

# STRATEGIC AEROSPACE APPROACH IN THE CONTEXT OF SECURITY AND SPACE INDUSTRY

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**Abstract:** *The aerospace, defense, security and space industries are important strategic sectors for the EU, contributing to each country's national security and economic prosperity. These highly productive sectors provide thousands of jobs, delivering sustainable growth in every region and nation of the EU. Creating Romania's strengths in these sectors will help increase productivity across the country and ensure that Romania can become one of the best places in the world to innovate, do business and create jobs. This paper is the result of an analysis of the international literature and seeks to highlight the need to invest in space capabilities to meet national goals: military success and defense strategy, leadership and prestige, resource development and management, and economic growth and diversification. For this, the research method chosen for this study is a qualitative one that involved cross-sectional and longitudinal exploratory studies of the literature. The data collection and interpretation was done in the context in which most states are in the process of defining and / or consolidating aerospace strategies.*

**Keywords:** *space industry; strategy; strategic sectors; national security; economic prosperity.*

## 1. Introduction in the strategic context of the situation at European and international level

Space and the development of associated or derived technologies and services are today recognized as a powerful economic engine by several nations, with the global space economy amounting to € 309 billion in 2017 (*The Space Economy in Figures, 2019*). While government investment was the driving force in the twentieth century (eg the Apollo program, the International Space Station (ISS) and the Global Positioning System (GPS)), business is now setting the pace.

Nations invest in space capabilities to meet national goals, like: military success and defense strategy, leadership and prestige, resource development and management, and economic growth and diversification. Economic growth and diversification are becoming increasingly important. Capturing a larger share of the global space economy is a desirable goal for several reasons. Space is a growing, reliable industry that has proven resilient to economic recessions, including the 2008 global recession.

Based on these realities, several countries have developed or are in the process of developing / updating strategies for the exploitation and use of space for both civilian and military purposes, as follows:

- *Europe – the Space Strategy for Europe*, <https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-2016-705-F1-EN-MAIN.PDF>

- *USA – Defence Space Strategy (2020)*, [https://media.defense.gov/2020/jun/17/2002317391/-1/-1/1/2020\\_defense\\_space\\_strategy\\_summary.pdf](https://media.defense.gov/2020/jun/17/2002317391/-1/-1/1/2020_defense_space_strategy_summary.pdf)

- *UAE – National Space Strategy 2030*, <https://space.gov.ae/Documents/PublicationPDFFiles/2030-National-Strategy-Summary-EN.pdf>

- *Ireland – National Space Strategy for Enterprise 2019-2025*, <https://enterprise.gov.ie/en/Publications/Publication-files/National-Space-Strategy-for-Enterprise-2019-2025.pdf>

- *France - Space defence strategy (2019)*, [https://www.defense.gouv.fr/content/download/574375/9839912/Space%20Defence%20Strategy%202019\\_France.pdf](https://www.defense.gouv.fr/content/download/574375/9839912/Space%20Defence%20Strategy%202019_France.pdf)
- *Denmark – Denmark's national space strategy (2016)*, <https://ufm.dk/en/publications/2016/denmarks-national-space-strategy>
- *Portugalia – Portugal space 2030*, <https://ptspace.pt/space-2030/>

Regarding the development of European space policy, there are two main actors: European Union (EU) represented by the European Commission (EC) and the European Space Agency (ESA). Alongside these two main bodies, there are intergovernmental organizations whose field of interest is more limited / specific, such as European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), European Defense Agency (EDA) and the new European Union Agency for Space Programs (EUSPA), already started the work in January 2021. The strategic decision-making spectrum in the field of space policy in Europe is complemented by the EU and ESA Member States, which have the interest and opportunity to set their own objectives and strategies.

On 6<sup>th</sup> of June 2018, on the basis of the EU Commission's Communication on "A Space Strategy for Europe" (<https://www.consilium.europa.eu/en/policies/eu-space-programme/>), the European Commission presented the new space programme. It aims to ensure the continuity of investment in the EU space activities, to encourage scientific and technical progress and to support the competitiveness and innovation capacity of the European space industry. The new programme will bring together existing infrastructure and services and introduce new features, covering:

- ensuring the continuity and evolution of Galileo and EGNOS, the EU's global and regional satellite navigation systems, as well as Copernicus, the Earth observation program;
- development of new security components: Space Situational Awareness (SSA), government satellite communications (GOVSATCOM);
- encouraging a strong and innovative space industry, by improving access for start-ups and small and medium-sized enterprises (SMEs) to venture capital, testing, certification and standardization facilities;
- maintaining the EU autonomous access to space by aggregating the EU demand for launch services and investments in innovative technologies, such as reusable launchers;
- unification and simplification of the governance system by introducing a single regulation allowing for simplified ways of cooperation between all institutional actors.

In this context, the European Commission, as programme manager, sets priorities and operational decisions and ESA will remain the main partner in implementing the program, while the new EUSPA will support market development and security. As part of the Multiannual Financial Framework 2021-2027 (Horizon Europe), the new space programme will have 16 billion euros: 9.7 billion Galileo and EGNOS, 5.8 billion Copernicus and 0.5 billion for new security components (SA and GOVSATCOM). (EU budget: € 16 billion Space Program to boost EU space leadership beyond, [https://ec.europa.eu/growth/index\\_en](https://ec.europa.eu/growth/index_en)).

Thanks to the EU's Horizon 2020 programme, about 20% of the funds managed by ESA in recent years have come from the EU budget, while the rest is mostly provided by the contribution of ESA Member States. For example, ESA's 2020 budget was 6.68 billion Euros (European Space Agency's 2020 budget up 16.8% over 2019 including final past-due payment from France, <https://www.spaceintelreport.com/>), of which ESA Member States' contributions to mandatory and optional programmes accounted for 70% of funding, the EU contributed 23% and EUMETSAT revenues to 3%. The contributions of the ESA Member States shall, to a greater or lesser extent, be returned to the countries of origin in the form of research / development contracts for space applications and technologies.

## **2. National aerospace strategy of Romania in the new European context of research coordination in the fields of security and space industry**

The security and space industry offers substantial potential for economic development through the use of space data and space services, artificial intelligence, satellite communications and cybersecurity in the development of new technologies, which could also have a crucial impact on the economic environment, outside the field of security and space industry.

Another important issue at the national level is the strengthening of national security and research and development for national military bodies. Digitization, the development of disruptive technologies and the implementation of 5G will change the approach to the development of industrial solutions, services and technologies and will require the realisation of strategic public-private partnerships for the implementation of development strategies in the field of IT, space and security. Space technologies, satellite communications and artificial intelligence could also help address global challenges, such as:

- climate change;
- environment protection;
- transport (road, rail and sea);
- health and logistics;
- security and protection of critical infrastructures.

The implementation of a research strategy in the fields of security and space industry can create a huge development potential not only for security and production organizations through the use of space data and artificial intelligence services, but also for:

- public authorities capable of optimizing their work processes;
- business environment, by streamlining the production and distribution process;
- environment, by reducing the ecological footprint of public authorities and the business environment;
- society as a whole.

In this sense, research in the fields of security and space industry is becoming an increasingly important catalyst for technological development and innovation in general. With regard to cyber security, should be mentioned recent security events, such as targeted attacks on various states, public and private institutions, and critical infrastructure. Recently, there have been countless cyber-attacks, initiated by groups of anonymous hackers who benefit from strong funding, on some states in which presidential elections were coming, on some public institutions (hospitals, airports, research institutes), on some institutions. Private (banks, large innovative companies), or on critical infrastructures (national energy distribution systems, transport, utilities). Cybercrime is on an upward trend, with more and more local groups specializing in illicit activities in this area – compromise of ATMs and POS; card cloning; unauthorized access to computer systems, illegal interception of computer data, posting fictitious ads on heavily accessed commercial sites, infecting computer systems with ransomware, taking control of computer resources for mining virtual currencies, but also the use or exploitation of cryptocurrencies for illicit operations in the economic area. According to the National Defence Strategy for the period 2020-2024, Romania is a promoter and actor involved in sustainable international partnerships, a pole of regional stability; being a member of NATO and the EU, our country is a state resilient to threats, which ensures security and prosperity for its citizens, but is also a pole of regional stability. The exponential trend of developing emerging technologies (5G, artificial intelligence, big data, Internet of Things, cloud and smart computing) generates, on one hand, the need to increase and improve communications that will support innovative digital services designed for citizens and the business environment and, on the other hand, the need to collect and secure the data and

information circulated in the respective systems. In order to increase cyber security, public-private partnerships have been concluded with the aim of increasing cyber defense and security incident response capabilities.

The aerospace, defense, security and space industries are important strategic sectors for the EU, contributing to each country's national security and economic prosperity. These highly productive sectors provide thousands of jobs, delivering sustainable growth in every region and nation of the EU. The strengthen of Romania's power in these sectors will contribute to the country's economic growth and to the increase of the national capacity to innovate, do business and create jobs. From the perspective of the author of this study, the National aerospace strategy of Romania in the new European context of research coordination in the fields of security and space industry should have as general objectives the following:

- Identifying national research priorities and competences in the fields of security and space industry related to European research policies in these fields (DG Defense Industry and Space; European Space Agency; DG Research and Innovation; DG Communications Networks, Content and Technology; European Defense Agency etc.);

- Elaboration of the national strategy in the fields of security and space industry for the new strategic planning cycle (2021-2027);

- Defining, promoting and supporting the implementation (identification of funding sources / instruments, expertise, etc.) of research topics of national interest;

- Integration of national policies and activities in the fields of security and space industry in the evolving international context.

*Specific objectives:*

- Identifying national research competencies in the fields of security and space industry;

- Defining national research priorities in the fields of security and space industry (objectives);

- Defining research topics of national interest;

- Promoting and supporting research topics of national interest (identifying funding sources / instruments, providing expertise, etc.).

### **3. Discussions and proposals regarding the scientific and technical implementation of the draft strategy**

The research strategy in the fields of security and space industry should be prepared by an inter-agency working group involving academic, public and private partners with responsibilities related to security, space, artificial intelligence and cybersecurity. The security and space industry research strategy sets the short, medium and long-term direction for the security and space sector and aims to help academic researchers and research institutes, businesses and public authorities to harness the sector's potential.

The research strategy in the fields of security and space industry should take into account:

- exploiting and creating opportunities and applications for businesses, researchers and authorities;

- public in the security, space and space sector in the short, medium and long term;

- exploitation of the common European space infrastructure (Galileo and Copernicus), including through integration in the national infrastructure for data positioning;

- exploiting European cooperation in space (ESA and EUMETSAT);

- increasing the degree of cooperation and coordination between EU Member States and Romanian actors (bilateral cooperation);

- raising the level of awareness of the advantages, costs, dangers involved in adopting new technologies;
- analysis and development of the legislative framework in the field of security and space industry;
- identification of funding sources/instruments for the implementation of new solutions.

#### *4.1. Proposal regarding the strategy implementation scheme:*

ROSA has not yet officially presented its aerospace strategy. The scheme for implementing the national strategy in the new European context of research coordination in the fields of security and space industry can be outlined, from the author's point of view, in two stages, on three distinct work packages:

- Stage I: Identify national research priorities and competences in the fields of security and space industry related to European research policies in these fields (DG Defense Industry and Space; European Space Agency; DG Research and Innovation; DG Communications Networks, Content and Technology; European Defense Agency etc.
- Stage II: Development of strategy and priority research topics in the fields of security and space industry.
  - ✓ Elaboration of the national strategy in the fields of the security and space industry for the new strategic planning cycle;
  - ✓ Defining, promoting and supporting the implementation (identification of funding sources / tools, expertise, etc.) of research topics of national interest;
  - ✓ Integration of national policies and activities in the fields of security and space industry in the evolving international context.

#### *4.2 Work packages*

*Work package no. 1: Analysis of the current situation Identify national research competencies in the fields of security and space industry in this activity:*

- the Romanian institutions with research and development activities in the fields of security and space will be inventoried;
- scientific publications with Romanian authors in the fields of security and space will be analyzed;
- key players in the security and space sector in Romania will be identified, including through the use of specific databases, including EMITS and others;
- interviews will be conducted with representatives of the identified key actors, in order to collect from them additional information regarding the national research competences in the target field.

Identify specific tools to support and increase national research skills in the fields of security and space industry. This activity will analyze the legislative, financial and technological framework that provides specific tools to support and increase national competences in the target field.

It should be analyzed at least:

- National Plan for Research, Development, Innovation;
- Sectoral plans of public authorities;
- Structural funding programs (European);
- Funding programs of the European Commission and other European bodies, including the European Space Agency;
- Relevant technological and research infrastructures;

- Relevant private investment. Other specific tools to support and increase national skills in the target area will be inventoried and identified.

*Work package no. 2: Establishing the vision Identifying / defining national research priorities in the fields of security and space industry related to European research policies in these fields.*

The work should start by analyzing the reference documents on European policies in the target field, including: European Space Technology Master Plan, GovSatCom program, Galileo program, Copernicus program, SSA program and critical infrastructures. National research priorities in the target areas of other European or internationally relevant countries will also be analyzed.

The activity will continue by interviewing:

- representatives of relevant European actors, such as: DG Defense Industry and Space; European Space Agency; DG Research and Innovation; DG Communications Networks, Content and Technology; European Defense Agency etc...;
- some representatives of key actors in the security and space sector, which will include research organizations, companies and public authorities. Based on the information collected, national research priorities in the target area need to be identified and defined.

*Work package no. 3: Research topics Defining research topics of national interest in the fields of security and space.*

The activity should start with:

- inventory of the size of the security and space sector in Romania (research organizations, industry, public authorities) from the perspective of revenues and number of employees;
- inventory of current and future needs of public authorities and the private sector of products, services and data in the security and space sector;
- identification of the strengths of the Romanian industry in the security sector, space and similar fields;
- assessing the consequences of various scenarios of development or stagnation of national research and development and innovation capacity in various areas of the target area.

## **Conclusions**

The impact of the results of the implementation of the strategy in the new European context of research coordination in the fields of security and space industry from an economic and social point of view in the medium and long term is estimated to increase the competitiveness of the Romanian economy through innovation in the field of space and security, to stimulate RDI activities in the field of space and security, both within research organizations and in the private sector, and to strengthen national security.

The results of the project activities can be the basis of security and aerospace defense solutions implemented at national and European level, which can generate a significant number of jobs in the field of defense industry mainly, but also in that of adjacent industries (information technology, communications infrastructure, various service providers, etc.);

Increasing security in the Pan-European area, as a synergistic effect of the project results and other activities with similar/complementary objectives carried out by third parties, will contribute to ensuring a stable economic and social climate, economic and social development and improving living standards of the population of European states.

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