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Anti-Satellite Weaponry

Geopolitical Threats in the Era of New Space

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Anti-Satellite Weapons: Military Threats to Non-State Assets

What is an ASAT?

- Weapons system designed to disrupt the operations of a target satellite
- Kinetic: use of physical force, typically an explosion or collision
- Non-kinetic: use of non-destructive interference

Why ASATs?

- Military rationale: Negate an adversary's use of space-enabled military technology

Implications for Space Sustainability

- Creation of long-lasting orbital debris
- Currently over 25,000 pieces of trackable debris; over 100 million pieces of un-trackable debris





Anti-Satellite Weapons: Military Threats to Non-State Assets

History of Kinetic ASAT Testing

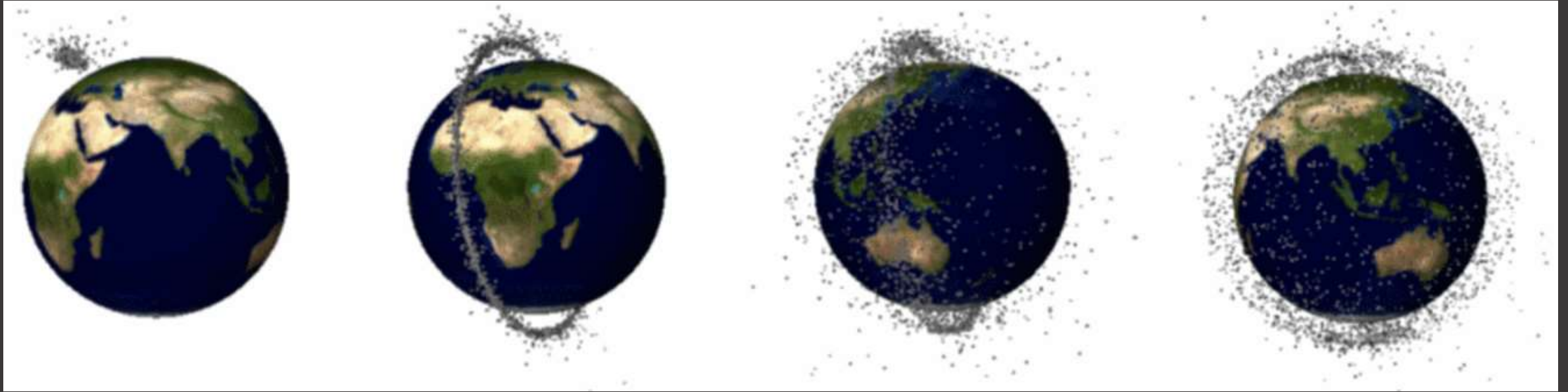
- 1959 – 2006: relatively low-intensity tests, ceasing in the 1980s to 90s
- 2007 – Present: resurgence of ASAT testing, sharply escalating debris creation
 - 2007: China (Fengyun-1C)
 - 2008: United States (US-193)
 - 2019: India (Microsat-R)
 - 2021: Russia (Cosmos 1408)

Implications for Non-State Actors

- Impacts of kinetic ASAT tests
- Potential impacts of kinetic ASAT warfare
- Risk of polluting Low Earth Orbit – losing access to crucial orbital bands

Evolution of the Debris Cloud From a Kinetic Direct Ascent ASAT Intercept

Visual simulation of debris cloud (objects over 10cm) following hypervelocity kinetic intercept



Debris 10 minutes
after:

10 days

6 months

3 years

Source: David Wright via Secure World Foundation, 2010 (https://swfound.org/media/9550/chinese_asat_fact_sheet_updated_2012.pdf)

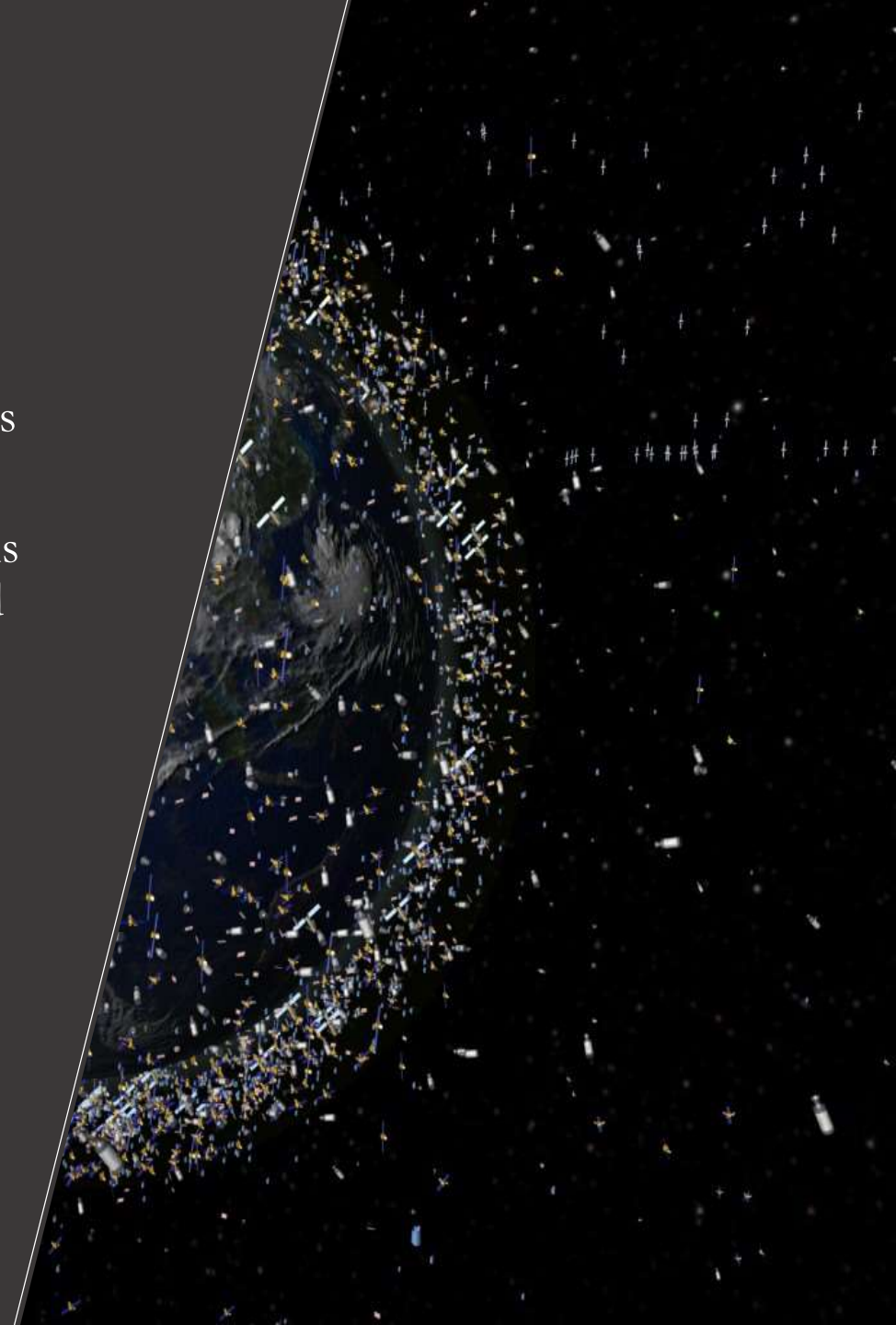
Governance: Imperfect Outcomes

Current Governance Regime

- Lack of binding legal agreements restricting state behaviour
- Reliance on non-binding “soft law” – guidelines and best practices
- Net results
 - Global norms emphasizing the undesirability of orbital debris creation, while allowing states leeway to act in their perceived national security interest
 - Continued kinetic ASAT testing

Recent Developments

- United States unilateral moratorium on direct ascent ASAT tests
- UN Open-Ended Working Group on reducing space threats through norms, rules and principles of responsible behaviors





Looking Ahead: the Future of ASAT Governance and the Role of New Space Actors

Governance Outcomes

- Widespread push for binding regulation unlikely
- Continued reliance on non-binding agreements – corresponding need to develop, sharpen, and socialize global norms

The Role of New Space

- Get involved in the governance discussion!
- Geopolitical conflict poses a critical risk to the long-term viability of space-enabled space applications
- Push governments to tackle both the technical and political sides of space sustainability