Registration and Space Situational Awareness

IISL-ECSL Symposium
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April 4th, 2016
Space Situational Awareness

• **Space Situational Awareness (SSA)** is defined as *the comprehensive knowledge of space objects and the ability to track, understand and predict their future location*;

• **Purpose:** to **safeguard space-based systems**, which have become fundamental assets to the sustainable development of every nation;

• Indeed, “**the destruction of even part of space infrastructure can have heavy consequences for the safety of citizens and economic activities**” (BOBRINSKY AND DEL MONTE, 2010);
Major Concerns

A-) Tracking and surveillance of space objects:
   – Increasing population of space debris represents relevant risks of in-orbit collisions and interferences;

B-) Space Weather:
   – Solar storms and explosions of charged particles can damage space objects and power grids on Earth;

C-) Near-Earth Objects:
   – Small natural bodies, attracted by Earth’s gravitational field, producing orbital or terrestrial dangers;

➢ Through a catalog of space objects and relevant events, SSA can provide warning of potential threats;
Relevance

• SSA is critical to the long term sustainability of outer space:
  a) Providing **information** of current space activities and their environmental impact;
  b) Contributing to **efficient and safer** space activities;
  c) Enabling **protection** of valuable satellites and space-based systems;
  d) Increasing **transparency** and favoring the **compliance** of applicable international treaties;
• **Thus, greater awareness of the space environment is imperative to the safe and continuous development of space activities;**
SSA Initiatives

• Growing number of governmental and even non-governmental SSA initiatives, national or regional in scope;

• Relevant examples:
  – USA: US Joint Space Operations Center (JSpOC), operated by the military;
  – Russia: International Scientific Optical Network (ISON), managed by the Russian Academy of Sciences;
  – Europe: Space Situational Awareness Program, by the European Space Agency;
  – Brazil: Embrace Program, by INPE;

• Additionally, relevant SSA bilateral agreements have recently been concluded, covering collaboration, services and, most importantly, data sharing;
SSA and Registration

• International Registration: States and international intergovernmental organizations can contribute to SSA by providing applicable registration at the UN;
  – In accordance with Resolution 1721 B (XVI) and the Registration Convention (1975);
  – UNOOSA publicly disseminates the information (website and UN Official Documents System);

• Identification of space objects, establishing their likely source of origin and applicable Launching State, is of particular importance to SSA initiatives;

• Resolution 62/101, of 2008, recommended initiatives to enhance the practice of international registration;
Current Challenges

- **To assure efficient SSA**, some aspects of current international registration procedure and practice must be considered:
  - Relevant number of space faring nations are **not** parties to the Registration Convention;
  - Many countries **do not maintain national registers** and/or do not make the information publicly available;
  - **Insufficient information** provided internationally;

- In accordance with the UNCOPUOS expert group on Space Debris, Space Operations and Tools to Support Collaborative Space Situational Awareness:

  "The lack of comprehensive information on objects injected into orbit results in a patchy and incomplete picture of what is in orbit and where, and therefore impacts space situational awareness and ultimately safety (...)" (A/AC.105/2014/CRP.14, p. 26).
Concluding Remarks

• Most satellites are operated in orbit without knowledge of the objects around them or the space environment;

• SSA can only be truly effective, surpassing gaps of coverage, through further international cooperation, sharing efforts and capabilities for the common interests of every nation;
  – Technical difficulties in integrating different SSA systems should not be taken for granted;

• The international registry of space objects, managed by UNOOSA, could serve as a cornerstone for a future “system of systems”, integrating SSA initiatives under the United Nations;

• Such possibility should be considered by the UNCOPUOS STSC Working Group on the Long Term Sustainability of Outer Space Activities, and also by this Legal Subcommittee.
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Thank you.

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