



*Promoting Cooperative Solutions for Space Sustainability*

# **Norms of Behavior for Small Satellite Operators – Basic Principles**

Mr. Ian Christensen

Dr. Brian Weeden

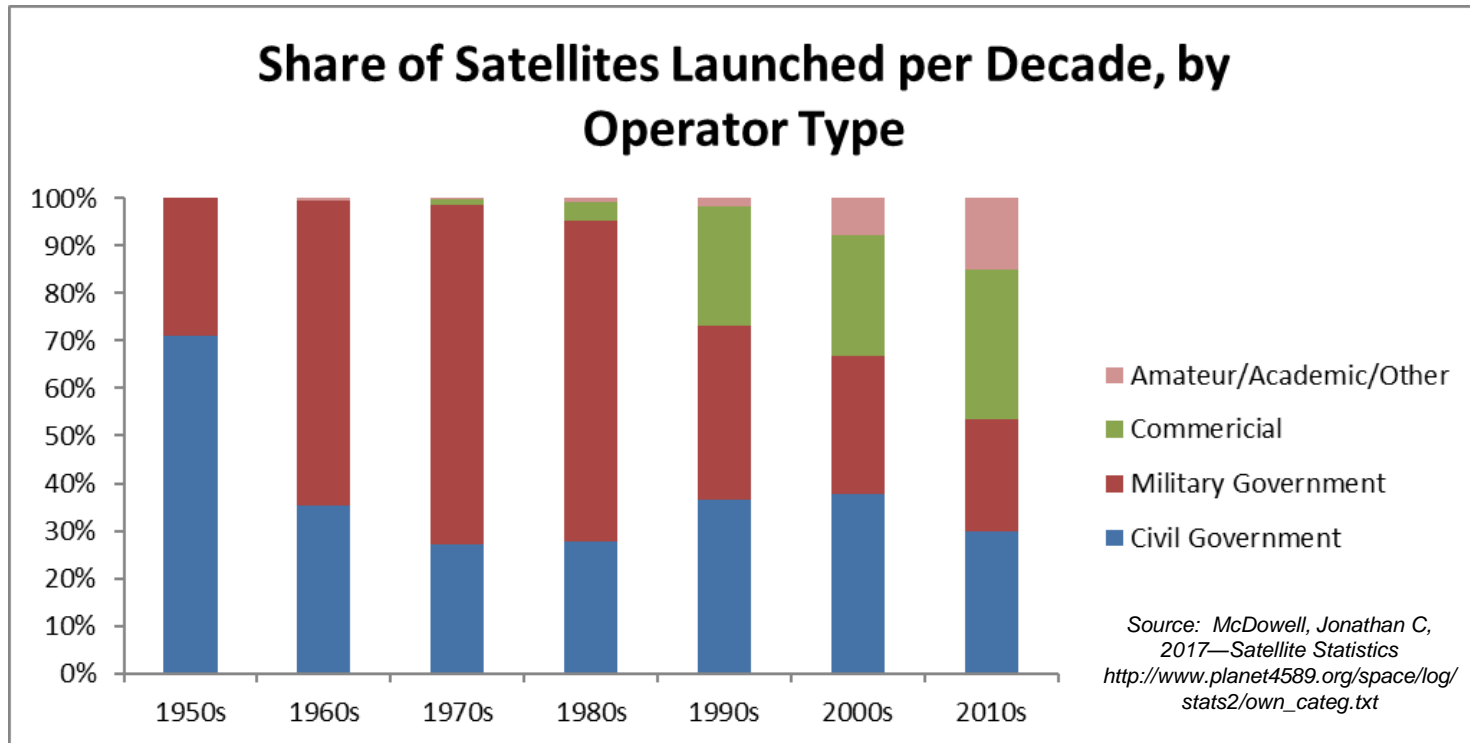
Secure World Foundation

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Adelaide, Australia, 29 September 2017

IAC-17-A6.10-B4.10.1

# 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



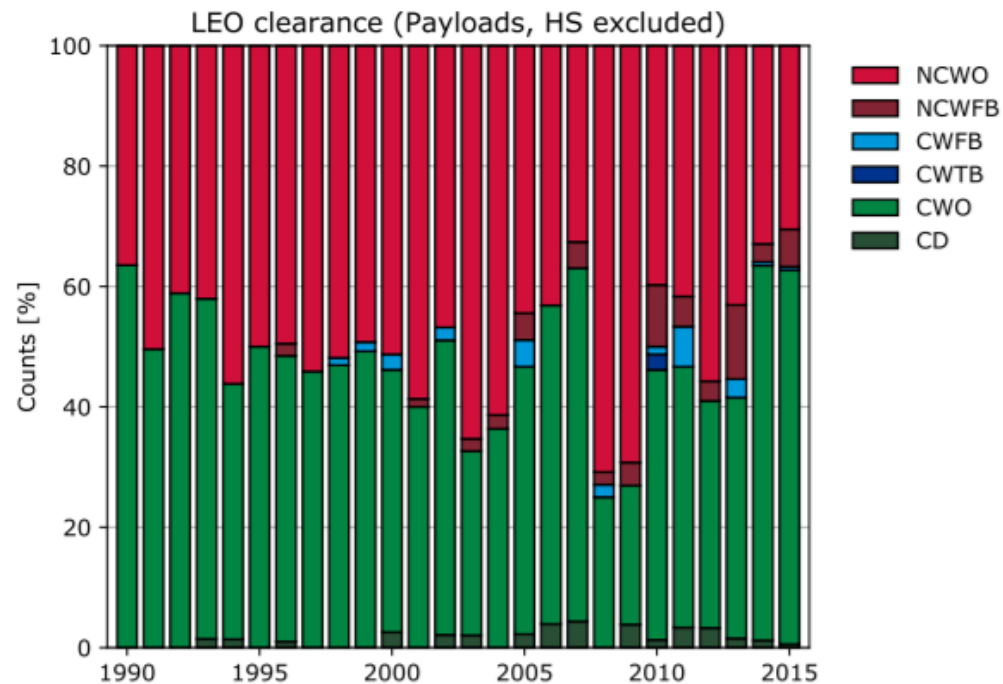
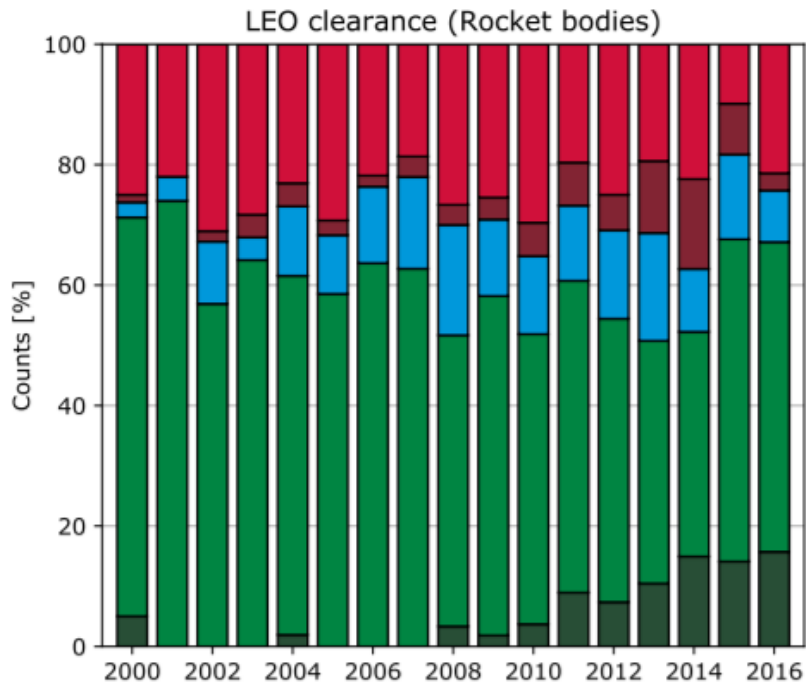
Historically –  
stand on left,  
walk on right

# 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



Source: ESA Space Debris Office, "ESA Annual Space Environment Report." April 27, 2017.  
[https://www.sdo.esoc.esa.int/environment\\_report/Environment\\_Report\\_I1R2\\_20170427.pdf](https://www.sdo.esoc.esa.int/environment_report/Environment_Report_I1R2_20170427.pdf)

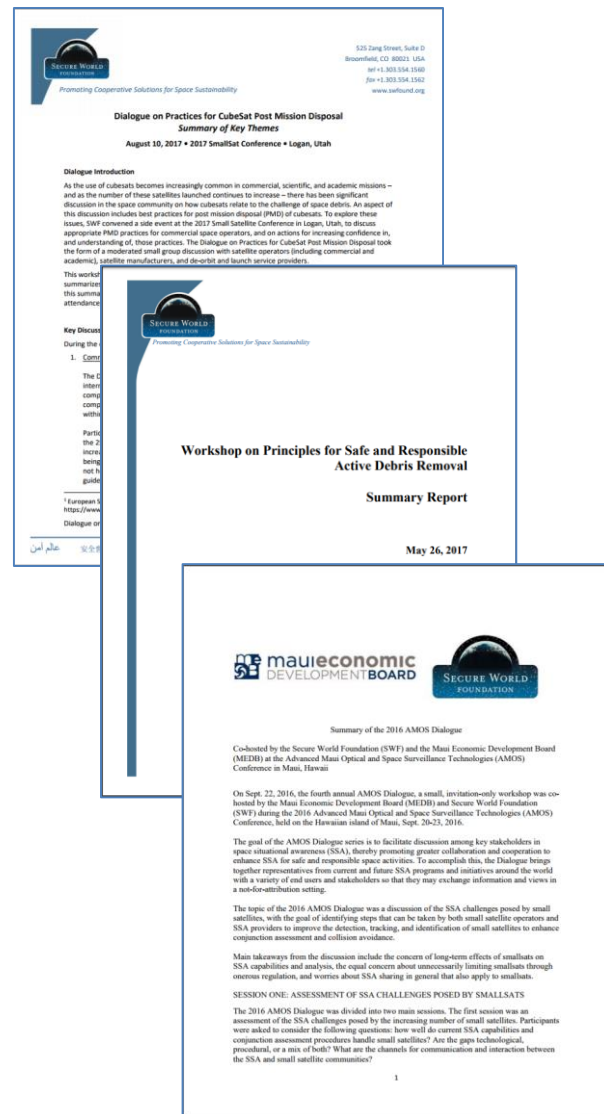
# Impetus for Norms in the Private Sector

- 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

# Areas of Opportunity for Smallsat Operations Norms of Behavior

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



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# Thank you. Questions?

[ichristensen@swfound.org](mailto:ichristensen@swfound.org)