

# ROMANIAN PUBLIC-FUNDED RESEARCH AND DEVELOPMENT ACTIVITIES IN THE SPACE SECTOR

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**Abstract:** Romania achieved full membership within ESA (European Space Agency) in 2011 and is actually involved in several European flagship space programmes. The “National Strategy for Space and Related Fields” is a strategic project funded through the Romanian Space Technology and Advanced Research Program (STAR), which is implemented by a consortium coordinated by IAROM S.A. One of the project goals is to identify national space-related technological capabilities and possible niches for Romania within the European space industry, as well as to identify cooperation opportunities within the mandatory and optional ESA programs. This paper presents an overview of the areas of expertise covered by projects contracted in 2012 and 2013 in the framework of the national space research and development programme. The paper does not cover industrial space contracts since they contain sensitive information.

Keywords: national strategy, space sector, Romania, ESA

## 1. Introduction

Romania became ESA’s 19<sup>th</sup> Member State on 22 December 2011. This has led to a step-by-step integration within ESA programmes and projects. As part of this ongoing process, ROSA has developed five support tools generally called strategic projects.

The “National Strategy for Space and Related Fields - SNDS” is one of the strategic projects, which is jointly implemented by IAROM, SPASTO CONSULTING and BITNET CCSS [1]. The project’s mission is to support the participation of Romanian organizations into mandatory and optional ESA programmes, including pre-qualification activities and adaptation to the ESA requirements [2]. This can be achieved by developing a medium to long-term strategy which will define the main objectives and directions that must be pursued for a sustainable development of the Romania’s space sector.

## 2. Analysis of contracted R&D space projects in 2012 and 2013

The purpose of this analysis was to identify existing or potential national space-related competences. The results presented in this paper covers public-funded research and development space projects contracted in 2012 and 2013 within the framework of two national public-funded programs: “STAR” and “Partnerships in Priority S&T Domains”. The paper does not cover space contracts concluded by Romanian organizations with ESA and the European space industry since they contain sensitive information.

## 3. Evaluation methodology

Relevant information for our analysis has been extracted from the following sources:

- ✓ Public information (project websites, presentations during Romanian Space Week Conferences and similar events);
- ✓ Documents made available by Romanian organizations involved in

space activities to the SNDS project consortium;

- ✓ Informal discussions held with representatives from various research and industry entities (during workshops, ESA-Romania meetings, etc.)

For each identified space project, collected information has been organized using a synthetic sheet which contains the following information: project title, funding program, the coordinating organization and partners, brief description of the project objectives and estimated results, project's domain of expertise according to ESA programmes.

### 3.1 Statistical analysis results

We have identified and analysed a total number of 123 space projects. 108 projects have been funded through the

STAR programme C1 (2012) and C2 (2013) competitions which are coordinated by ROSA (Romanian Space Agency). From these 108 projects:

- ✓ 96 of them are RDI (Research, Development and Innovation) projects;
- ✓ 7 of them are CCTS (Competence Centre in Space Technologies) projects;
- ✓ 5 of them are strategic projects.

Other 15 projects have been funded through the PCCA (Collaborative Projects on Applied Research) programme competitions which are coordinated by UEFISCDI (Executive Unit for Financing Higher Education, Research, Development and Innovation).

Table 1 presents information regarding the classification of the identified projects according to ESA programmes [3].

*Table 1. Public-funded projects classification*

No.	ESA space programmes	2012	2013	TOTAL
1	Science / Robotic exploration	7	4	11
2	Earth observation (including GMES)	12	12	24
3	Telecommunication and integrated applications (ARTES)	1	1	2
4	Navigation (GNSS and Galileo)	0	0	0
5	Human Space Flight	0	1	1
6	Launchers	6	2	8
7	Space Situational Awareness (SSA)	3	2	5
8	Development and operation of micro-satellite missions	3	2	5
9	Development of technologies, system, sensors and equipment for space applications	22	34	56
10	Other	6	5	11
<i>TOTAL</i>		60	63	123

Fig. 1 and Fig. 2 present a comparative analysis of space projects funded in 2012 and 2013. These figures clearly illustrate a pragmatic overview of the existing competences and interests among national organizations.

Several conclusions can be drawn from this statistical analysis.

- ✓ 65% of the total number of funded projects is related to the following domains: Earth Observation (20%) and Development of technologies, systems,

sensors and equipment for space applications (45%).

- ✓ There are no funded projects related to Navigation (GNSS and Galileo). To some extent, the situation is the same on Telecommunication and Human space flight fields, having identified a total of 3 funded projects.
- ✓ 11 projects have been identified in the Science field, but there is no project in the field of Robotic exploration.

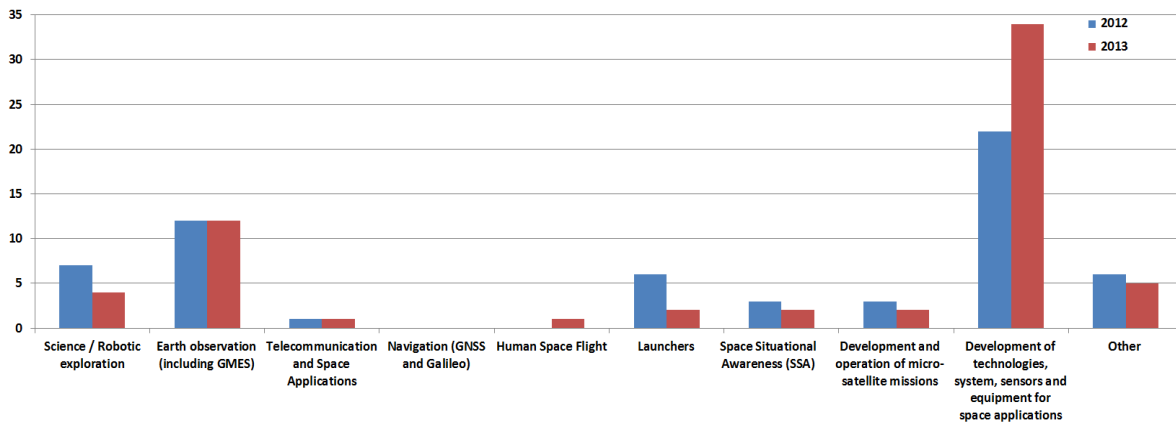


Figure 1: Classification of contracted space projects according to ESA programmes. Comparative analysis for 2012 and 2013

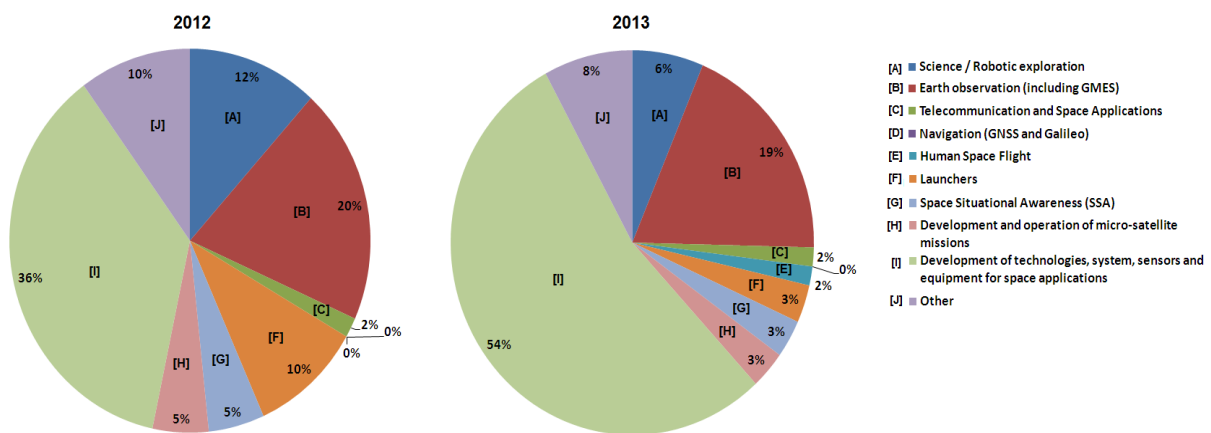


Figure 2: Percentage of funded projects according to ESA programmes. Comparative analysis for 2012 and 2013

Other relevant information extracted from our analysis: 88 national entities have contracted at least one project as prime or sub-contractors (partners), from which:

- ✓ 46 entities (52%) are from the public sector (institutes, universities, agencies, research centers, etc.);
- ✓ 42 entities (48%) are from the private sector (companies including SMEs).

Figure 3 illustrates an analysis of the Romanian entities involved in space contracts (research organizations vs. companies) and their geographical distribution.

The analysis for 2012 and 2013 reveals that:

- ✓ Only 14 (33%) entities from the private sector have had at least one project contracted as prime. The majority of the identified private entities are involved as partners (sub-contractors).

- ✓ 23 projects from the total number of funded projects (18%) in 2012 and 2013 are coordinated by private companies.
- ✓ There is an extreme geographical centralization of the funded project proposals (80% of the project coordinators being from Bucharest and Magurele platform).

Some other outcomes of this analysis are:

- ✓ Lack of project proposals in some space related ESA programs to which Romania is contributing (for instance GNSS and Galileo).
- ✓ Mismatch between Romanian project proposals addressing space technologies and the ESA “Compendium of Potential Generic Technology Activities” [4] (which raises questions about potential space industry niches for Romania).

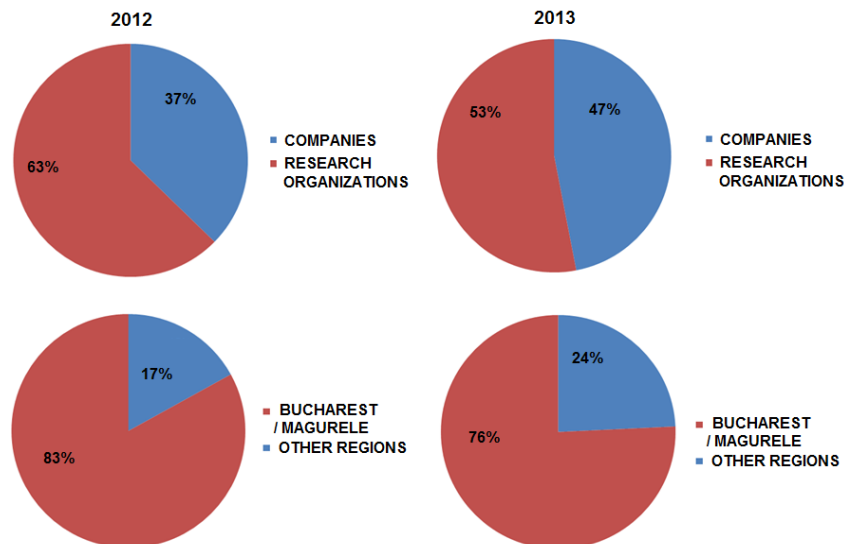


Figure 3: Percentage of participating Romanian entities to the national space programme; Research organization vs. companies. Entities from Bucharest area vs. entities from other regions

#### 4. Conclusions

Romania has potential for developing space related European industrial niches in the field of technology:

- ✓ Software development for various space systems;
- ✓ Development of components, sub-assemblies, structures for small launchers and satellites;
- ✓ Development of scientific instruments/sensors on-board for various space missions;
- ✓ Development of nanosatellites.

Service provision represents another potential niche for the Romanian space industry, mainly regarding:

- ✓ Data processing and applications development in the framework of various space missions (especially in the field of Earth Observation / remote sensing);
- ✓ Observational data provision and processing for different ground-based SSA (Space Situational Awareness) systems. Especially Space Weather and Space Surveillance and Tracking.

#### Acknowledgements

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