TOWARDS A NATIONAL STRATEGY IN SUPPORT OF DEVELOPING ROMANIAN SPACE CAPABILITIES

Nicolae-Mihail TONCEA*, Andrei STAN, Octavian CRISTEA*****

***IAROM, Bucharest, **SPASTO CONSULTING, Bucharest,**
****BITNET CCSS, Cluj-Napoca,**
iarom@xnet.ro , and_stan@yahoo.com , octavian.cristea@bitnet.info

Abstract: *The economic, political, military and security world is rapidly changing, leading nations to increasingly be dependent on capabilities provided by space assets: communications, navigation and timing, weather, missile warning and tracking, Earth observation, etc. Romania became ESA's 19th Member State on 22 December 2011. The ongoing ESA-Romania negotiations, based on mutual interests, identified national know-how and available financial resources, leading to a "step-by-step" integration of Romania into ESA projects and programs. As part of this process, the Romanian Space Agency has developed five support tools, generally called "strategic projects". The "National strategy for space and related fields" is a one of the strategic projects, jointly implemented by IAROM, SPASTO CONSULTING and BITNET CCSS. The main objective of this project is to identify national space related capabilities and cooperation opportunities within ESA programs, including the identification of European space industry niches. Another important objective is to give support to the development of the national space strategy. This paper is focusing on ESA programs and identifies the opportunities which are already open to the Romanian scientists and industry, including security related issues.*

Keywords: space, strategy, Romania, ESA

1. Introduction

The economical, political, military and security world is rapidly changing, leading nations to increasingly be dependent on capabilities provided by space assets: communications, navigation and timing, weather, missile warning and tracking, Earth observation, etc. Space infrastructure is at risk of being damaged or destroyed by natural phenomena, such as solar radiation and asteroids, and by other spacecraft and their debris. It is also under threat from electromagnetic interference, be it intentional or otherwise. [1]

This is the reason for which space assets are actually considered as being "critical infrastructure" and subject of international concern. Just to give an example, in the spring of 2013, a NATO classified specialists meeting had as subject the simulation of "a day without space". [2]

The development of the Romanian space sector cannot be done without taking into account the strategies and policies of the European Space Agency (ESA), European Union (EU) and NATO.

Of special interest for the development of Romanian space research and industry is the participation to ESA programs.

2. Romania – ESA cooperation

Romania became ESA's 19th Member State on 22 December 2011. Romania's cooperation with ESA is long standing. In 1992, Romania was one of the first Eastern European countries to sign a Cooperation Agreement in the field of the peaceful use

of outer space with ESA, paving the way for the Romanian participation in several research projects with other European countries. Cooperation between ESA and Romania was strengthened further in October 1999 with the signing of a five-year Framework Cooperation Agreement, and the signature of the European Cooperating State Agreement in 2006. During this pre-accession period, Romania participated in several ESA missions, such as Cluster, Herschel, Planck, SOHO and in Earth Observation activities, microgravity, exploration and technology activities. [3]

3. ESA objectives and programs

On 21 November 2012, the ESA council meeting at ministerial level decided on the future space programs, with the objective of pushing the frontiers of knowledge, supporting an innovative and competitive Europe and enabling new space-based services. [4] A list of ESA approved programs is presented in Table 1.

Table 1 List of ESA programs approved in 2012

Field	*Programme*
Earth observation	EOEP-4 MetOp-SG GMES space component (GSC) 3
Human space flight & exploration	ISS exploitation phase 2, 2nd BFC ELIPS 4 ISS exploitation – technology demonstrators Mars robotic exploration preparatory programme 2
Launchers	New launch system (NLS) and evolution of Ariane 5 VEGA consolidation and evolution preparation (VECEP) Guiana Space Centre (CSG) funding Programme for reusable in-orbit demonstrator for Europe (PRIDE) Launcher exploitation accompaniment programme (LEAP)
Telecommunications & integrated applications	ARTES strategy (ARTES 1) Core world competitiveness (ARTES 3-4), including Atlas Core telecom technology (ARTES 5.1, 5.2) NEOSAT (ARTES 14) Partner (ARTES 14): ELECTRA GLOBENET (ARTES 7 complement) IRIS (ARTES 10) SAT-IS (ARTES 21) IAP (ARTES 20)
Navigation	European GNSS evolution programme (EGEP)
Space situational awareness	SSA component 1: space surveillance and tracking SSA component 2: space weather and NEOs KuaFu space weather mission
Technology & innovation	GSTP 6 Basic technology research (TRP) ESA technology transfer programme (TTP), including business incubation European components initiative (ECI-InD) Cosmic vision

The three strategic ESA objectives for the next few years are:

3.1 Pushing the frontiers of knowledge

This objective will be achieved through a combination of mandatory activities – ESA's scientific and basic technology programs – and optional activities, such as the Earth Observation Envelope Programme-4 for increased scientific understanding of the Earth, the exploitation of ISS and exploration programs.

3.2 Supporting an innovative and competitive Europe

It involves a public investment complemented through partnerships, mostly with private partners (industry and operators). These partnerships are particularly important in the telecommunications sector, which is the main commercial field of space activities. They are the basis for the development of the next generation platforms Neosat and Partner. In the launcher sector, the main objective is to decide and properly manage its evolution within the next decade. Finally, Europe's edge in world markets will be supported through the Technology Research Programme, the General Support Technology Programme including a Small Mission Initiative, the European Component Initiative for Technology non-Dependence and the Technology Transfer Programme.

3.3 Enabling services

It involves a public investment substantially complemented (at least doubled) through partnerships with Eumetsat and the EU. These investments focus on maximising benefits from satellites to society and the economy, in particular through programs such as MetOp Second Generation in meteorology, Iris and SAT-AIS in satellite communications, the European GNSS Evolution Programme for navigation, and GMES Space Component 3 in the critical field of Earth Observation for environment and security.

4. Towards a national space strategy adapted to ESA requirements

There are important milestones to overcome in order to align the Romanian space sector with the European Space Agency's (ESA) standards and procedures and to achieve a significant level of development and expertise in the industrial and research areas of the space sector in Romania, which will allow the Romanian entities to play a relevant role in ESA programs. In order to enable a solid return of investment in ESA technologies and programs it is very important for the emerging Romanian space industry and space community to have a strategy and the technical capabilities to absorb the investment put forward.

As part of this process, the Romanian Space Agency (ROSA) has contracted consulting services for five support tools, generally called "strategic projects". [5]

5. Description of the national strategy for space and related fields project

The "National strategy for space and related fields" is a one of the strategic projects and it is jointly implemented by IAROM, SPASTO CONSULTING and BITNET CCSS.

The mission of this project is to increase the competitiveness of research, industrial and academic entities for participation in the European space activities through a competitive strategy of excellence able to define the directions and development objectives on the medium and long term that may decisively cause the participation of Romanian entities in activities and applications in the mandatory and optional programs, including prequalification activities and adaptation to the ESA requirements. The development of a realistic and coherent strategy, harmonized with the European space strategy and policy, will provide to all involved entities a pragmatic strategy document that will lead to the creation of scientific, technological and industrial niches at national and European level in the field of space, and to identification of projects / activities for Romanian entities participation in the ESA programs, and to the exploitation of opportunities created by the accession of Romania in the ESA and

the EU integration.

The strategy may be the core of the strengthening and the sustainable development of the Romanian space field on medium and long term, at least in two of its major components: vector of scientific - technological - industrial leading progress and the strategic importance of the area.

The project activities are broken down in several work packages (WPs) covering the following topics:

a) Analysis of the European space strategy and space policy as instruments in the service of internal and external policies of the EU and its social, economic and strategic imperatives, in order to identify significant milestones in the Romanian space strategy development.

b) Identification and/or evaluation of Romanian entities working in the field of space and having R&D, industrial or training capabilities (or development potential) for participation in mandatory and optional ESA programs.

c) Identification and/or evaluation of the Romanian entities working in the field of aeronautics and security, having potential for space related products or services development.

d) Assessment of industrial niches at national and European level in the space area, harmonization with the Technology Master Plan, Technology Readiness Level and the forecast on IPR for increasing the contribution of the Romanian entities to ESA programs.

e) Defining medium and long term strategic objectives and action plans supporting the Romanian entities participation in the ESA flagship programs.

f) Shaping a national strategy for space and related fields taking into account existing and possible future instruments for its implementation.

The expected project results are the following:

- increasing the adaptation of the entities from research, industry, operators and the Romanian scientific community to the ESA requirements;
- extending the Romanian participation in projects / activities within the framework of mandatory and optional ESA programs;
- identifying the space related scientific, technological and industrial niches for Romania within the European space industry;
- supporting the establishment of new Romanian companies working in space related field;
- providing leading trained specialists in the space field by initiating and conducting multidisciplinary educational and demonstrative activities;
- increasing turnover, exports, labour productivity, value added and profitability of the Romanian companies involved in ESA programs;
- supporting the Romanian delegates at ESA.

6. Implementation tools

Actually, the national space strategy is implemented using the following tools:

- ✓ Romania: Space & Security priority within the "Partnerships in priority S&T domains" Programme [6];
- ✓ Romania: Space Technology and Advanced Research Programme [5], having two components:
  - Research and development projects;
  - Strategic projects.
- ✓ ESA: Outline proposals under the Romanian industry incentive scheme [7];
- ✓ ESA: other procurements (not under the incentive scheme) open to the Romanian entities [7].

7. Conclusions

Of special interest for the development of the Romanian space research and industry is the participation to ESA programs.

There are important milestones to overcome in order to align the Romanian space sector with the European Space Agency's (ESA) standards and procedures.

The "National strategy for space and related fields" is one of the projects supporting the Romanian entities' participation in ESA

programs and activities and the development of a national space strategy adapted to ESA requirements.

Actually, several tools are available for implementing the national space strategy, while others are under consideration.

Acknowledgements

This project is funded through the Romanian Space Technology and Advanced Research Program (STAR), contract no. 4/2012.

References

[1] Communication from the Commission to the Council, The European Parliament, the European Economic and Social Committee and the Committee of the Regions, *Towards a space strategy for the European Union that benefits its citizens*, 2011

[2] NATO STO Specialists Meeting, *NATO Space Capability Preservation: A Day Without Space*, 2013, http://www.cso.nato.int/Detail.asp?ID=6232

[3] http://www.esa.int/About_Us/Welcome_to_ESA/Romania_accedes_to_ESA_Convention

[4] ESA, *Resolution on the role of ESA in sustaining competitiveness and growth in Europe*, 2012

[5] ROSA, *Space Technology and Advanced Research - Programme for Research, Development and Innovation, approved by Law no. 262/2011 regarding the ratification of the Agreement between Romania and European Space Agency (ESA)*, http://star.rosa.ro/

[6] UEFISCDI, *Joint Applied Research Projects*, http://uefiscdi.gov.ro/articole/2992/Proiecte-colaborative-de-cercetare-aplicativa.html

[7] ESA invitation to tender (ITT) system, http://emits.esa.int/emits/owa/emits.main