IAA Study Group Status Report

Responsible Commission: Commission 5

Study Number and Title: 5.13 Space Systems as Critical Infrastructure

Short Study Description (repeat from Study Group Proposal):

The study aims to elaborate a qualitative and quantitative assessment of the degree of criticality of space systems as essential infrastructures for the Earth civilization, respectively to:

- estimate the critical dependence of basic Earth activities, as basic infrastructures and life, on the functioning of space systems;
- evaluate vulnerabilities of space systems against natural and human-made threats
- generate the quantitative approach to produce recommendations for space agencies and political stakeholders regarding the actual utilization and future needs of space critical systems.

The intermediate goals are to:

- correlate parts from issues as near Earth objects (NEO), space debris, nuclear sources in space, long term threatening Earth and out of Earth factors, disaster and crisis management
- generate substance for legal instruments and policy guidelines
- create multidisciplinary issues as base for next studies

Progress in past six months:

The study is in line with the CRITSYS project, conducted by the Romanian Space Agency (ROSA), the European Institute for Risk, Security and Communication Management (EURISC) and the Military Equipment and Technologies Research Agency (METRA), developed in the framework of the National Plan for Research, Development and Innovation 2007 – 2013 – Partnership Program, and with the European Space Agency program on Space Situational Awareness (SSA).

The kick-off meeting took place within the framework of the 1st conference on Space Systems as Critical Infrastructure in September 2012, and looked at how economies, health, ecology and governments would be affected by satellites shutdown, and what would be the financial and legal consequences. The second edition of the conference inquired the extent of humankind's dependency on satellites to support nations' most vital infrastructures as well as to sustain the modern and mobile lifestyles. The participants included experts in space systems and critical infrastructures from specialized institutions in Romania as well as from Germany, Italy and Poland. The third edition8 of Space Systems as Critical Infrastructure took place in August 2014 and addressed the issue of dependency of ground-based systems and infrastructures on the well-functioning of space systems. With this occasion, it has been addressed the European

dimension of outer space infrastructures, as well as the unique Romanian contribution to the fund of European knowledge on space and security. Finally, the fourth conference on Space Systems as Critical Infrastructure represents the last one of this series and took place in August 2015. It addressed the issue of new threats and trends and benefited from the participation of various national and international entities, policy makers, industry and researchers. A full report of the event has been already sent to IAA in early September 2015.

The 4th IAA conference on Space Systems as Critical Infrastructure in August 2015 benefited from the participation of notable scientific figures from institutions such as the European Space Agency, DLR – German Aerospace Centre, Observatoire de Paris, and Polish Academy of Science as well as the Old Dominion University, Virginia, USA. Romania has been represented by the Romanian Space Agency, 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.

Following the research done for the CRITSYS project and the materials gathered from the four conferences in Mamaia, a report will be delivered by February 1st, 2016. This study aims at delivering a comprehensive report on the state of the art of the space critical infrastructures as well as recommendations with regards to the goals mentioned above. The materials gathered over the past two years have been analyzed and divided according to the following framework:

- The first stage of the project established that space systems are key components for a wide range of applications that ensure a proper functioning of social, economic and politic mechanisms. Therefore, the first part of the project deepened the complex interrelationships between the space, ground and administrative segments of space critical infrastructures.

- The second stage identified the interdependencies between a number of critical infrastructures (e.g. energy, transport, ICT, health, financial) and space infrastructures. A number of integrated applications such as in the field of farming and nuclear applications have been assessed.

- The third stage attempted to tackle the legal issues with regards to space critical infrastructures. Despite of the fact that space law is currently developing by widening its scope to address critical space situations, the lack of a unique legal frame slows down space activities.

- Finally, the last phase assesses risks and vulnerabilities and the need to create a common way to assess the risks and vulnerabilities in all selected areas of critical infrastructures such as industry, agriculture, finance, political environment, and human welfare.

The suggested report is structured into six chapters, which will be delivered according to the schedule below:

Activity	Details	Time schedule
First draft		15 December 2015
	Chapter 1: Introduction	15 December 2015
	Chapter 2: Classification of Space Critical Infrastructures (Space Segment, Ground Segment, Others)	15 October 2015
	Chapter 3: Dependencies (Space weather, NEOs, Space Debris, Meteorology, Critical Communications, GNSS, Integrated applications)	1 November 2015
	Chapter 4: Legal issues	15 November 2015
	Chapter 5: Risks and vulnerabilities (Evaluation, Areas of dependencies)	
	Chapter 6: Conclusions	1 December 2015
Revision of the first draft		15 December 2015 – 20 January 2016
Incorporation of the comments received		20 January 2016 – 1 February 2016
Delivery of the report		1 February 2016

Website Study Information update: (please give any update regarding Study Group Membership, documents, Study Plan and Schedule):

Issues requiring resolution? (Recommend approach): n/a

Product Deliveries on Schedule? (If modified explain rationale): yes

Study Team Member Changes? (List any Study Team Members that you wish to discontinue, and provide names plus contact coordinates of any Members you wish to add on the second page of this Study Update form.) Note: Complete contact information including email, tel. and fax must be provided for all additions. Only Members with complete contact information will be listed and receive formal appointment letters from the IAA Secretariat.)

Add Member: Ulpia Elena Botezatu (research fellow, details below)

Name of person providing Study Group Status (Study Group Chair or Co-Chair):
Marius-Ioan Piso - President and CEO, Romanian Space Agency

Status Report Date: 30. 09. 2015

Study Team Membership Changes
Effectivity Date: 01. 06. 2015

Discontinue: n/a
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