5th IAA Conference on Space Systems as Critical Infrastructure

Space and Security

9-10 August, 2016, Mamaia, Romania

Event report
1. **Organisation of the conference**

The 5th IAA Conference on Space Systems as Critical Infrastructure has been jointly organized by the International Academy of Astronautics and the Romanian Space Agency. The event has been steered by the Scientific Program Committee, as follows:

- **Chair** Dr. Marius-Ioan Piso (President and CEO, Romanian Space Agency; Chairman, Trustees Section 4, IAA)
- **Co-chair** Dr. Sergio Camacho (Secretary General CRECTEALC, Mexico)
- **Rapporteur** Dr. Peter Hulsroj (Former Director, European Space Policy Institute)

The Committee has as members the following persons:

- Dr. Jean-Michel Contant (SG IAA)
- Prof. Dr. Adrian Gheorghe (Old Dominion University, Virginia, USA)
- Dr. Peter Jankowitsch (President IAA)
- Dr. Detlef Koschny (SSA Office, ESA)
- Dr. Liviu Muresan (Executive President EURISC)
- Prof. Wolanski Piotr (Poland)
- Dr. Dumitru-Dorin Prunariu (Cosmonaut, Romanian Space Agency)
- Dr. Luca del Monte (European Space Agency)
- Prof. Setsuko Aoki (International Institute of Space Law)

Participation to the event was opened to all decision makers, technical representatives from all organizations interested in understanding the complex interdependencies between space technologies and other critical sectors, as well as academia and the research environment.

The Call for Abstracts was issued in early June, 2016, proposing a list of topics like:

- external threats of space critical infrastructure: space weather, atmosphere, natural cosmic debris, artificial space debris, natural terrestrial debris
- internal threats of space critical infrastructure on: electronic interference, laser attack on satellite sensors destruction, electromagnetic pulse, cyber attacks

The abstracts received by July 29th, 2016, have been reviewed by the appointed Scientific Program Committee and authors have been notified by August, 5th, 2016.

The participants of the 5th IAA Conference on Space Systems as Critical Infrastructure came from institutions like the European Space Agency, DLR - German Aerospace Centre, Centre of Space Technologies Institute of Aviations, Warsaw, Poland as well as the Old Dominion University, Virginia, USA. Romania has been represented by the
Romanian Space Agency, Romanian Parliament - Chamber of Deputies, Sub-committee for Space, Politechnica University of Bucharest, Institute of Space Sciences, National Institute for Lasers, Plasma and Radiation Physics, Military Equipment and Technologies Research Agency, Polytechnic Institute Bucharest and private companies and think-tanks. The conference was attended by more than 30 participants from 5 countries.

1.1. Objectives

Space systems have become key enablers for a wide variety of commercial, scientific and military applications. The rapid growth of their capabilities has offset some of the size of the required investment and new developments promise an even greater reduction in the cost of space infrastructure. As such, some of the extant space systems have become deeply embedded in the functioning of advanced societies, supporting economies, lifestyles and governance processes. The increasing dependence on certain space systems places them firmly in the area of critical infrastructure, whose disruption or destruction would generate lasting damage. This inclusion into critical infrastructure theory is even more warranted as space systems have become a technological backbone for existing recognized critical infrastructures, such as energy, transportation, administration and others. The reliance of infrastructure systems-of-systems on space based command, coordination and control capabilities during normal functioning, but especially during emergency and crisis situation management processes, means that space systems fulfil the requirements for critical status.

1.2. Program

This year’s theme Space and Security was selected due to the increasing importance of space security and encompasses two elements: a. security in space and b. security from space. In relation to “security in space”, there is an increasing demand of space missions and applications with implications stemming from space debris which are not yet fully assessed. The planned construction and soon operation of Mega constellations would mean a “step increase” in the use of the Low Earth Orbit region. In relation to “security from space”, space technologies and applications can be used as a tool to assist decision and policy makers in developing, implementing and monitoring a number of policy areas (e.g. border control, security and defence, disaster management, migration, food production, maritime, energy). The current regulatory framework is lagging behind the space technological development, market and societal demands.

This year, Romania holds, for the second time, the rotatory Presidency of the European Interparliamentary Space Conference (EISC), that has currently 11 full members, all Member States of ESA, namely Belgium, Czech Republic, Estonia, France, Germany, Italy, Luxembourg, Poland, Romania, Spain, United Kingdom. A preparatory workshop on Space and Security already took place this April in Sinaia, Romania, and the 18th Plenary of the European Interparliamentary Space Conference (EISC), that will take place between 3 and 4 October in Bucharest, at the Palace of the Parliament where participants will debate the possible scenarios for the European future involvement, in securing space exploration and preserving the Earth environments, particularly on
security for a better development of an efficient European space policy and on promoting regulatory framework in line with market reality and emerging issues.

The program has included more than 15 talks in almost two days of conference. The oral presentations have been divided into three sessions: I Global views, II. Current topics, III. New technologies. Each session has been moderated by an expert in the field and comprised a number of 5 research papers. Each session finished with a session of Q&A. The debates have resumed the second day with a round table on achieving resilience of SCIs.
- Cybersecurity of Critical Space Infrastructure - Luca del Monte, Industry, Procurement and Legal Directorate, European Space Agency (ESA)
- Current and Future Threats for Critical Space Infrastructure Protection Marius Opran, Romanian Space Agency (ROSA)
- Towards a resilient governance system framework for space critical infrastructures- Adrian Gheorghe, Old Dominion University, USA
- Towards a space reliant paradigm for crisis and emergency situation management, Alexandru Georgescu, EURISC Foundation
- Discussions. Q&A

12:40-14:00 Working Lunch – Restaurant H. Zenith

14:00-15:45 Session 2 Current topics
Moderator: Adrian Gheorghe

- EO Data for Monitoring the Green Infrastructure - Alexandru Badea, ROSA
- Future space communication infrastructure dedicated to security of European citizens. GOVSATCOM initiatives - Mircea Cernat, ROSA
- **Present and Perspectives in GNSS Back-up Strategies** - Alexandru Rusu-Casandra, Politehnica University of Bucharest, Romania, Vlad Gabriel Olteanu, Romanian Space Agency, Romania

- **Space Weather phenomena and their effects on Critical Infrastructure** – Alexandru Georgescu, EURISC Foundation

- **An overview of the Space Debris threat to Critical Space Infrastructures** – Stefan Popa, Stefan Arseni, Military Equipment and Technologies Research Agency (METRA)

- Discussions Q&A

**15:45-17:30 Session 3 New technologies**

Moderator: Dumitru Dorin Prunariu

- **Rocket Technology and Critical Space Infrastructure as a possibility for Polish-Romanian Cooperation** - Adam Okninski, Leszek Loroch, Piotr Wolanski, Center of Space Technologies, Institute of Aviation, Warsaw, Poland

- **Thermal fatigue effects upon spatial components** - Tudor Prisecaru, Politehnica University of Bucharest

- **High Power Lasers for Space Applications** - Mihai Ganciu, National Institute for Laser, Plasma and Radiation Physics INFLPR

- **Emulation of the Jovian Radiation environment by using PW lasers** - Bogdan Mihalcea, INFLPR

- **Quantum based techniques for space: a paradigm shift** - Mihai Datcu, German Aerospace Center DLR

- Discussions Q&A

19:30 Dinner and networking event, Restaurant H. Zenith

---

**Wednesday 10 August 2016**

**09:30- 12:00 Round Table**

Panelists: Marius-Ioan Piso, Adrian Gheorghe, Luca del Monte, Dumitru Dorin Prunariu, Valerian Vreme

**12:30-14:00 Lunch - Restaurant H. Zenith**
3.2. Conclusions

The aim was to provide an overview of current initiatives, an update on the implementation and adherence to existing regulatory framework and instruments and a view of the way ahead to the security, safety and sustainability of space activities.

In particular, the conference addressed and discussed the present issues of space security, as a result of the current challenges and its impact on the present and future space activities.