Norms and Standards to Enable Emerging Industry Segments: Satellite Servicing

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ON-ORBIT SATELLITE SERVICING (OOS) AND NORMS

Overview of the need for normative efforts in OOS
Rapid expansion in the number & types of commercial space applications is creating opportunities but also challenges.

How can governments and the private sector work together to set “rules of the road” for these emerging new applications?
Development of OOS and RPO Capabilities

• On-orbit servicing (OOS) and Rendezvous and Proximity Operations (RPO) are key to enabling future of on-orbit activities

• Benefits and challenges
  – Greatly increase the viability of and benefits from space activities
  – Raises a number of diplomatic, legal, safety, operational, and policy challenges that need to be tackled

• OOS and RPO are not new, and are already international
  – 50+ years of experience in doing it with human spaceflight, but increasingly shifting to robotic/autonomous
  – Multiple countries/companies developing and testing RPO capabilities

• How to develop norms and standards to enable cooperative OOS/RPO and mitigate challenges?
Current Activities in OOS & RPO

- **SATellite InsPEction**: Chandah
- **Life ExtenSIon**: Orbital ATK, Effective Space Solutions
- **Satellite Refueling**: AIRBUS DEFENCE & SPACE
- **Modular Satellite Assembly**: NovaWurks, IBOSS
- **Deorbit / End of Life Services**: ASTROSCALE, D-ORBIT

And future activities and applications, which would leverage technology, norms, and standards

Selected examples of active organizations, not intended as complete listing
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”
CONFERS: STANDARDS FOR OOS AND RPO

Developing industry-consensus standards for cooperative OOS & RPO
DARPA and Satellite Servicing

• The Defense Advanced Research Projects Agency (DARPA) has had a long history with developing cooperative OOS technologies
  – Orbital Express, Robotic Servicing of Geosynchronous Satellites (RSGS)
  – Goal is to develop/demonstrate core technologies, and spin them off to industry
• Establishing norms and standards is essential to creating a vibrant commercial OOS industry
• Consortium for Execution of Rendezvous and Servicing Operations (CONFERS) program is meant to be a forum where industry and other stakeholders can engage to develop standards and norms
CONFERS Team

Advanced Technology International (ATI)
• Prime, lead for consortium development

Secure World Foundation (SWF)
• Lead for outreach and engagement

University of Southern California Space Engineering Research Center (SERC)
• Conducting research into existing standards and practices

Space Infrastructure Foundation
• Space-related standards development expertise
CONFERS Objectives

- Leverage best practices from government and industry to research, develop, and publish non-binding, voluntary consensus standards (technical and operations) for cooperative OOS and RPO.
- These standards would provide the foundation for a new commercial repertoire of robust space-based capabilities and a future in-space economy.
- Be open to participation by private sector stakeholders in the satellite servicing community.
- Focus on RPO in the first year, and OOS in the second year.
- Initially supported by DARPA, CONFERS intends to transition to fully private-sector operations over a period of several years.
CONFERS: A Holistic Approach To Standards

- **Interfaes and Designs**: Engineering and design to increase the safety, viability, and interoperability of satellite servicing

- **Operational Practices**: Behavior of satellite servicing and RPO activities

- **Data Exchange and Sharing**: Information sharing between servicing companies, clients, and governments

- **Transparency and Confidence-Building Measures**: Mechanisms to reduce misperceptions and concerns about the dual-use nature

CONFERS Process

FORMATION COMMITTEE

Executive Committee

Membership Tiers

Application process to be open to private sector stakeholders with “direct and material interest”

ESTABLISH CONSORTIUM

Public Conference

Initial draft standards developed by CONFERS members will be formally released

DRAFT STANDARD

FORMAL STANDARDS DEVELOPMENT

Distribution Statement “A” (Approved for Public Release, Distribution Unlimited)
swfound.org
Next Steps and Engagement

• Formation Committee (assisted by ATI and SWF) to finalize the Consortium structure
• Consortium will be open to participation by private sector stakeholders in the satellite servicing/RPO community
• Information on membership application process will be available on the CONFERS website at: www.satelliteconfers.org

• Contact Information:
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Thank You

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