

IAA Study Group Status Report

The IAA Study Group benefited from the participation of notable scientific figures, such as Prof. Dr. Adrian Gheorghe, the Batten Chair of Engineering at Old Dominion University, in Norfolk, Virginia, USA, and Dr. Liviu Mureşan, Executive President of the European Institute for Risk, Security and Communication Management. Their expertise in the field of system-of-systems engineering and risk governance was invaluable in framing the discussion regarding the potential impact on human civilization of the disruption in the functioning of critical space systems. Also present and with notable inputs were IAA members, Maj. Gen. (ret.) Dr. Dumitru Dorin Prunariu and Dr. Piotr Wolanski from the Warsaw Institute of Aviation. Dr. Prunariu brought with him valuable experience as the former Chairman of the United Nations Committee on the Peaceful Uses of Outer Space. The discussions centered on a global perspective of cascading disruptions to services such as communications, positioning, timing and so on, with immediate impact on the normal operation of numerous ground-based infrastructures such as energy production, transportation and shipping, and finally affecting human systems such as healthcare, education and administration. The picture painted was that of human civilization prospering on the basis of interdependencies which augmented innate vulnerabilities in systems and created new ones. The need for global risk governance and critical infrastructure protection, especially with regard to space systems, was adequately stressed. Also noted were the potential impact of space based threats – such as asteroid impacts and space weather phenomena. The presence of accomplished researchers in various fields and of other junior researchers allowed a pooling of ideas and research experience that helped fulfill the goal of this phase of the IAA Study Group.

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 Romanian project CRITSYS, 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 – Partnerships Program, and with the European Space Agency program on Space Situational Awareness (SSA).

The kick-off meeting entitled the 1st IAA Conference on Space Systems as Critical Infrastructure took place on the 6th and 7th of September in Mamaia, Romania. The 2nd IAA Conference on Space Systems as Critical Infrastructure is aimed to take place between the 29th and 30th of August 2013 in Mamaia, Romania.

The first phase of the project defined, identified and classified the space critical infrastructure, ranked the SCI upon effects on CI, established quantitative and qualitative criteria and parameters to define the criticality of infrastructure and revealed the global and national/entity effects of SCI malfunction and destruction.

The second phase of the project ends on September 30th and involves a mapping of the interconnections between space systems and various terrestrial critical infrastructures, as defined in European legislation, such as health, finance, water supply, food supply, ICT and energy. This is especially relevant to the activity of the study group, as it highlights the most likely pathways of disruption of normal human activity that may pose a significant threat to human civilization. Moreover, the results of the project are of use to security experts and decision makers in a practical sense.

The project resulted in a series of articles in noteworthy Romanian publications and, in the near future, prestigious international publications, such as the International Journal of System of Systems Engineering.

Website Study Information up to date? (Study Group Membership, Study Plan and Schedule):

-There is no information yet on the website.

Issues requiring resolution? (recommend approach):

- Establishing appropriate methodologies for measuring the criticality of systems taken into consideration
- Resolution between the need for future space security development and the current state of space assets, which is the baseline for current national and intergovernmental security framework
- Lack of framework for implementation of findings, such as mechanisms for compliance with COPUOS recommendations for technical standards and avoidance of debris creation in LEO
- Lack of security culture among political decision makers regarding critical space infrastructure, possibly impeding efforts for minimizing threats, uncertainties and risks.

- Lack of security coordination and cooperation between the private sector, an increasingly important presence in space for commercial applications, and governmental bodies responsible for security in general, and space in particular – satellite companies should be recognized as critical infrastructure operators within, for instance, the European Programme for Critical Infrastructure Protection, and given the same responsibilities as their counterparts in energy and others.
- Communication issues regarding dissemination of new intelligence and best practices in critical infrastructure protection, including transferring these successfully to space critical infrastructures.
- Lack of appropriate national bodies to promote dissemination of findings – space critical infrastructures affect all countries, including developing ones, but not all of them may have a space agency or proper security personnel at governmental levels to assimilate new information on space security and their interests.
- Definition of scale of potential destruction, with an emphasis on levels which would enable the maintenance of advanced human civilization or quick resumption of developed status

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.)

Name of person providing Study Group Status (Study Group Chair or Co-Chair):
Marius-Ioan Piso

Status Report Date: 26.08.2013

Study Team Membership Changes

Effectivity Date:

Discontinue:

Add: