

# Registration and Space Situational Awareness



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# 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*;
  - Space Safety & Sustainability Working Group (Space Generation, 2012).
- 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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