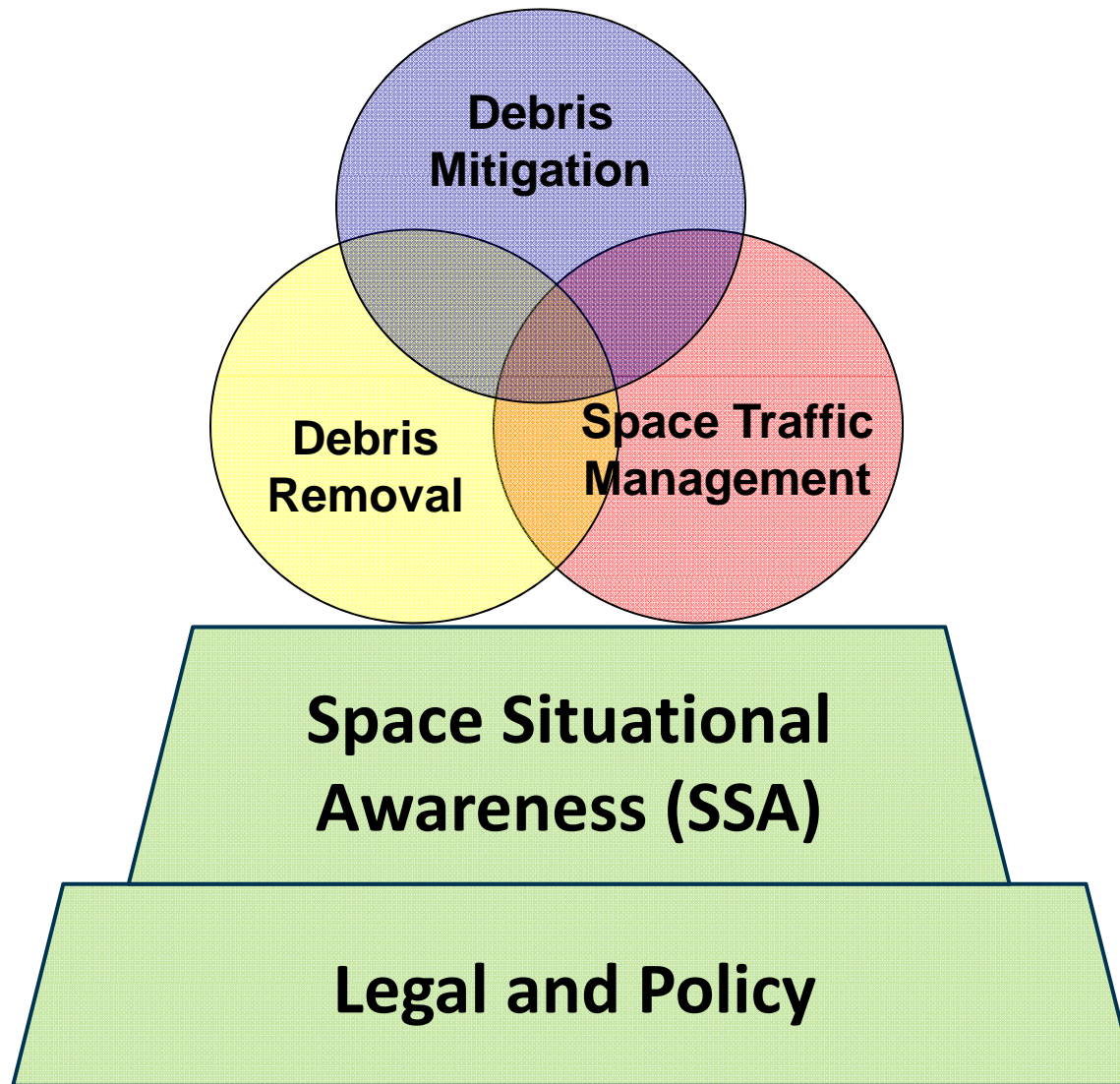


Active Debris Removal: An Opportunity for Leadership and Cooperation

Brian Weeden
Technical Advisor
Secure World Foundation

bweeden@swfound.org

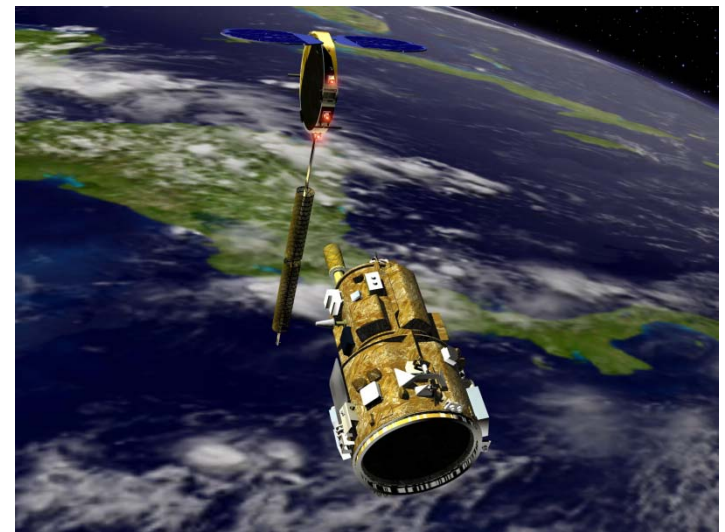
- Private, non-profit foundation founded in 2004
- HQ just outside of Denver, official offices in DC and Vienna (Austria), presence in Montreal
- Dedicated to the *secure and sustainable use of space for the benefit of all humanity*
- *Inform, facilitate, advocate*
- Strong role in both the international and domestic policy communities, linking technical and policy/legal initiatives



- Active debris removal is more than just a technical issue
 - Legal, policy, and economic concerns are deeply imbedded in the concept and will affect mission success
- A *technically feasible* solution may not be a *politically feasible* solution
 - We may need to accept a less optimal technical solution to satisfy the other concerns

Thinking about active debris removal from a multidisciplinary and international context from the beginning is essential to success

- There is not an international consensus on the legal definition of “space debris”
 - This was good in the early days of space activity as it enabled flexibility
- One person’s space debris might be another’s hibernating “capability”
 - Or still serving some function to some user after primary mission has ended
 - Example: Mublcom and DART
- What about DSP Flight 23?



- There needs to be general international agreement and transparency on the technical merits for removing objects in general
- There needs to be general international agreement and transparency on which objects are selected for removal
- Lack of consensus or buy-in could lead to perception that objects are being selected for removal due to political motivation
 - Unduly labeling certain States as “bad actors”
 - Removal mission is cover story for intelligence gathering or sabotage

- The Liability Convention has two different (sometimes overlapping) definitions of who has responsibility for a space object

The term “launching State” means:

- (i) A State which launches or procures the launching of a space object;
- (ii) A State from whose territory or facility a space object is launched;

- Registration Convention states launching State “***shall register the space object***” with the UN Office of Outer Space Affairs (OOSA) and provide info for the official UN Register of Space Objects
- As currently accepted, a launching State still owns an object beyond the end of life when satellite becomes “space debris”
- A State removing a piece of debris put into space by another State without permission could be seen as a breach of sovereignty

- US military currently maintains the most public and complete catalog, but it is not necessarily accurate nor exhaustive
- US does not have radar coverage over much of Asia, an area where Russia has excellent LEO radar coverage
 - Are there LEO debris objects in the Russian catalog but not in the American one?
- “Classification of Geostationary Objects” compiled annually by ESA/ECOC has additional ~300 debris objects not in public US catalog
 - Uses optical tracking data from European and International Scientific Optical Network (ISON) sensors
- These are discrepancies above and beyond deliberate “omissions”

International Designator	Name of Space Object	State/Organization	Date of Launch	UN Registered	Document of Registration	Document of Decay or Change	Function of Space Object	Remarks
1998-021G	IRIDIUM 68	(for USA)	07/04/1998	No		ST/SG/SER.E/343	-----	Not registered with the United Nations. Mentioned by Russian Federation in ST/SG/SER.E/343
1998-026A	IRIDIUM 69	China	02/05/1998	Yes	ST/SG/SER.E/356		Motorola Iridium system used for telecommunication service.	-----
1998-032A	IRIDIUM 70	USA	17/05/1998	Yes	ST/SG/SER.E/344		Spacecraft engaged in practical applications and uses of space technology such as weather or communications	-----

Note: Information highlighted in green has been obtained from other sources and has not been communicated officially to the United Nations.

- Active debris removal is not an anti-satellite activity
- **However**, some of the same technologies being considered for active debris removal could also be developed for ASAT capabilities
- A State developing and deploying active debris removal technologies without sufficient transparency could be seen as covert ASAT development
- Recent programs have had this transparency / dual-use concern
 - American XSS-11
 - Chinese BX-1

- If an object is selected for active removal, what information does the owner need to provide to facilitate efficient and safe removal?
- If a State or private entity removes a piece of “space debris” from orbit, are they allowed to claim salvage rights over the material?
 - How can the Launching State protect intellectual property rights with respect to design elements or technology in the object being removed?
- If a State or private entity docks with a piece of “space debris”, what examinations are they allowed to conduct to dock/attach/verify?
- What do we do about ITAR?

The United States should take the lead in organizing an international technical demonstration mission for active debris removal

- Key benefits:
 - Increased awareness of the severity of the space sustainability problem and space debris in general for all space actors
 - Provides the necessary transparency on the project to help stave off diplomatic and political objections
- Leadership, not Dominance
- Not just “friends and allies”
 - Russia and China represent ~60% of the orbital debris population

- Truly international cooperation and research to provide consensus on which objects are a priority for removal and *why*
- Begin an international conversation on the problem of heterogenous satellite catalogs
 - Focusing on debris does not necessarily mean forcing State to reveal sensitive payloads and objects
- Consider international space situational awareness to monitor and provide transparency/verification for debris removal activities
- Bring together legal and technical experts to start discussing the problem of legal definitions and sovereignty

**Thank you for your time.
Questions?**

bweeden@swfound.org