Norms of Behavior for Small Satellite Operators – Basic Principles

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A Fundamental Change?

As of December 2016: Total number of operating satellites: 1,459

Forecast: Up to 2400 micro/nanosatellites to launch by 2023

NGSO Constellations: 18,000+ planned satellites – based on US filings alone
What are “Norms”?

- **Sociology**: informal understandings that govern the behavior of members of a society
- **International relations**: Standard of appropriate behavior for actors with a given identity

**Osaka**

Historically – stand on right, walk on left

**Tokyo**

Historically – stand on left, walk on right
Norms in Space Governance

- Much of the existing space governance framework is based on norms
  - **Example:** Freedom of overflight for satellite reconnaissance
    - Launch of Sputnik in 1957 helped set the norm that satellite overflight did not breach territorial sovereignty
    - By mid-1960s, freedom of overflight was a generally accepted norm
    - Was not codified into “hard law” until Outer Space Treaty of 1967

- Norms are likely going to be the main mechanism to address future challenges
  - “Congested, contested, competitive”
  - Far more space actors than ever before, with diverse interests and goals
  - Increasingly challenging to get global consensus on new “hard law”
Example: Space Debris Mitigation Guidelines

- Inter-Agency Space Debris Coordination Committee (IADC)
- Some progress on national implementation
- ESA research indicates 40-60% compliance with 25-year rule

https://www.sdo.esoc.esa.int/environment_report/Environment_Report_I1R2_20170427.pdf
Impetus for Norms in the Private Sector

- Over the next decade, the private sector will become the dominant player in space (18,000+ satellites planned for launch)

- Incentives for satellite operators to set norms/behaviors w/out waiting for governments to act
  - Increase the sustainability of their own business models
  - Allay concerns that “darkening the skies” will create havoc for existing users
  - Preempt the need for government regulation (or at least inform it)

- Ties into broader Corporate Social Responsibility movement
  - Businesses value in social good beyond just bottom line
  - Socially responsible practices that reinforce business models
During 2016 and 2017 the Secure World Foundation (SWF) has held a series of workshops discussing best practices in several areas related to smallsat and cubesat operations:

- Satellite operator best practices for minimizing collisions
- Space situational awareness (SSA) and smallsats
- Cubesat launch and deployment best practices
- Cubesat post-mission disposal best practices
- Principles for safe and responsible active debris removal
Rendezvous and Proximity Operations

**Active Debris Removal**
- Workshop convened at April 2017 European Conference on Space Debris
- Principles for Transparency in Operations
  1) Statement of Intent
  2) Ownership and Permission
  3) Public Tech. Description
  4) Public High-level CONOPS
  5) Info Sharing Operator/Service Provider

**On Orbit Servicing**
- 50+ years of experience in doing it with human spaceflight, but increasingly shifting to robotic/autonomous
- Multiple countries/companies developing and testing “dual-use” RPO capabilities
- DARPA Consortium For Execution of Rendezvous and Servicing Operations (CONFERS)
Smallsats and SSA

- Need to raise awareness of existing best practices among new satellite operators
- Role of launch sector as a “gatekeeper” and information portal
- Need to develop a more comprehensive approach to bringing to market the technology for satellite-mounted devices that can improve the detecting, tracking, and identification of small satellites

Cubesat Post-Mission Disposal

- Communicate and maintain current “good” PMD compliance for cubesats
- Need to increase understanding of reasons when there is non-compliance
- Need to build dialogue on best practices for end of life operations, beyond the de-orbit guidelines
- Develop best practices for end of life spacecraft passivation and configuration for end of mission
Thank you. Questions?

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