



Promoting Cooperative Solutions for Space Sustainability

Stressors to the Stability of the Space Domain

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Oct. 17, 2017

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- Why this is an issue for the long-term sustainability of space
- New actors
- Mega-constellations
- Counterspace, crisis escalation, and new uses of space
- Conclusions

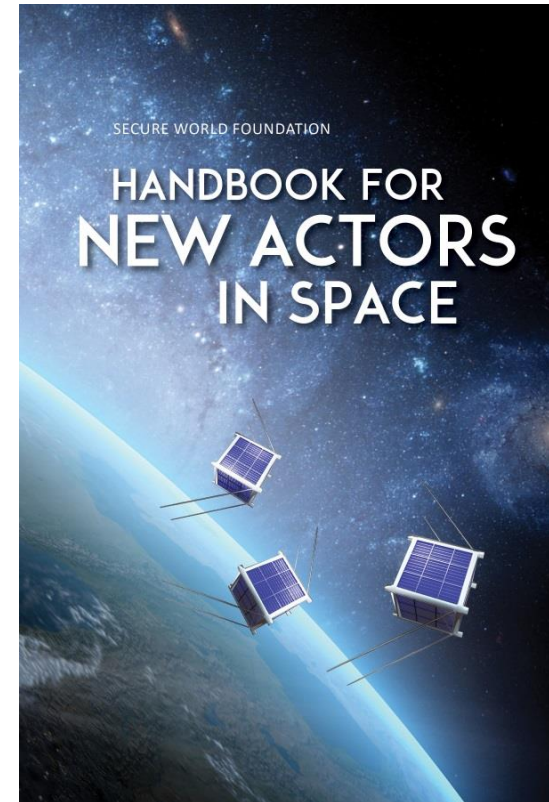


Importance to Space Sustainability

- Increasing number of and diversity in *new actors*, concurrent with increasing *importance of space* in daily activities globally
- Stability rests upon *reliable and predictable access to space*
- *Lack of clarity* of the cause when satellite capabilities disappear

SWF Handbook for New Actors in Space

- **Goal:** Create a publication that provides an overview fundamental principles, laws, norms, and best practices for safe, predictable, and responsible activities in space
- **Two specific audiences:**
 - Countries developing space programs and/or having to oversee and regulate their first satellites
 - Universities and start-up companies that are developing/operating satellites



www.swfound.org/handbook

- **Chapter 1: The International Framework for Space Activities**
 - Freedom and Responsibility
 - Registration of Space Objects
 - International Frequency Management
 - Remote Sensing
 - International Standards
 - International Export Control
 - International Liability
 - Dispute Settlement
 - Environmental Issues
 - Advanced Issues

- **Chapter 2: National Space Policy and Administration**
 - Public Policy
 - Public Administration and National Oversight
 - Case Study: Remote Sensing Policy and Administration

- **Chapter 3: Responsible Space Operations**
 - Pre-launch
 - Launch
 - On-orbit
 - End-of-life



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Handbook Next Steps

- The Handbook was officially released in February 2017
- Electronic copies are available on the SWF website, free of charge, at www.swfound.org/handbook
- Printed copies are also available through Amazon
- Feedback is welcome!

Mega-constellations

- ***Over 16,000 satellites*** planned to be launched over the next 10 years
- Huge ***space traffic management*** concern
- ***Frequency allocations*** will be challenging
- Are current standards of ***end-of-life operations*** sufficient?

Counterspace and Crisis Escalation

- Reports of *renewed interest in counterspace* programs
- Tabletop exercise (TTX) on crisis escalation and space
- Co-hosted by SWF and the Center for Strategic and International Studies (CSIS) in Washington, DC, in November 2016; second hosted by the Observer Research Foundation in February 2017
- Intended to *raise awareness* about the risks of crisis escalation
- *Identify gaps* in existing mechanisms and deterrence capabilities
- Host discussions in an *unclassified, open* forum

Crisis Escalation Tabletop Takeaways

- Real *reluctance to use kinetic force* against satellites
- *Loss* of key military space capability *could be partially compensated for*
- *Temporary and reversible interference* not always perceived as such
- *Threshold* between strategic and tactical assets *not always clear*
- In-kind responses not always warranted

- ***Space resource utilization***
 - Hague Space Resources Working Group
 - Concerns about some nations being left behind
- ***Rendez-vous and proximity operations***
 - Dual-use nature can make intent murky
- Active debris removal
 - ***Same issue with dual-use***

- ***Reluctance to use kinetic force*** against satellites
 - Cyber attacks and other electronic interference seen as much more usable
- ***Important to have this discussion*** because counterspace efforts are being considered internationally
- Space actors need to ***consider the resilience*** of their space assets
- ***Norms of behavior and improved space situational awareness can help*** guide debate about appropriate responses



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Questions?

Thanks.

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