U.S. Policy, Programs, and Diplomatic Initiatives to Respond to Space Debris and Counterspace Threats

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Overview

- U.S. national policy, programmatic, and diplomatic initiatives to address two major outer space threats
  - Space debris
  - Counterspace threats (anti-satellite capabilities)

- Comparison of progress made on each
  - Policy directives in the 2010 National Space Policy
  - Implementation
  - Budgetary allocations
  - Diplomatic initiatives
Trends in perception of space threats

• 1950s – 1980s: Counterspace is the biggest threat
  – Cold War competition between the U.S. and Soviet Union
  – Nearly all the focus was on military threat posed by Soviet space and counterspace capabilities
  – Space environment was a risk, but not focused on

• 1990s – 2000s: Environment is the biggest threat
  – Collapse of the Soviet military threat, and beginning of increased international civil and commercial activity
  – Increased focus on threats of space debris and space weather to satellite operations
Mid-2000s: Shocks to the system

- 2002/2003 Afghanistan/Iraq are the first real “space wars”
  - U.S. realizes space is the key to (and weakness of) future warfare
- 2006 Landmark NASA study on Kessler Syndrome
  - Debris population will continue to grow despite no new launches
- 2007 Chinese ASAT test
  - Destroyed defunct weather satellite with ground-based DA-ASAT weapon, created ~3,000 pieces of trackable debris @850 km
- 2009 Iridium-Cosmos Collision
  - Destroyed active U.S. commercial comsat and dead Russian military comsat, created ~2,000 pieces of trackable debris @850 km
- 2010 DARPA Catcher’s Mitt Study
  - Removal (remediation) of large debris objects only way to reduce long-term collision risk to operational satellites
2010 U.S. National Space Policy

• Completed fairly early in President Obama’s term (compared to other administrations)
  – Only 4 years since the previous NSP

• Represents the “consensus” view of the bureaucracy
  – Created by an inter-agency committee led by the White House

• Provides presidential-level policy direction to the executive branch
  – Sets core principles and goals for U.S. space activities
  – Guidance for specific space sectors
  – Describes roles and responsibilities for Departments/Agencies
POLICY, PROGRAMS, AND DIPLOMACY FOR SPACE DEBRIS
2010 National Space Policy

• Preserving the Space Environment and the Responsible Use of Space
  – Continue to develop, adopt, and follow space debris mitigation guidelines
  – Increase space situational awareness (SSA) capabilities
  – NASA and DoD jointly pursue R&D of debris remediation technologies
  – Develop “space collision warning measures” to warn governmental, commercial, and international entities of close approaches between space objects
Program/budget implementation

• Debris mitigation
  – US agencies continue to follow guidelines, stricter rules for exemptions

• Increase SSA
  – U.S. military investing around $1 billion a year in improving SSA
  – Interagency discussions on “space traffic management”

• Close approach warnings
  – USSTRATCOM began providing warning of close approaches to all satellite operators in 2010

• Remediation
  – Minimal NASA funding (a few million dollars) for low-level R&D
Diplomatic initiatives

• UN COPUOS Working Group on Long-Term Sustainability of Outer Space Activities
  – Expand upon the success of the debris mitigation guidelines
  – Developing voluntary guidelines across 4 broad categories
    • Using space for sustainable development on Earth
    • On-orbit space activities
    • Space Weather
    • National regulation

• Data-sharing agreements with USSTRATCOM (as of August 2015)
  – 9 foreign governments
  – 2 international organizations
  – 49 commercial entities
Missing component - remediation

- USG considered but never implemented plan
  - Concern over dual-use perceptions
  - Didn’t fall into any one agency’s “job basket”
  - Cost too much money
  - Policy uncertainties/inertia

- DoD
  - Not tasked with preserving the space environment
  - Concerned about domestic/international politics of “space weapons”

- NASA
  - Competition among field centers for this new mission
  - Already struggling with budget battles between SLS, Commercial Cargo and Crew, & Planetary Science
POLICY, PROGRAMS, AND DIPLOMACY FOR COUNTERSPACE
• Assurance and Resilience of Mission-Essential Functions
  – Maintain continuity of national security space functions
  – Increase protection and resilience of key space assets
  – Develop ability to detect, warn, characterize, and attribute incidents in space
  – Prepare to operate in a degraded, disrupted, or denied space environment
  – Pursue bilateral and multilateral transparency and confidence-building measures (TCBMs)
  – Consider arms control measures that are equitable, verifiable, and enhance U.S. national security
Program/budget implementation

• 2011 National Security Space Strategy (NSSS)
  – Promote peaceful & sustainable uses of space
  – Improve US space capabilities
  – Partner with international and commercial entities
  – Prevent and deter aggression
  – Prepare to defeat attacks and operate in degraded environment

• 2012 DoD Space Policy
  – Support development of norms of responsible behavior
  – Build coalitions
  – Improve resilience of US national security space capabilities
  – Develop capabilities to respond to an attack
2010-2015: More shocks to the system

• Chinese robotic rendezvous and proximity ops (RPO) in LEO in 2010, 2013, and 2014

• Chinese test of potential DA-ASAT that could reach GEO in May 2013

• Russia conducts robotic RPO demonstrations in LEO in 2013 and 2014

• Russian satellite shows mysterious pattern of movements in GEO, including parking next to US commercial satellites, in 2014-2015
Further action on counterspace

- DoD initiates Space Portfolio Review (SPR) in May 2014
  - Assess national security space investments in light of counterspace threats

- Change in tone of public statements by senior military leadership
  - “Need to prepare to fight a war and defend ourselves in space”
  - “Space will become a battlefield like air, land, and sea”

- Congressional action
  - Directed several studies on space defense and deterrence and role of offensive counterspace
  - $5-8 billion in “reallocated” spending across FY16-FY20 for “space protection”
Further action (con’t)

• Creation of the Joint Space Doctrine and Tactics Forum (JSDTF)
  – Improve collaboration and cooperation between military and intelligence community on space
  – Develop tactics, techniques, and procedures (TTPs) for responding to attacks on space capabilities

• Creation of the Joint Interagency Combined Space Operations Center (JICSpOC)
  – Experiment with implementing the concepts developed by the JSDTF

• Renamed the Secretary of the Air Force from Executive Agent for Space to Principal DoD Space Advisor (PDSA)
Diplomatic initiatives

• Participation in the Group of Governmental Experts (GGE) on Transparency and Confidence-building Measures (TCBMs) in Outer Space Activities

• Participation in consultations on the International Code of Conduct for Outer Space Security

• Engaging in a series of bilateral dialogues on space security with several countries

• Created the Combined Space Operations (CSpO) Initiative to enhance space operations planning and coordination
Comparison

• “Punctuated equilibrium” holds true
  – Action comes as a response to external shocks
  – Shocks in both counterspace and space debris drove 2010 NSP
  – Additional shocks in counterspace over last 5 years may have influenced greater focus on implementation there

• Much more willingness to allocate budget for counterspace threats than space debris threats
  – Several billion USD in direct spending on counterspace, a few million in direct spending on space debris
  – Remediation: If more than one have responsibility, no one has responsibility
  – Better relationship between Pentagon and Congress than between NASA and Congress
Thank You. Questions?

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