

## **Aerospace: the international, European and national environment and interconnection with the Economy / Society**

### **The International Environment**

The field of Aerospace Science and Technology has significant dynamics both within the European Union and globally.

At the same time, the field of Aerospace Science and Technology is experiencing significant development, e.g. in the fields of applied electromagnetism, durability of materials, machine learning, digital signal and image processing, algorithms for processing and visualization of (big) data, design of satellite systems and multispectral detectors, power sources, etc.

In terms of economic conditions of the global space market, in 2017 it increased by 44% with a total investment cycle of 261 billion dollars and parallel construction and launch of 144 satellites. According to data provided by the Global Satellite Industry Association, this cycle amounted to 350 billion US dollars in 2018 and is expected to exceed 1.1 trillion in 2040.

At the same time, the satellite manufacturing industry recorded a record increase of 77% in 2017 worldwide, with areas covering the greatest interest of investors in space being commercial communications 35%, Earth observation services 19%, Government services 14% and research and development 12%. The remaining percentage is shared almost equally between navigation, shipping, meteorology, space observation and research in general.

### **The European Environment**

In the European Union, the Galileo (for navigation) and Copernicus (for Earth observation) programs in conjunction with the European Space Agency's new generation of satellites and the European Union (EU) long-term strategy in the field of aerospace, have developed a reference framework that offers major opportunities for research and innovation

According to the text of the Space Strategy for Europe (2016), key objectives of the EU aerospace strategy, are:

The full utilization of space for the benefit of our society and economy with emphasis on:

- the extensive use of space (satellite) data by the public and private sectors,
- additional services to help achieve the objectives of common European priorities, such as security and defense, as well as the fight against climate change,
- promoting the use of Galileo in mobile devices and critical infrastructure,
- enhancing connectivity, especially in remote areas, through advanced satellite telecommunications systems,
- to facilitate innovative businesses to develop services and applications

- Promoting a competitive and innovative European space sector, with emphasis:

- boosting innovation,
- the emergence of new business models,
- promoting more private investment for start-ups, in particular in the context of the Europe Investment Plan and the venture capital fund,
- supporting European industrial space hubs and cooperative formations in European regions.

- Maintaining Europe's strategic autonomy and strengthening its international role in space with an emphasis on:

- autonomous access and use of space for the implementation of industry and business policies, as well as for the security, defense and strategic autonomy of the EU. ,
- autonomy in government satellite communications (GovSatCom), in order to ensure the provision of reliable, secure and cost-effective satellite communications services for the EU. and national public authorities,
- protecting vital space infrastructure from space debris, space weather and cyber attacks.

In particular, the EU has committed the amount of 16 billion euros for the period 2021-2027 according to the following distribution:

- € 9.7 billion for EU navigation systems, essentially the Galileo and EGNOS programs. This financing line seeks to continue the necessary investments for the completion and maintenance of the satellite cluster, the development of an enhanced and geographically accurate signal and the commercial utilization of satellite navigation services for the benefit of the Internet of Things, the smart mobile devices, traffic management and automated standalone support mainly in the transport sector.
- 5.8 billion euros for the EU Earth Observation Program, essentially the Copernicus program. This funding line seeks to strengthen environmental monitoring as well as emergency management (eg extreme weather events) and to support border and maritime security. Additionally, new Copernicus missions such as that for monitoring the concentration of CO<sub>2</sub> in the atmosphere, will allow the EU to remain in the forefront of the effort to tackle climate change, in line with the commitments made under the Paris Agreement. In the same context, the Copernicus Data and Information Access Services (DIAS) system will more effectively support small and medium-sized enterprises to leverage Copernicus data for innovative applications.
- 0.5 billion euros for the development of new security systems, e.g. Governmental Satellite Communication (GOVSATCOM) which is intended to support Member States in providing reliable access to secure telecommunications systems necessary for border surveillance and support for diplomatic missions and humanitarian operations.

It is also worth noting the strong dimension of the aerospace sector in the EU HORIZON 2020 program, as well as the fact that a number of thematic directions (satellite telecommunications, Earth observation, geospatial data, satellite navigation, etc.) are directly related to the Smart Specialization (RISE) priorities of the NSRF 2021-2027.

Finally, in March 2020 it was announced by the EU, the new 'Connectivity' program which concerns the development of an integrated telecommunications system and internet access with space media / satellites with a budget of 6 billion euros and will include the construction of an array of hundreds of satellites.

## **The national environment**

In Greece, the field of aerospace has shown significant dynamics in recent years with a significant number of public and private sector to demonstrate research, industrial and commercial activities related to aerospace technologies, applications and services. In particular, the following developments are noted:

- Greece participates in the European Space Agency and pays an annual contribution of 30 million euros for mandatory and optional (such as Earth Observation) programs for a period of three years. According to the ESA Regulation, these amounts are reimbursed to the Member State ("industrial return") for supporting projects designed and implemented by public and private sector bodies in Greece. At the same time, the institutions in Greece have the right to participate in the competitive programs of ESA and to claim additional funding. It is pointed out that according to the data of the Industrial Return Committee of ESA, presented in March 2016, in 2015 it was returned to Greece through contracts, 31% more than the amount of the contribution.
- The creation of the Hellenic Space Center ", with the aim of strengthening the national economy, shielding defense, transport security, monitoring the environment and climate change, locating and navigating, supporting telecommunications, support primary production (precision agriculture), the prevention and response to emergencies (eg floods, forest fires, heat waves) for the protection of citizens and the development of services for the modernization of public administration, and the provision of services for society.
- The inclusion in the Recovery and Sustainability Fund and the Program for the development of microsatellites<sup>2</sup> amounting to 200 million euros for the next decade, starting in 2021. The Program, which is a high and immediate priority for the Greek Government and the European Union, utilizes these new funds in order to invest in mature projects in the field of space which can enhance the capacity of the domestic innovation ecosystem (capacity building) and on the other hand leads to a significant increase in the benefit from the use of space technologies to achieve sustainable development (user driven space).
- It is noted that the national program of Microsatellites is an important step in the implementation of the country's strategy for the utilization of aerospace technologies and applications and their integration into the national economy. It includes the development of a range of microsatellites to support search and rescue, border surveillance, national security and civil protection, as well as telecommunications

and geospatial applications for use in areas such as government satellite services, cartography, shipping, precision agriculture, topography and town planning, etc. The construction of the microsatellite system (space and ground part) is expected to increase the capabilities of the Greek high-tech industry.

- The creation of the ecosystem for space and its applications (Si-Cluster) within the collaborative scheme Corallia (Athena Research Center). A significant number of public and private entities are active in this ecosystem, operating in the field of Aerospace in Greece.

Finally, it is worth noting that:

- (a) gradually more and more public bodies in Greece are turning to the utilization of space (essentially satellite) services in the fields of satellite remote sensing (Earth observation), satellite navigation and satellite telecommunications; and
- (b) in Greece every year approximately 28 million euros are invested in space technologies, applications and services, with the Association of Space Technology Industries (EVIDITE) recording a turnover of up to 200 million euros per year in total, through the 42 small and medium enterprises (it is noted that these companies alone, employ about 2000 researchers).

As a result of the above, there is a significant need for specialized personnel with studies in Aerospace Science and Technology, as reflected in the positions of the Ministry of Digital Government, Hellenic Space and Technology Applications Industry (EVIDITE) - ecosystem si-Cl.