



Promoting Cooperative Solutions for Space Sustainability

U.S. National Policy and Space Debris

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Evolution of space debris threat

- 1960s
 - Need to better understand space environmental threats to human spaceflight missions
 - Biggest concern is natural space debris (micrometeoroids)
- 1970s
 - Explosions begin creating more human-generated space debris
 - Kessler & Cour-Palais warn human-generated space debris may eventually become bigger threat than natural space debris
- 1980s
 - More explosions, Space Station Freedom, and military ASAT testing create high-level awareness of space debris
 - Need to minimize creation of space debris from human activities in space



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Evolution of space debris threat (con't)

- 1990s
 - Need guidelines to minimize the creation of space debris through on-orbit activities
 - Adoption of national & international mitigation guidelines can slow growth
- 2000s
 - Chinese ASAT test and Iridium-Cosmos collision undo progress from mitigation guidelines
 - Need to develop collision warning & avoidance measures
- 2010s
 - Post-mission disposal (PMD) not enough, needs to be combined with remediation (ADR)
 - Emergence of cubesats and megaconstellations requires high compliance with PMD and ADR



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Space debris in US National Space Policy

Year	President	Policy Directive	Implementation
1988	Ronald Reagan	Minimize creation of space debris in tests, experiments, and systems	
1989	George HW Bush	+ Encourage other countries to adopt space debris minimization policies	
1996	Bill Clinton	++ Develop design guidelines for space debris minimization, and take a leadership role in promoting international adoption	
2006	George W Bush	+++ Follow national orbital debris mitigation standards, and incorporate into licensing of commercial satellites	
2010	Barack Obama	++++ Preserve the space environment, foster development of space collision warning measures, and research debris removal technology	



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Way forward

- Major impediment to making further progress is the *lack of a bureaucratic champion* for space sustainability
 - If it's everyone's job, then it's no one's job
- Current policy discussions on regulatory reform and space traffic management offer a chance to fix the situation
 - Assign responsibility for the space environment to Dept of Commerce
 - Combine with authority for civil SSA and regulatory oversight
- Need to focus on developing best/practices standards for ADR & incentives for removing existing debris



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Thank You Questions?

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