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

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 megaconsatellations requires high compliance with PMD and ADR

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	

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

Thank You
Questions?

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