SPACE SECURITY INDEX

Committee on the Peaceful Uses of Outer Space

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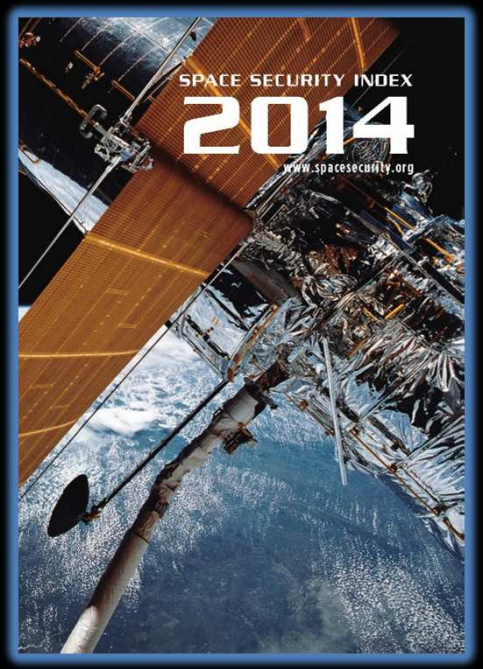
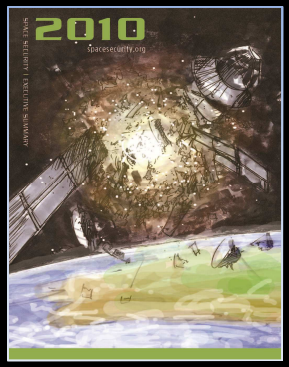
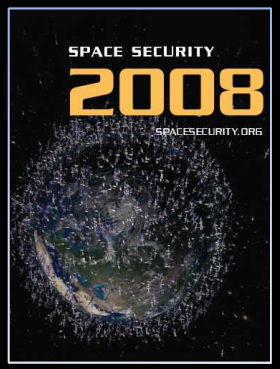
The Space Security Index



- Provides objective and fact-based research to promote ***transparency and confidence*** in space activities
- Supports the development of ***policy*** to ensure secure access to space for all





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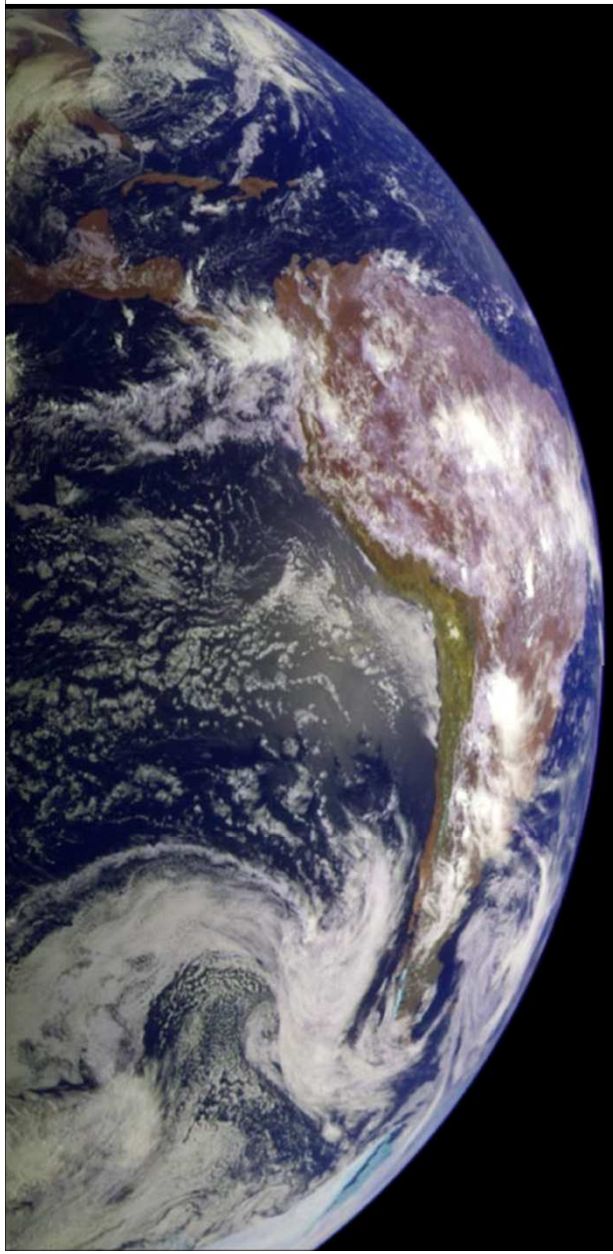
Defining Space Security



"The secure and sustainable access to and use of space, and freedom from space-based threats"

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Space Security Themes

- **Theme 1:** Condition of the space environment
- **Theme 2:** Access to and use of space by various actors
- **Theme 3:** Security of space systems
- **Theme 4:** Outer space policies and governance

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Condition of the space environment

Theme 1: Condition of the space environment

- ***Indicator 1.1:*** *Orbital debris*
- ***Indicator 1.2:*** *Radio frequency (RF) spectrum and orbital positions*
- ***Indicator 1.3:*** *Near-Earth Objects*
- ***Indicator 1.4:*** *Space situational awareness*

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Condition of the Space Environment

- Key challenge: Indiscriminate threat posed by space debris to spacecraft of all nations
- Difficulties inherent in Active Debris Removal
- Awareness of the space debris problem has increased considerably
- Greater willingness to share space situational awareness data through international partnerships

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Access to and use of space by various actors

Theme 2: Access to and use of space by various actors

- ***Indicator 2.1:*** *Space-based global utilities*
- ***Indicator 2.2:*** *Priorities and funding levels in civil space programs*
- ***Indicator 2.3:*** *International cooperation in space activities*
- ***Indicator 2.4:*** *Growth in commercial space industry*
- ***Indicator 2.5:*** *Public-private collaboration on space activities*
- ***Indicator 2.6:*** *Space-based military systems*

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Number and diversity of space actors

- ***Access*** to outer space is growing
- ***New space actors*** emerging
- Barriers to entry are sharply **decreasing**

➢ **But**: Limited resources (e.g. orbital slots, RF spectrum)

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Access to and use of space by various actors

- Limited nature of some space resources will pose governance challenges to ensure equitable access for newcomers
- International cooperation assists in the transfer of expertise and technology for the access to, and use of space, by emerging space actors
- A healthy space industry can lead to decreasing costs for space access and use, and may increase the accessibility of space technology for a wider range of space actors
- Military space sector has been an important driver in the advancement of capabilities to access and use space, but may be source of friction

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Security of space systems

Theme 3: Security of space systems

- ***Indicator 3.1:*** *Vulnerability of satellite communications, broadcast links, and ground stations*
- ***Indicator 3.2:*** *Protection of satellites against direct threats*
- ***Indicator 3.3:*** *Capacity to rebuild space systems and integrate smaller satellites into space operations*
- ***Indicator 3.4:*** *Earth-based capabilities to attack satellites*
- ***Indicator 3.5:*** *Space-based negation enabling capabilities*

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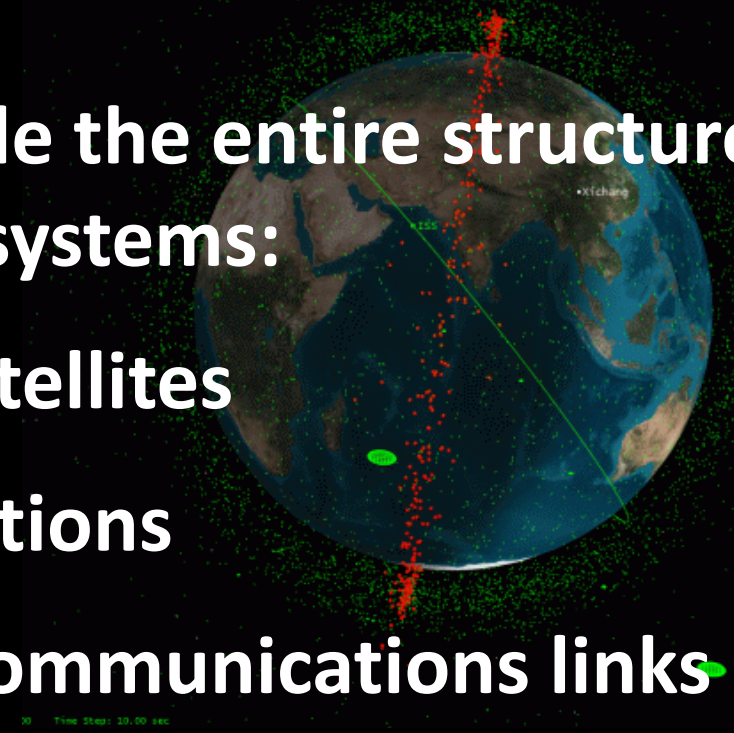
Security of space systems

- Offensive/Defensive space capabilities are NOT ONLY related to systems in orbit

- They include the entire structure of space and terrestrial systems:

- Orbiting satellites
- Ground stations
- Data and communications links



Security of space systems

- The dynamics of space systems protection and negation are closely related and, under some conditions, protective measures can motivate adversaries to develop the capabilities to overcome them

- While no hostile anti-satellite (ASAT) attacks have been carried out, recent incidents testify to the availability and effectiveness of ground-based systems to destroy satellites

Security of space systems

In the past decade alone:

- ground-based anti-satellite weapons (ASATs) have been tested,
- several communications satellites have been deliberately jammed;
- missile defense systems have been used as ASATs;
- precursor technologies that would allow space-to-space offensive capabilities have been developed

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Outer space policies and governance

Theme 4: Outer space policies and governance

- ***Indicator 4.1:*** *National space policies and laws*
- ***Indicator 4.2:*** *Multilateral forums for space governance*
- ***Indicator 4.3:*** *Other initiatives*

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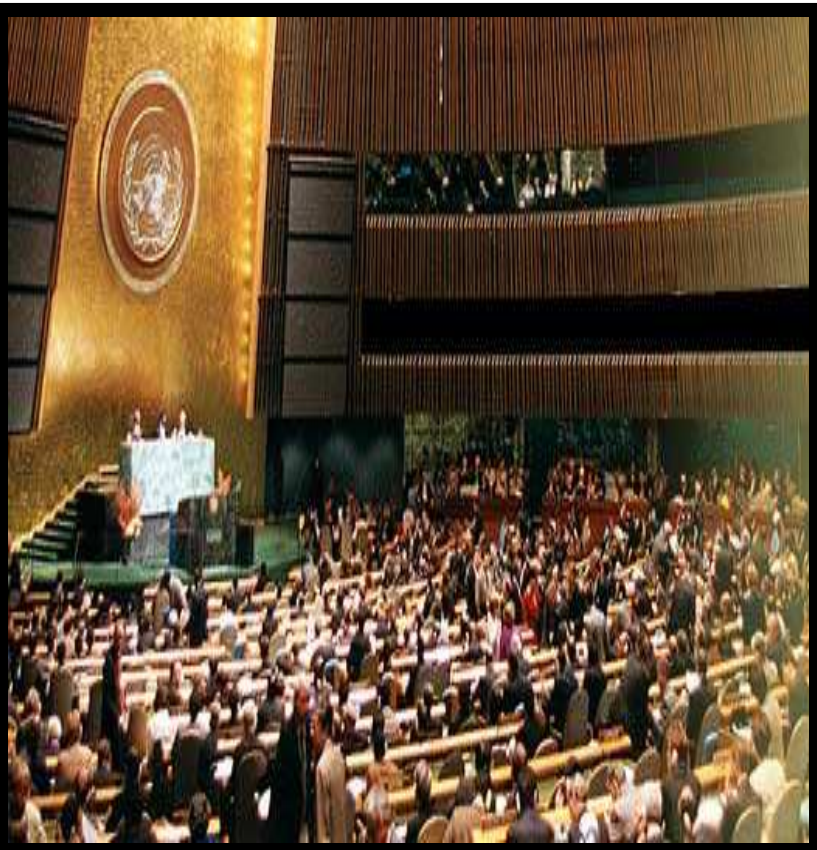
Outer space policies and governance



Laws, Policies, and Doctrines

Existing normative architecture for space activities is ***insufficient***

Different Approaches:

- National vs. Multilateral
- Legally- vs. politically-binding

➢ Not necessarily mutually exclusive

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Outer space policies and governance

Key proposals:

- **Int'l Code of Conduct for Outer Space Activities**

- **PPWT**

- **Canada's proposed pledges not to:**

a. Place weapons in space,
b. Test or use weapons on satellites so as to damage or destroy them, and
c. Use satellites themselves as weapons.

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Outer space policies and governance

- International space actors have been unable to reach consensus on the exact nature of a space security regime and issues to be covered by an updated normative regime for outer space
- Current alternatives for consideration include both **legally binding** treaties (such as PPWT) and **politically binding** norms of behavior (such as ICoC)
- Establishment of GGE on TCBMsand LTSSA Working Group widely seen as positive developments
- Deadlock at CD continues

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