;

(c) a consolidated set of user requirements;

(d) a work plan;

(e) an appropriate management scheme;

(f) the role and financial implications of the Parties;

(g) an industrial policy scheme;

(h) budgetary aspects;

(i) rules of intellectual property rights, rules of ownership including the transfer of ownership, the implementation principles including voting rights, and the participation by third Parties.

Both Parties shall work out guiding principles in addition to these specific arrangements as soon as possible.

3. Any financial contribution made by one Party in accordance with a specific arrangement shall be governed by the financial provisions applicable to that Party. Under no circumstances shall the European Community be bound to apply the rule of 'geographical distribution' contained in the ESA Convention and specially in Annex V thereto. Compliance with the rules relating to financial control and auditing of the Party contributing to the joint initiatives, or of both Parties in case of joint contribution, shall apply to any joint activity.

Article 6

Consultation and information

1. The Parties shall consult each other regularly in order to coordinate their activities to the fullest extent. Each Party shall inform the other of any initiatives within its own decision-making process, in the fields of cooperation under Article 3, which may be of interest to the other Party.

2. The Parties shall exchange all information at their disposal which may be required for the implementation of this Agreement, subject to their respective rules.

3. Except when otherwise provided, the Parties shall not disclose any information exchanged in connection with this Agreement to any persons other than those employed by them or officially entitled to handle such information nor shall they use it for commercial purposes. Such disclosure shall extend only so far as may be necessary for the purpose of this Agreement set out in Article 1 and shall be in strict confidence.

Article 7

External dimension of the cooperation

1. Each Party shall inform the other of its activities of an international dimension which may be of interest to the other Party.

2. Whenever appropriate a Party may, in relation to any matters relevant to its international activities, consult the other Party.

3. Once a specific arrangement has been concluded between the parties in accordance with Article 5, the external aspects of this joint activity vis-à-vis third parties shall be pursued jointly by the parties in accordance with that specific arrangement.

Article 8

Coordination and facilitation of cooperative activities

1. The coordination and facilitation of cooperative activities under this Agreement shall be accomplished by regular joint and concomitant meetings of the Council of the European Union and of the Council of ESA at ministerial level (Space Council).

2. The objectives of the joint and concomitant meetings shall include the following:

(a)providing orientations supporting the achievement of the objectives of this Agreement and identifying actions required;

(b)making recommendations, in particular related to the main elements of the specific arrangements;

(c)advising the parties on ways to enhance cooperation consistent with the principles set out in this Agreement;

(d) reviewing the effective and efficient functioning of this Agreement.

3. A Secretariat shall assist the concomitant meetings and shall elaborate the initiatives deriving from the implementation of this Agreement. The Secretariat shall implement the guidelines provided by the concomitant meetings of the two Councils. The Secretariat shall establish its own rules of procedure and be composed of officials of the Commission of the European Communities and of the ESA Executive. The Parties shall undertake, in accordance with their respective rules and procedures, to contribute to the required administrative support.

4. Without prejudice to the Parties' internal decision-making procedures, the Secretariat shall consult on a regular and informal basis high-level representatives of the Member States of the European Community and of the European Space Agency, with the purpose of reaching common understanding on issues related to the implementation of this Agreement.

Article 9

Exchange of personnel

1. The Parties may second members of their staff to each other for specified periods in order to share expertise and develop mutual understanding.

2. Rules for the implementation of this Article shall be established by the Secretariat, as referred to in Article 8, and be agreed to in the form of a specific arrangement under this Framework Agreement.

Article 10

Public relations

1. The Parties undertake to coordinate in advance their public-relations, press and media activities concerning any joint public activities relating to subjects covered by this Agreement.

2. In all relevant media activities, the role of each Party in this Agreement shall be clearly identified and mentioned.

3. The detailed arrangements for implementing public relations activities provided for in this Article shall be adopted jointly.

Article 11

Settlement of disputes

1. Any disputes which may arise between the Parties relating to the interpretation or application of this Agreement shall be submitted for direct negotiations within the Secretariat.

2. If it is not possible to settle the dispute in accordance with paragraph 1, either of the two Parties may notify the other of the appointment of an arbitrator. The other Party shall then appoint its own arbitrator within a period of two months. The arbitrators shall then appoint a third arbitrator within one month.

3. The arbitrators' decisions shall be taken by majority vote.

4. The award of the Arbitration Tribunal shall be final and binding on the Parties.

5. Each Party to the dispute shall take the appropriate steps required to implement the arbitrators' decisions.

Article 12

Entry into force, duration, amendments and termination

1. This Agreement shall enter into force on the date of the last written communication by which the Parties notify each other that their respective internal procedures necessary for its entry into force have been completed.

2. This Agreement shall remain in force for four years from the date of its entry into force. It shall be automatically extended for subsequent periods of four years unless either of the Parties notifies the other Party in writing, at least one year before the expiry of any of its periods of duration, of its intention to terminate it.

This Agreement shall terminate upon the expiry of twelve months after the receipt of written notification by one Party sent by the other Party.

3. The termination or expiry of this Agreement shall not affect the validity of the specific arrangements entered into between the Parties in accordance with Article 5, which shall remain in full force and effect until the terms for their execution or termination take place.

4. This Agreement shall be amended only by written agreement between the Parties.

5. This Agreement is not intended to modify or supersede any previous agreements entered into between the Parties, which shall remain in full force and effect in accordance with their own terms and provisions.

Article 13

Signature and authenticity

This Agreement shall be drawn up in duplicate in the Danish, Dutch, English, Finnish, French, German, Greek, Italian, Norwegian, Portuguese, Spanish and Swedish languages, each of these texts being equally authentic.

Hecho en Bruselas, el veinticinco de noviembre del dos mil tres.

Undærdiget i Bruxelles den femogtyvende november to tusind og tre.

Geschehen zu Brüssel am fünfundzwanzigsten November zweitausendunddrei.

Έγινε στις Βρυξέλλες, στις είκοσι πέντε Νοεμβρίου δύο χιλιάδες τρία.

Done at Brussels on the twenty-fifth day of November in the year two thousand and three.

Fait à Bruxelles, le vingt-cinq novembre deux mille trois.

Fatto a Bruxelles, addì venticinque novembre duemilatre.

Gedaan te Brussel, de vijfentwintigste november tweeduizenddrie.

Utferdiget i Brussel den tjuefemte november totusenogtre.

Feito em Bruxelas, em vinte e cinco de Novembro de dois mil e três.

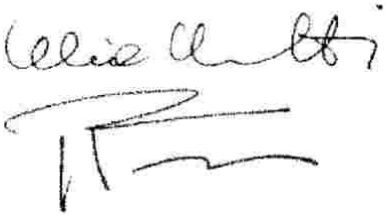
Tehty Brysselissä kahdentenakymmenentenäviidentenä päivänä marraskuuta vuonna kaksituhattakolme.

Utferdiget i Brussel den tjuefemte november totusenogtre.

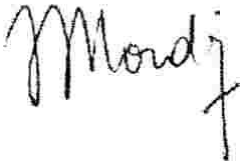
Por la Comunidad Europea

For Det Europæiske Fællesskab

Für die Europäische Gemeinschaft
Για την Ευρωπαϊκή Κοινότητα
For the European Community
Pour la Communauté européenne
Per la Comunità europea
Voor de Europese Gemeenschap
For Den europeiske union
Pela Comunidade Europeia
Euroopan yhteisön puolesta
För Europeiska gemenskapen



Por la Angecia Espacial Europea
For Den Europæiske Rumorganisation
Für die Europäische Weltraumorganisation
Για την Ευροωπαϊκή Υπηρεσία Διαστήματος
For the European Space Agency
Euroopan avaruusjärjestön puolesta
Pour l'Angence spatiale européenne
Per l'Agenzia spaziale europea
Voor het Europees Ruimteagentschap
For Den europeiske romorganisasjon
Pela Agência Espacial Europeia
För Europeiska rymdorganisationen"



"(1) The EU Council Resolutions of 22 June 1998 (OJ C 224, 17.7.1998, p. 1), 2 December 1999 (OJ C 375, 24.12.1999, p. 1), 16 November 2000, (OJ C 371, 23.12. 2000, p. 2).

(2) The ESA resolutions of: 23 June 1998: ESA/C/CXXXVI/Res.1 (Final), 11 May 1999: ESA/C-M/CXLI/Res. 1 (Final); ESA/C(2000)67; ESA/C-M/CXLVIII/Res. 1 (Final), 16 November 2000, referring to the European Strategy for Space; ESA/C-M/CLIV/Res. 1 (Final), 15 November 2001; ESA/C-M/CLXV/Res.3 (Final), 27 May 2003."[134]

[134]FRAMEWORK AGREEMENT between the European Community and the European Space Agency (2004)

- **Understanding for the cooperation in the frame of the Sentinel Collaborative Ground Segment between the European Space Agency and the National Observatory of Athens**

"Annex
to the Understanding for the cooperation in the frame of the Sentinel Collaborative Ground Segment between the European Space Agency and the National Observatory of Athens, acting in its capacity of Greece's National Point of Contact (hereinafter "Letter of Understanding")"

"This Annex to the Understanding for the cooperation in the frame of the Sentinel Collaborative Ground Segment between ESA and the National Observatory of Athens, acting in its capacity of Greece's National Point of Contact, of 12 May 2014, describes the technical details and specific provisions of Sentinel Collaborative Ground Segment initiatives conducted under the said Understanding.

a) **Collaborative Archiving and Dissemination Centers (CAC), National mirror site**

Entity conducting the initiative: National Observatory of Athens (hereinafter "NOA") Represented by its President, Prof. Kanaris C. Tsinganos

Activity: NOA intends to set-up a national Mirror Site for hosting and onward distributing Sentinel data, at the premises of the National Observatory of Athens (NOA), in order to ensure the access, archiving, and redistribution of Sentinel data and products for the derivation of value adding environmental services and information. The objective of this activity is to provide data also to neighboring South Eastern Mediterranean and Balkan countries and Black Sea Region, on the basis of the existing and/or future transnational needs and co-operations.
The Greek Mirror Site architecture has been designed and tested by the operational partners NOA & GREEK RESEARCH AND TECHNOLOGY NETWORK S.A. (GRNET) in collaboration with the technical staff of ESA.
The Mirror Site architecture combines the NOA and GRNET (partner of GEANT) processing, archiving, retrieval and networking capabilities, with the use of cloud processing resources of the Okeanos IaaS services of GRNET. The designed infrastructure provides large scale capacities for the dynamic creation and unlimited use of powerful Virtual Machines (e.g. 8 cores, 8 GB RAM and 100 GB HDD), for satellite data processing.
NOA makes available the appropriate interfaces for data and data catalogues handling, and the creation of meta-data catalogues and archives of the collected data/products.

ESA support:

a) Access to Collaborative Data Hub

ESA grants NOA access to the Collaborative Data Hub (CollDH), [link to the portal], a rolling archive, providing bulk dissemination capabilities for Sentinel data products. The CollDH will continuously store Sentinel data acquired during the last month(s) at the processing levels agreed as part of the Sentinel core data product list as defined in the CSC Operations Concept Document. It enables searching, browsing, previewing and downloading the Sentinel data. The time interval covered by the CollDH rolling archive will be scalable and include at least the last month of data.
Access to the CollDH is allowed via a web authentication module. ESA will provide NOA with a username and password to access the CollDH. This username and password may be used only by NOA (including its representatives, employees and contractors involved in the initiative) for the purpose of the initiative and will not be shared with other natural or legal persons.
NOA will use the CollDH access only for the purpose of its activity in the initiative described above. Through registration at the CollDH, accessing and\or downloading available content, NOA shall not misuse or interfere with the service of the CollDH portal. In particular, NOA aims at building up an own mirror archive of Sentinel data and hence will not repeat the download of identic datasets from the CollDH, but store downloaded Sentinel data for reuse and re-dissemination.
All functionalities and contents offered by the CollDH are provided by ESA on a best efforts-basis, as set out in the Exchange of letters and the "General Clauses and Conditions for the Sentinel Collaborative Ground Segment cooperation with GMES Space Component Participating States" (hereinafter "General Clauses"). The transmission of content from the CollDH may be interrupted or delayed by ESA in the event of technical constraints, such as the internet bandwidth. In such case, the download requested by NOA will be enabled later taking into account other users' requests.

b) Data dissemination

GEANT is a broad bandwidth network coordinated by DANTE connecting European research and education institutions, which interfaces with national partner networks. GRNET is the Greek national partner network to GEANT, managed and owned by the General Secretariat for Research and Technology of the Ministry of Education and Religious Affairs in Greece.
ESA will make best efforts to agree with GEANT/GRNET on connecting the CollDH to GEANT/GRNET network. Upon such agreement, ESA will provide the appropriate data transfer protocols for the transfer of satellite data through the broad bandwidth networks of GEANT/GRNET. ESA assumes no responsibility for data transfer taking place within GEANT/GRNET. Until data transfer is agreed upon between ESA and GEANT/GRNET, ESA will provide appropriate interfaces, to transfer Sentinel data to NOA via internet.

Time schedule: The proposed activities will start once Sentinel-1 data will become available in accordance with ESA data provision plan (e.g. after launch, commensurate with the ramp-up plan for data provision). Further data from Sentinel-2, Sentinel-3 and

Sentinel-5 Precursor will be included as soon as available in accordance with the related ESA data provision plans.
The National Mirror Site is expected to be a long term activity, and is planned be sustained by NOA & GRNET throughout the period in which Sentinel data are available.

Reporting: In line with section 5 of the Understanding, the NPC will keep ESA informed about the course and success of any Sentinel Collaborative Ground Segment initiative.
The regular reports shall have at least annual frequency, and shall as a minimum contain information regarding:
• Sentinel data use and applications;
• Onward-dissemination of Sentinel data, including user statistics of the Greek mirror site;
• Any changes to the pre-agreed set up of activities that will have an impact on ESA's support to the national activities.

More specifically, as concerns National Mirror Site usage statistics, the following minimum set of information shall be provided to ESA as part of the annual reports. **User account statistics,** including:
• Contact e-mail
• Utilization domain (i.e. research, commercial, education, other)
• Usage field (i.e. atmosphere, emergency, marine, land, security, climate, other)
• Country of the account user Note: the above fields should be requested as part of the user account registration

Data dissemination statistics, including:
• Data delivered per user account
• Data volume per user account
• Statistics on the core product delivered

Sentinel data governance: Sentinel data made available via the CollDH is governed by the provisions of section 6 of the Understanding."[135]

[135]https://sentinel.esa.int/documents/247904/1843964/CollGS_TA_Greece.pdf, ESA Sentinel, Sentinel Collaborative Ground Segment between European Space Agency and the National Observatory of Athens

- **Article 60: Establishment and function of the Legal Person Governed by Private Law "Hellenic Space Center"**

Article 60 Establishment and function of the Legal Person Governed by Private Law "Hellenic Space Center"

"1. A non-profit legal person governed by private law is established, hereinafter, under the name "Hellenic Space Center" with the distinctive title "HSC".

2. The agency under the name "Hellenic Space Agency SA" and the distinctive title "HSA" which was established under article 18 of the Law. 4508/2017 (A' 200), is resolved without being cleared and is deleted from the General Electronic Commercial Registry under the Law 3419/2005 (A' 297).

3. HSC enders as a successor of HSA and by operation of law, in total of any kind of responsibilities, rights, obligations and other legal relationships of HSA. Any kind, nature or capacity for legal transaction concluded or announced until this present law comes into force and they are in progress, in which the sole or one of the parties is HSA are to be continued by and under the name of HSC, without HSC or any other party or third actor to have the right to ask for this reason the resolution of the before mentioned legal transactions or to not conclude the obligations that are derived from them. Additionally, by publishing the present document, there are transferred ipso jure to HSC all the operations, programs, responsibilities and funding that HSA maintained. Pending trials of HSA are to be continued by and under the name of HSC without their abrupt termination and without the need for any further special, judicial or extrajudicial action for their continuation.

4. HSC is located in Athens, with its registered seat to be able to transfer to another municipality under the decision of the Minister of Digital Governance.

5. HSC belongs to the broader public sector and it functions in favor of the public interest. It functions according to the rules of private economy and is governed by the provisions of this law and of its internal operating regulations. HSC reaps all of the administrative, financial, judicial, substantive and procedural law, benefits and imperfections of the public sector. Furthermore, it is exempt from custom duties, direct or indirect taxes, except for the Value Added Tax (VAT), of the single property tax and of the special property tax, contributions in favor of third parties and fees of any nature for the imported equipment by HSC, in accordance with the provisions in force.

6. 6. Every action or decision, to the transfer of assets or liabilities, and every practical right to HSC, as well as the transcript of such acts or agreements in the relevant mortgage offices or cadastral offices, is exempt from all taxes, except the capital collection tax and

the tax on the transfer of immovable property, donations, estate properties, where such a case occurs, from all fees, contributions or rights in favor of the public or any legal entity under public law and insurance organizations or third parties. Specifically, regarding the income tax, HSC is exempt of it, with the exception of income that is obtained from capital and transfer of capital surplus, according to case a' of article 46 of Law 4172/2013 (A' 167). In all respects, the provisions of EU law on state aid apply, excluding issues relating to military applications and issues of national security.

7. HSC is supervised by the Minister of Digital Governance.

8. HSC's purposes are the following:
a) formulating a strategy proposal in the field of space and the elaboration of a rolling-dynamic action plan of space strategy in collaboration with the university and research community, the public and private sector, setting goals, areas of cooperation and procedures for the achievement of such goals,
b) the cooperation, coordination, support and mobilization of institutes, services, and legal entities of the public and private sector for the promotion, diffusion and evaluation of Greece's space strategy, as well as the participation in European and international organizations of groups that take action in space issues and programs,
c) the promotion and participation as a coordinator of public bodies in functions and programs, as well as the management of national programs and projects in the field of space, such as in scientific research, technology, telecommunications, security, economy, environment, agricultural development, transport, digital governance and trade,
d) the participation in European and international organizations, initiatives, forums and activities is issues regarding space, the coordination of the national representatives in the field of space, the development of European and international collaborations, the exchange and composition of knowledge, innovation and actions in order to maximize reciprocal participation of the country in the European and international space-related organizations, in European and international space programs , as well as the participation in the planning of programs for the service of national, scientific, operational and developmental needs in which space plays a primary role,
e) the contribution in development and enhancement of technology and space applications, services and terrestrial infrastructure for the benefit of domestic industry and research, as well as the support for the designing process for satellite systems, materials and equipment, including communication activities, through the utilization of the country's participation in the international and European organizations and programs, as well as in all kinds of refunds that the country is entitled to,
f) the cooperation with the competent bodies and services for the constant education of the students, the new researchers and public workers in matters of space, as well as the design and participation in the implementation of actions to help the understanding of space activities and applications,
g) the promotion of standardization issues and transfer of know-how and good practices in the field of space applications and services,

h) the experimental or commercial exploitation of the rights of the public sector in satellite and space objects, as well as in the exploitation of the related services, resources and assets, movable and immovable, upon relevant assignment or permit from the Ministry of Digital Governance,
i) providing assistance to the public sector regarding satellite and space issues, as well as providing consultant services and research development for the Ministry of Digital Governance regarding management of rights and obligations of the public sector in space, the entry and evaluation of space objects and the development of space systems.

9. HSC funding comes from: a) any kind of funding/ grants from the Government Budget (Regular and Public investment program),
b) funding, grants, contributions and any kind of contribution from bodies and organizations of the public and private sector, the EU and other European and international organizations, among others for the projects that HSC undertakes to implement,
c) for the utilization of public rights on space objects, satellites, satellite orbits and relevant radio frequencies granted to HSC by the Ministry of Digital Governance, as well as contracts or programs implemented during the experimental or commercial activity,
d) the provided services and transfer of rights regarding the use of scientific- research related projects and studies,
e) donations, contributions, estates, legacies, grants, sponsorships and all kinds of contributions from the natural and legal persons, the public and private sector, resident or non-resident,
f) same revenue from the provisions of its specialized services to third parties, execution of projects on behalf of third parties,
g) income from the use of assets of its movable and immovable property and from loans of any kind, as well as from any other legal sources. In case of HSC's resolution, its property, movable and immovable, and all kinds of rights and obligations fall into the public sector.

10. As for the space programs and space applications regarding national defense, the Ministry of Defense maintains administrative and operational autonomy relating to HSC, although it may participate after an invitation of HSC's Board of Directors to the meetings, without the right to a vote, in the case that the topic of discussion relates to maters of national defense and security.

11. HSC complies with all the necessary documents and supporting documents in makes available to the competent bodies, whenever requested. The verifications, inspections and audits of the funded programs and projects are carried out in order to monitor the implemented actions and to ensure that the funds available from HSC are invested in accordance with the objectives and provisions of this law and the decisions of its bodies. The management use of HSC begins January 1st of each year and ends December 31st of each year. HSC prepares an annual report, which includes the financial report and the report of the activities of HSC and in published on its official website. The financial

report includes a balance sheet, a statement or results and the finances of HSC. In October of each year, the Minister of Digital Governance is presented with the annual report for the previous year. The regular audit of the financial management of HSC is annual and it is exercised by two certified public accountants, appointed by an equal number of deputies by decision of the Minister of Digital Governance and they audit the legality of financial management based on the data contained in the annual report. Remuneration od the certified public accountants burdens the budget of HSC. By decision of the Minister of Digital Governance, an emergency audit may be ordered at any time.

12. HSC's administrative body is the Board of Directors, appointed for a five-year term by a decision of the Minister of Digital Governance and consists of seven (7) members, namely:
a) President,
b) Managing Director,
c) five (5) members.

13. The President convenes the Board of Directors in a regular or emergency meeting, prepares the agenda and directs its work. The President, absent or incapacitated, shall be replaced by the Vice-President. In the event that one or more positions of advisors are vacant for any reason, they shall be filled in for the remainder of their term of office in the manner prescribed for their appointment. Until this filling, the Board of Directors legally meets and decides validly, since its number has not been reduced to less than three (3) members. If the number of members is reduced to less than three (3), the required temporary advisors shall be appointed by the Minister of Digital Governance, until the permanent ones are appointed. The term of office of the advisors is extended until the new advisors are appointed. The President or his deputy presides over the meetings of the Board of Directors and direct its work. The Chairman of the Board supervises the work of HSC, monitors its operation, informs the Board and is its highest executive body. The Board of Directors is responsible for deciding on any issue related to the management of the property, the administration and representation of HSC and in general its activity, and takes all the appropriate measures and decisions for the realization of the purpose of HSC. The Board convenes at the invitation of its President at the regular meetings at least twelve (12) times a year. The invitation shall be notified to the members by the agenda at least 48 hours before the meeting. The President is obligated to convene the Board of Directors when requested to do so by at least two if its members or the Ministry of Digital Governance, who may attend the meeting without a vote. The Chairman of the Board of Directors determines and proposes the issues of the agenda, in which he also includes the issues proposed by the members of the Board of Directors. The Board of Directors meets legally, as long as four (4) members participated in the meeting- and decides by a majority. In case of a tie, the President's vote shall prevail.

14. The members of the Board of Directors must have a recognized prestige, scientific competence and professional experience, a high level of know-how and extensive

experience that meets the requirements of the position or areas in which HSC operates. The special qualifications and barriers or incompatibilities of the members of the Board of Directors are determined in the Regulation of HSC.

15. The Board of Directors is responsible for the administration of HSC and its purpose. The Board of Directors decides on the issues related to the management of HSC, except for those issues that, according to the provisions of the present, belong to the competence of the Minister of Digital Governance. The Board of Directors may, by its decision, entrust the handling of special issues to specialized scientists in the field of Space, who do not belong to the regular staff of HSC and who have special knowledge and experience in the cases assigned to them, and their remuneration is determined by the above decision.

16. The HSC hires staff under private law employment contracts for fixed-term or indefinite employment, under a paid contract or project contract, in accordance with the provisions in force. HSC, in derogation from the existing provisions, may hire up to ten (10) scientists of known value for the fulfillment of its purposes and to cover the special needs of the State, during the control of space activities and supervision. of space objects, by analogous application of par. 6 of article 13 of law 3429/2005.

17. At the beginning of the operation of HSC, by decision of the Minister of Digital Governance, upon the request of the interested parties, up to six (6) executives of the Ministry of Digital Governance are allowed to be seconded to HSC, permanent or with a fixed-term private law employment contract. The same decision regulates the terms and any other issue related to posting, except for salary issues for which Article 23 of Law 4354/2015 (A` 176) applies. By decision of the Minister of Digital Governance, in derogation of the existing provisions, the immediate and urgent staffing needs of HSC may be temporarily covered by the transfer or parallel exercise of the duties of existing specialized personnel of the Ministry of Digital Governance to HSC. The same decision determines the specific working conditions that will govern the temporary exercise of duties of this staff until the completion of the formation and staffing of HSC, as well as every necessary detail.

18. To meet the needs of HSC, the secondment of personnel from the State is allowed, by legal entities of the public or the wider public sector, by independent administrative authorities, as well as by legal entities under private law and bodies, which are supervised by the State in accordance with Law 4440/2016.

19. At the same time, the staff with a private law employment relationship of indefinite duration is maintained by HSC with the same legal employment relationship, fixed time and mandate relationship, who during the publication of this law work and serve in the abolished with the present HSA SA, retaining all the rights and obligations arising from the existing, at the time of publication of this, contracts, annual salaries and employment relationships.

20. With an internal regulation prepared by HSC within one year from the publication of the present and submitted for approval to the Minister of Digital Governance, more specific issues are regulated, necessary for the smooth and efficient operation of HSC, in particular the organization, operation, structure and responsibilities of the services, its number of staff positions per category and specialty and their distribution in its administrative units, the number of specialist scientists, as well as the number of positions of legal advisor, lawyers and special legal associates, which are linked to HSC in relation to paid mandate, the necessary qualifications, the terms of recruitment and employment and the grade and salary development of the scientists, the evaluation procedures of the executives, as well as the disciplinary law of the staff and any other relevant issues. Also, issues of security and staffing, protection of personal data and confidential information, as well as control of the HSC.
Until the issuance of the internal regulation, the above issues are regulated by decisions of the Board of Directors of HSC."[136]

Original script:

Άρθρο 60 – Σύσταση και λειτουργία του ΝΠΙΔ «ΕΛΛΗΝΙΚΟ ΚΕΝΤΡΟ ΔΙΑΣΤΗΜΑΤΟΣ»

1. Συνιστάται νομικό πρόσωπο ιδιωτικού δικαίου μη κερδοσκοπικού χαρακτήρα με την επωνυμία «ΕΛΛΗΝΙΚΟ ΚΕΝΤΡΟ ΔΙΑΣΤΗΜΑΤΟΣ» και το διακριτικό τίτλο «ΕΛ.ΚΕ.Δ.» στο εξής. Στις διεθνείς συναλλαγές, η επωνυμία του ΕΛ.ΚΕ.Δ., αποδίδεται στα αγγλικά ως «HELLENIC SPACE CENTER ».
2. Η ανώνυμη εταιρεία με την επωνυμία «Ελληνικός Διαστημικός Οργανισμός Α.Ε.» και τον διακριτικό τίτλο «ΕΛ.Δ.Ο. Α.Ε.» η οποία συστάθηκε με το άρθρο 18 του ν. 4508/2017 (Α΄ 200), καταργείται χωρίς να τεθεί σε εκκαθάριση και διαγράφεται από το Γενικό Εμπορικό Μητρώο (Γ.Ε.ΜΗ.) του ν. 3419/2005 (Α` 297).
3. Το ΕΛ.ΚΕ.Δ. υπεισέρχεται ως καθολικός διάδοχος στη θέση της ΕΛ.Δ.Ο. Α.Ε. και αυτοδικαίως στο σύνολο των πάσης φύσεως αρμοδιοτήτων, δικαιωμάτων, υποχρεώσεων και λοιπών εννόμων σχέσεων της ΕΛ.Δ.Ο. Α.Ε. Οι κάθε είδους, τύπου, φύσεως και περιεχομένου δικαιοπραξίες που έχουν συναφθεί ή προκηρυχθεί μέχρι την έναρξη ισχύος του παρόντος νόμου και ευρίσκονται σε ισχύ, στις οποίες το μοναδικό ή ένα από τα συμβαλλόμενα μέρη είναι η ΕΛ.Δ.Ο. Α.Ε. συνεχίζονται από και στο όνομα του ΕΛ.ΚΕ.Δ, χωρίς το ΕΛ.ΚΕ.Δ ή άλλο συμβαλλόμενο μέρος ή τρίτος να δικαιούται να ζητήσει για το λόγο αυτό τη λύση των ανωτέρω δικαιοπραξιών ή τη μη εκπλήρωση των υποχρεώσεων που απορρέουν από αυτές. Επιπλέον, με τη δημοσίευση του παρόντος μεταφέρονται αυτοδίκαια στο ΕΛ.ΚΕ.Δ. όλα τα έργα και προγράμματα καθώς και αρμοδιότητες και χρηματοδοτήσεις που διατηρούσε η ΕΛ.Δ.Ο. Α.Ε. Οι εκκρεμείς δίκες

[136]Translated from http://www.opengov.gr/ypes/?p=6799, Ministry of Internal Affairs, Άρθρο 60 – Σύσταση και λειτουργία του ΝΠΙΔ «ΕΛΛΗΝΙΚΟ ΚΕΝΤΡΟ ΔΙΑΣΤΗΜΑΤΟΣ»

της ΕΛ.Δ.Ο. Α.Ε. συνεχίζονται από και στο όνομα του ΕΛ.ΚΕ.Δ., χωρίς να επέρχεται βίαιη διακοπή τους και χωρίς να απαιτείται οποιαδήποτε ειδικότερη, δικαστική ή εξώδικη, ενέργεια για την συνέχισή τους.
4. Το ΕΛ.ΚΕ.Δ. εδρεύει στην Αθήνα, με απόφαση δε του Υπουργού Ψηφιακής Διακυβέρνησης μπορεί να οριστεί ως έδρα άλλος δήμος της χώρας.
5. Το ΕΛ.ΚΕ.Δ. ανήκει στον ευρύτερο δημόσιο τομέα και λειτουργεί προς όφελος του δημοσίου συμφέροντος. Λειτουργεί σύμφωνα με τους κανόνες της ιδιωτικής οικονομίας και διέπεται από τις διατάξεις του παρόντος νόμου και του Εσωτερικού Κανονισμού Λειτουργίας του. Το ΕΛ.ΚΕ.Δ. απολαμβάνει όλων των διοικητικών, οικονομικών, δικαστικών, ουσιαστικού και δικονομικού δικαίου προνομίων και ατελειών του Δημοσίου. Επίσης, απαλλάσσεται από την καταβολή δασμών, άμεσων ή έμμεσων φόρων, πλην του Φόρου Προστιθέμενης Αξίας (ΦΠΑ), του Ενιαίου Φόρου Ιδιοκτησίας Ακινήτων και του Ειδικού Φόρου επί Ακινήτων, εισφορών υπέρ τρίτων και τελών οποιασδήποτε φύσης για τον εισαγόμενο από αυτήν εξοπλισμό που προορίζεται για την εκπλήρωση των σκοπών της, σύμφωνα με τις κείμενες διατάξεις.
6. Κάθε πράξη ή συμφωνία, που αφορά στη μεταβίβαση στοιχείων ενεργητικού ή παθητικού και κάθε εμπράγματου δικαιώματος προς το ΕΛ.ΚΕ.Δ., καθώς και η μεταγραφή των πράξεων ή συμφωνιών αυτών στα οικεία υποθηκοφυλακεία ή κτηματολογικά γραφεία, απαλλάσσεται από κάθε φόρο, εκτός του Φόρου Συγκέντρωσης Κεφαλαίου και των Φόρων Μεταβίβασης ακινήτων, δωρεών, κληρονομιών, όπου συντρέχει τέτοια περίπτωση, από κάθε τέλος, εισφορά ή δικαίωμα υπέρ του Δημοσίου ή οποιουδήποτε νομικού προσώπου δημοσίου δικαίου και ασφαλιστικών οργανισμών ή τρίτων. Ειδικά για το φόρο εισοδήματος, το ΕΛ.ΚΕ.Δ. απαλλάσσεται αυτού, με εξαίρεση το εισόδημα που αποκτά από κεφάλαιο και υπεραξία μεταβίβασης κεφαλαίου, σύμφωνα με την περίπτωση α' του άρθρου 46 του ν. 4172/2013 (Α' 167). Σε κάθε περίπτωση, εφαρμόζονται οι ρυθμίσεις του ενωσιακού δικαίου περί κρατικών ενισχύσεων, εξαιρουμένων των ζητημάτων που αφορούν στρατιωτικές εφαρμογές και των θεμάτων εθνικής ασφαλείας.
7. Το ΕΛ.ΚΕ.Δ. εποπτεύεται από τον Υπουργό Ψηφιακής Διακυβέρνησης.
8. Οι σκοποί του ΕΛ.ΚΕ.Δ. είναι οι ακόλουθοι:
α. η διαμόρφωση πρότασης για τη στρατηγική στον τομέα του διαστήματος και η εκπόνηση κυλιόμενου-δυναμικού σχεδίου δράσης της διαστημικής στρατηγικής σε συνεργασία με την πανεπιστημιακή και ερευνητική κοινότητα, το δημόσιο και τον ιδιωτικό τομέα που προσδιορίζει στόχους, τομείς συνεργασίας και διαδικασίες για την επίτευξη των στόχων,
β. η συνεργασία, ο συντονισμός, η υποστήριξη και η κινητοποίηση φορέων, υπηρεσιών και νομικών προσώπων του δημόσιου και του ιδιωτικού τομέα για την προώθηση, διάχυση και αξιοποίηση της διαστημικής στρατηγικής της Ελλάδας, καθώς και η συμμετοχή σε ευρωπαϊκούς και διεθνείς οργανισμούς και ομάδες που δραστηριοποιούνται σε διαστημικά θέματα και προγράμματα,
γ. η προώθηση και συμμετοχή ως συντονιστής δημόσιων φορέων σε έργα και προγράμματα, καθώς και η διαχείριση εθνικών προγραμμάτων και έργων σε τομείς του Διαστήματος, όπως η επιστημονική έρευνα, η τεχνολογία, οι τηλεπικοινωνίες, η ασφάλεια, η οικονομία, το περιβάλλον, η αγροτική ανάπτυξη, οι μεταφορές, η ηλεκτρονική διακυβέρνηση και το εμπόριο,

δ. η συμμετοχή σε ευρωπαϊκούς και διεθνείς οργανισμούς, πρωτοβουλίες, φόρουμ και δραστηριότητες για θέματα Διαστήματος, ο συντονισμός των εθνικών εκπροσώπων στον τομέα του Διαστήματος, η ανάπτυξη ευρωπαϊκών και διεθνών συνεργασιών, η ανταλλαγή και σύνθεση γνώσεων, καινοτομίας και δράσεων προκειμένου να μεγιστοποιηθεί η ανταποδοτική συμμετοχή της χώρας στους ευρωπαϊκούς και διεθνείς οργανισμούς Διαστήματος, σε ευρωπαϊκά ή διεθνή διαστημικά προγράμματα, καθώς και η συμμετοχή στη σχεδίαση προγραμμάτων για την εξυπηρέτηση εθνικών, επιστημονικών, επιχειρησιακών και αναπτυξιακών αναγκών στις οποίες το Διάστημα έχει πρωταρχικό ρόλο,
ε. η συμβολή στην ανάπτυξη και ενίσχυση της τεχνολογίας και των διαστημικών εφαρμογών, υπηρεσιών και επίγειων υποδομών προς όφελος της εγχώριας βιομηχανίας και έρευνας, καθώς και η υποστήριξη στο σχεδιασμό δορυφόρων, δορυφορικών συστημάτων, υλικών και εξοπλισμού, συμπεριλαμβανομένων των δραστηριοτήτων τηλεπισκόπησης, μέσω και της αξιοποίησης της συμμετοχής της χώρας στους διεθνείς και ευρωπαϊκούς οργανισμούς και προγράμματα, καθώς και στις πάσης φύσεως επιστροφές που δικαιούται η χώρα,
στ. η συνεργασία με αρμόδιους φορείς και υπηρεσίες για τη συνεχή επιμόρφωση των φοιτητών, των νέων ερευνητών και των δημόσιων λειτουργών σε θέματα Διαστήματος, καθώς και η σχεδίαση και η συμμετοχή στην υλοποίηση δράσεων για την κατανόηση των διαστημικών δραστηριοτήτων και εφαρμογών,
ζ. η προώθηση θεμάτων τυποποίησης και η μεταφορά τεχνογνωσίας και καλών πρακτικών στον τομέα των διαστημικών εφαρμογών και υπηρεσιών,
η. η πειραματική ή εμπορική αξιοποίηση των δικαιωμάτων του Δημοσίου σε δορυφορικά και διαστημικά αντικείμενα, καθώς και η αξιοποίηση των συναφών υπηρεσιών, πόρων και περιουσιακών στοιχείων, κινητών και ακινήτων, κατόπιν σχετικής εκχωρήσεως ή άδειας του Υπουργού Ψηφιακής Διακυβέρνησης,
θ. η παροχή συνδρομής προς το Δημόσιο αναφορικά με δορυφορικά και διαστημικά θέματα, καθώς και η παροχή συμβουλευτικών υπηρεσιών και η εκπόνηση μελετών προς το Υπουργείο Ψηφιακής Διακυβέρνησης αναφορικά με τη διαχείριση των δικαιωμάτων και των υποχρεώσεων του Δημοσίου στο Διάστημα, την καταχώριση και αξιολόγηση διαστημικών αντικειμένων, καθώς και την ανάπτυξη δορυφορικών συστημάτων.
9. Οι πόροι του ΕΛ.ΚΕ.Δ. προέρχονται από: α. κάθε είδους χρηματοδοτήσεις/επιχορηγήσεις από τον Κρατικό Προϋπολογισμό (Τακτικό και Πρόγραμμα Δημοσίων Επενδύσεων), β. χρηματοδοτήσεις, επιδοτήσεις, εισφορές και κάθε είδους ενισχύσεις ή επιχορηγήσεις από όργανα και οργανισμούς του δημοσίου και ιδιωτικού τομέα, της Ευρωπαϊκής Ένωσης και από άλλους ευρωπαϊκούς ή διεθνείς οργανισμούς, μεταξύ άλλων για τα έργα που αναλαμβάνει να υλοποιήσει, γ. την εκμετάλλευση δικαιωμάτων του Δημοσίου επί των διαστημικών αντικειμένων, των δορυφόρων, των δορυφορικών τροχιών και των συναφών ραδιοσυχνοτήτων που έχουν παραχωρηθεί στο ΕΛ.ΚΕ.Δ. από τον Υπουργό Ψηφιακής Διακυβέρνησης, καθώς και συμβάσεων ή προγραμμάτων που υλοποιούνται κατά την άσκηση πειραματικής ή εμπορικής δραστηριότητας, δ. την παροχή υπηρεσιών και τη μεταβίβαση των δικαιωμάτων χρήσης επιστημονικών – ερευνητικών έργων και μελετών, ε. δωρεές, ενισχύσεις, κληρονομίες, κληροδοσίες, επιχορηγήσεις, χορηγίες και κάθε είδους εισφορές φυσικών ή νομικών προσώπων, του δημόσιου ή του ιδιωτικού τομέα, της

ημεδαπής ή αλλοδαπής, στ. ίδια έσοδα από την παροχή των εξειδικευμένων υπηρεσιών του προς τρίτους, εκτέλεση έργων για λογαριασμό τρίτων, ζ. έσοδα από την αξιοποίηση στοιχείων της κινητής ή ακίνητης περιουσίας του και από δάνεια κάθε μορφής, καθώς και από οποιεσδήποτε άλλες νόμιμες πηγές. Σε περίπτωση διάλυσης του ΕΛ.ΚΕ.Δ., η περιουσία του, κινητή και ακίνητη, καθώς και τα κάθε είδους δικαιώματα και οι υποχρεώσεις του περιέρχονται στο Ελληνικό Δημόσιο.

10. Ως προς τα διαστημικά προγράμματα και τις διαστημικές εφαρμογές που εξυπηρετούν σκοπούς εθνικής άμυνας, το Υπουργείο Εθνικής Άμυνας διατηρεί διοικητική και επιχειρησιακή αυτονομία σε σχέση με το ΕΛ.ΚΕ.Δ., δύναται δε να συμμετέχει κατόπιν προσκλήσεως στις συνεδριάσεις του Διοικητικού Συμβουλίου του ΕΛ.ΚΕ.Δ. χωρίς δικαίωμα ψήφου, εφόσον συζητείται θέμα που άπτεται της εθνικής άμυνας και ασφάλειας.

11. Το ΕΛ.ΚΕ.Δ. τηρεί όλα τα απαραίτητα παραστατικά και δικαιολογητικά τα οποία και θέτει στη διάθεση των αρμόδιων οργάνων, όποτε ζητηθούν. Οι επαληθεύσεις, επιθεωρήσεις και οι έλεγχοι των χρηματοδοτηθέντων προγραμμάτων και έργων πραγματοποιούνται προκειμένου να παρακολουθούνται οι πραγματοποιούμενες δράσεις και να διασφαλίζεται ότι τα διατιθέμενα από το ΕΛ.ΚΕ.Δ. ποσά επενδύονται σύμφωνα με τους στόχους και τα προβλεπόμενα στον παρόντα νόμο και τις αποφάσεις των οργάνων του. Η διαχειριστική χρήση του ΕΛ.ΚΕ.Δ. αρχίζει την 1η Ιανουαρίου κάθε έτους και τελειώνει την 31η Δεκεμβρίου κάθε έτους. Το ΕΛ.ΚΕ.Δ. συντάσσει ετήσια έκθεση, η οποία περιλαμβάνει τον οικονομικό απολογισμό και τον απολογισμό πεπραγμένων του ΕΛ.ΚΕ.Δ. και δημοσιεύεται στον επίσημο διαδικτυακό του τόπο. Ο οικονομικός απολογισμός περιλαμβάνει ισολογισμό, κατάσταση αποτελεσμάτων χρήσης και τις χρηματοροές του ΕΛ.ΚΕ.Δ.. Τον Οκτώβριο κάθε έτους υποβάλλεται στον Υπουργό Ψηφιακής Διακυβέρνησης η ετήσια έκθεση που αφορά το προηγούμενο έτος. Ο τακτικός έλεγχος της οικονομικής διαχείρισης του ΕΛ.ΚΕ.Δ. είναι ετήσιος και ασκείται από δύο ορκωτούς λογιστές, που ορίζονται με ισάριθμους αναπληρωτές με απόφαση του Υπουργού Ψηφιακής Διακυβέρνησης και ελέγχουν τη νομιμότητα της οικονομικής διαχείρισης βάσει των στοιχείων που περιλαμβάνονται στην ετήσια έκθεση. Η αμοιβή των ορκωτών λογιστών επιβαρύνει τον προϋπολογισμό του ΕΛ.ΚΕ.Δ.. Με απόφαση του Υπουργού Ψηφιακής Διακυβέρνησης μπορεί να διατάσσεται οποτεδήποτε έκτακτος έλεγχος.

12. Όργανο Διοίκησης του ΕΛ.ΚΕ.Δ. είναι το Διοικητικό του Συμβούλιο, που ορίζεται για πενταετή θητεία με απόφαση του Υπουργού Ψηφιακής Διακυβέρνησης και αποτελείται από επτά (7) μέλη, ήτοι: α) Πρόεδρο, β) Διευθύνοντα Σύμβουλο, γ)πέντε μέλη.

13. Ο Πρόεδρος συγκαλεί το ΔΣ σε τακτική ή έκτακτη συνεδρίαση, καταρτίζει την ημερήσια διάταξη και διευθύνει τις εργασίες του. Τον Πρόεδρο, απόντα ή κωλυόμενο, αναπληρώνει ο Αναπληρωτής Πρόεδρος. Σε περίπτωση κατά την οποία κενωθεί για οποιονδήποτε λόγο μια ή περισσότερες θέσεις συμβούλων, η πλήρωση αυτών για τον υπόλοιπο χρόνο της θητείας τους γίνεται κατά τον τρόπο που γίνεται ο ορισμός τους. Μέχρι την πλήρωση αυτή το Διοικητικό Συμβούλιο νόμιμα συνέρχεται και αποφασίζει έγκυρα, εφόσον ο αριθμός του δεν έχει μειωθεί κάτω των τριών (3) μελών. Αν ο αριθμός των μελών μειωθεί κάτω των τριών (3) διορίζονται οι απαιτούμενοι προσωρινοί Σύμβουλοι από τον Υπουργό Ψηφιακής Διακυβέρνησης, μέχρι να ορισθούν οι οριστικοί.

Η θητεία των Συμβούλων παρατείνεται μέχρι να ορισθούν οι νέοι Σύμβουλοι. Ο Πρόεδρος ή ο αναπληρωτής του προΐστανται των συνεδριάσεων του Διοικητικού Συμβουλίου και διευθύνουν τις εργασίες του. Ο Πρόεδρος του ΔΣ εποπτεύει τις εργασίες του ΕΛ.ΚΕ.Δ. παρακολουθεί τη λειτουργία του, ενημερώνει το ΔΣ σχετικά, και είναι το ανώτατο εκτελεστικό όργανο αυτού. Το Διοικητικό Συμβούλιο είναι αρμόδιο να αποφασίζει για κάθε θέμα που ανάγεται στη διαχείριση της περιουσίας, τη διοίκηση και εκπροσώπηση του ΕΛ.ΚΕ.Δ. και γενικά τη δραστηριότητά της, λαμβάνει δε όλα τα ενδεικνυόμενα μέτρα και αποφάσεις για την πραγματοποίηση του σκοπού του ΕΛ.ΚΕ.Δ. Το Δ.Σ. συγκαλείται ύστερα από πρόσκληση του Προέδρου του σε τακτικές συνεδριάσεις τουλάχιστον δώδεκα (12) φορές το χρόνο. Η πρόσκληση κοινοποιείται στα μέλη με την ημερήσια διάταξη τουλάχιστον 48 ώρες πριν τη συνεδρίαση. Ο Πρόεδρος υποχρεούται να συγκαλεί το ΔΣ όταν αυτό ζητήσουν για συγκεκριμένο θέμα ή θέματα δύο τουλάχιστον μέλη του ή ο Υπουργός Ψηφιακής Διακυβέρνησης, ο οποίος μπορεί να συμμετάσχει στη συνεδρίαση αυτή, χωρίς ψήφο. Ο Πρόεδρος του ΔΣ καθορίζει και εισηγείται τα θέματα της ημερήσιας διάταξης, στα οποία περιλαμβάνει επίσης τα θέματα που προτείνονται από τα μέλη του ΔΣ και προεδρεύει στις συνεδριάσεις του Δ.Σ. Το Δ.Σ. συνεδριάζει νομίμως, εφόσον μετέχουν στη συνεδρίαση τουλάχιστον τέσσερα (4) μέλη – αποφασίζει δε κατά πλειοψηφία. Σε περίπτωση ισοψηφίας υπερισχύει η ψήφος του Προέδρου.

14. Τα μέλη του Διοικητικού Συμβουλίου πρέπει να διαθέτουν εγνωσμένο κύρος, επιστημονική επάρκεια και επαγγελματική εμπειρία, υψηλό επίπεδο τεχνογνωσίας και εκτενή εμπειρία που ανταποκρίνεται στις απαιτήσεις της θέσης ή των τομέων στους οποίους δραστηριοποιείται το ΕΛ.ΚΕ.Δ.. Τα ειδικότερα προσόντα και τα κωλύματα ή ασυμβίβαστα των μελών του Διοικητικού Συμβουλίου καθορίζονται στον Κανονισμό του ΕΛ.ΚΕ.Δ..

15. Το Διοικητικό Συμβούλιο είναι υπεύθυνο για τη διοίκηση του ΕΛ.ΚΕ.Δ. και του σκοπού της. Το Διοικητικό Συμβούλιο αποφασίζει για τα θέματα που σχετίζονται με τη διαχείριση του ΕΛ.ΚΕ.Δ., εκτός από τα θέματα εκείνα που, σύμφωνα με τις διατάξεις του παρόντος, ανήκουν στην αρμοδιότητα του Υπουργού Ψηφιακής Διακυβέρνησης. Το Διοικητικό Συμβούλιο μπορεί με απόφασή του να αναθέτει το χειρισμό ιδιαίτερων ζητημάτων σε εξειδικευμένους επιστήμονες στον τομέα του Διαστήματος, οι οποίοι δεν ανήκουν στο τακτικό προσωπικό του ΕΛ.ΚΕ.Δ. και οι οποίοι διαθέτουν ειδικές γνώσεις και πείρα στις υποθέσεις που τους ανατίθενται, η δε αμοιβή αυτών προσδιορίζεται με την ανωτέρω απόφαση

16. Το ΕΛ.ΚΕ.Δ. προσλαμβάνει προσωπικό με συμβάσεις εργασίας ιδιωτικού δικαίου για απασχόληση ορισμένου ή αορίστου χρόνου, με σύμβαση έμμισθης εντολής ή με σύμβαση έργου, σύμφωνα με τις ισχύουσες διατάξεις. Το ΕΛ.ΚΕ.Δ., μπορεί κατά παρέκκλιση των κείμενων διατάξεων να προσλαμβάνει έως δέκα (10) ειδικούς επιστήμονες εγνωσμένης αξίας για την εκπλήρωση των σκοπών της και για την κάλυψη των ιδιαίτερων αναγκών του Δημόσιου, κατά τον έλεγχο των διαστημικών δραστηριοτήτων και την εποπτεία των διαστημικών αντικειμένων, κατ` αναλογική εφαρμογή της παρ. 6 του άρθρου 13 του ν. 3429/2005.

17. Κατά την έναρξη λειτουργίας του ΕΛ.ΚΕ.Δ., με απόφαση του Υπουργού Ψηφιακής Διακυβέρνησης επιτρέπεται, κατόπιν αίτησης των ενδιαφερομένων, να αποσπώνται στο ΕΛ.ΚΕ.Δ., κατά παρέκκλιση των κείμενων διατάξεων, έως έξι (6) στελέχη του

Υπουργείου Ψηφιακής Διακυβέρνησης, μόνιμοι ή με σύμβαση εργασίας ιδιωτικού δικαίου αορίστου χρόνου. Με την ίδια απόφαση ρυθμίζονται οι όροι και κάθε άλλο θέμα σχετικό με την απόσπαση, εκτός από μισθολογικά θέματα για τα οποία εφαρμόζεται το άρθρο 23 του ν. 4354/2015 (Α` 176). Με απόφαση του Υπουργού Ψηφιακής Διακυβέρνησης, κατά παρέκκλιση των κείμενων διατάξεων, οι άμεσες και επείγουσες ανάγκες στελέχωσης του ΕΛ.ΚΕ.Δ. μπορεί να καλυφθούν προσωρινώς και με μετακίνηση ή παράλληλη άσκηση καθηκόντων υφιστάμενου εξειδικευμένου προσωπικού του Υπουργείου Ψηφιακής Διακυβέρνησης προς το ΕΛ.ΚΕ.Δ.. Με την ίδια απόφαση καθορίζονται οι ειδικότεροι όροι εργασίας που θα διέπουν την προσωρινή άσκηση καθηκόντων αυτού του προσωπικού μέχρι την ολοκλήρωση της συγκρότησης και στελέχωσης του ΕΛ.ΚΕ.Δ., ως και κάθε αναγκαία λεπτομέρεια.
18. Για την κάλυψη των αναγκών του ΕΛ.ΚΕ.Δ., επιτρέπεται η απόσπαση σε αυτήν προσωπικού από το Δημόσιο, από νομικά πρόσωπα του δημόσιου ή του ευρύτερου δημόσιου τομέα, από ανεξάρτητες διοικητικές αρχές, καθώς και από νομικά πρόσωπα ιδιωτικού δικαίου και φορείς, που εποπτεύονται από το Δημόσιο σύμφωνα με το ν. 4440/2016.
19. Παράλληλα, διατηρείται από το ΕΛ.ΚΕ.Δ. με την ίδια νομική σχέση απασχόλησης το προσωπικό με σχέση εργασίας ιδιωτικού δικαίου αορίστου χρόνου, ορισμένου χρόνου και σχέση εντολής, που κατά τη δημοσίευση του παρόντος νόμου εργάζονται και υπηρετούν στην καταργούμενη με το παρόν ΕΛ.Δ.Ο. Α.Ε., διατηρώντας όλα τα δικαιώματα και τις υποχρεώσεις που απορρέουν από τις υφιστάμενες, κατά το χρόνο της δημοσίευσης του παρόντος, συμβάσεις, ετήσιες αποδοχές και σχέσεις εργασίας
20. Με εσωτερικό κανονισμό που καταρτίζεται από το ΕΛ.ΚΕ.Δ. μέσα σε ένα χρόνο από τη δημοσίευση του παρόντος και υποβάλλεται για έγκριση στον Υπουργό Ψηφιακής Διακυβέρνησης, ρυθμίζονται ειδικότερα θέματα, αναγκαία για την εύρυθμη και αποδοτική λειτουργία του ΕΛ.ΚΕ.Δ., ιδίως η οργάνωση, η λειτουργία, διάρθρωση και οι αρμοδιότητες των υπηρεσιών της, ο αριθμός των θέσεων προσωπικού ανά κατηγορία και ειδικότητα και η κατανομή τους στις διοικητικές μονάδες της, ο αριθμός των ειδικών επιστημόνων, καθώς και ο αριθμός των θέσεων νομικού συμβούλου, δικηγόρων και ειδικών νομικών συνεργατών, οι οποίοι συνδέονται με το ΕΛ.ΚΕ.Δ. με σχέση έμμισθης εντολής, τα αναγκαία προσόντα, οι όροι πρόσληψης και εργασίας και η βαθμολογική και μισθολογική εξέλιξη των ειδικών επιστημόνων, οι διαδικασίες αξιολόγησης των διευθυντικών στελεχών, καθώς και το πειθαρχικό δίκαιο του προσωπικού και κάθε άλλο σχετικό ζήτημα. Επίσης, θέματα ασφάλειας και διαβάθμισης προσωπικού, προστασίας προσωπικών δεδομένων και απορρήτων πληροφοριών, καθώς και ελέγχου του ΕΛ.ΚΕ.Δ..
Ως την έκδοση του εσωτερικού κανονισμού, τα παραπάνω θέματα ρυθμίζονται με αποφάσεις του Διοικητικού Συμβουλίου του ΕΛ.ΚΕ.Δ.[137]

[137] http://www.opengov.gr/ypes/?p=6799, Ministry of Internal Affairs, Άρθρο 60 – Σύσταση και λειτουργία του ΝΠΙΔ «ΕΛΛΗΝΙΚΟ ΚΕΝΤΡΟ ΔΙΑΣΤΗΜΑΤΟΣ»