

Space Security and Emerging Security Challenges: Close Approaches, Responsible Behavior, and US-India Cooperation in Space

Victoria Samson, Secure World Foundation

Presentation for NIAS-CISAC Dialogue On India-US Cooperation on
Global Strategic Security Threats of the 21st Century

Bengaluru, India

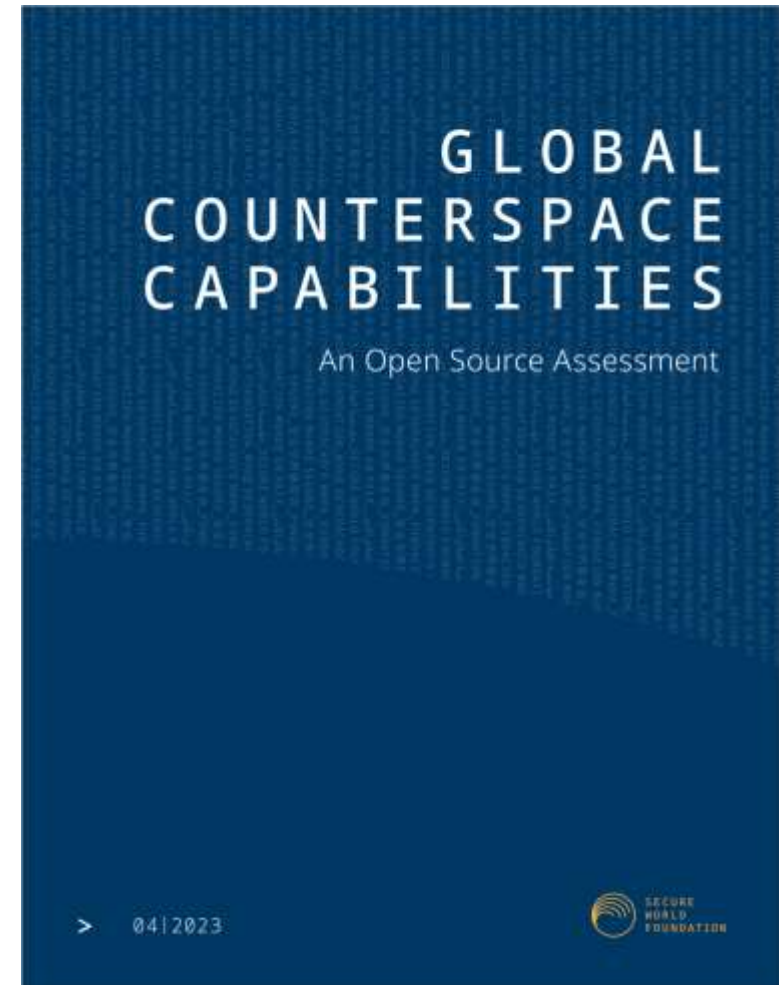
Sept. 26, 2023



SECURE
WORLD
FOUNDATION



- Existence of counterspace capabilities is not new, but the circumstances surrounding them are
- Significant R&D/testing of a wide range of destructive & non-destructive counterspace capabilities by multiple countries
- ***Only non-destructive capabilities are actively being used in current military operations***



<https://swfound.org/counterspace>



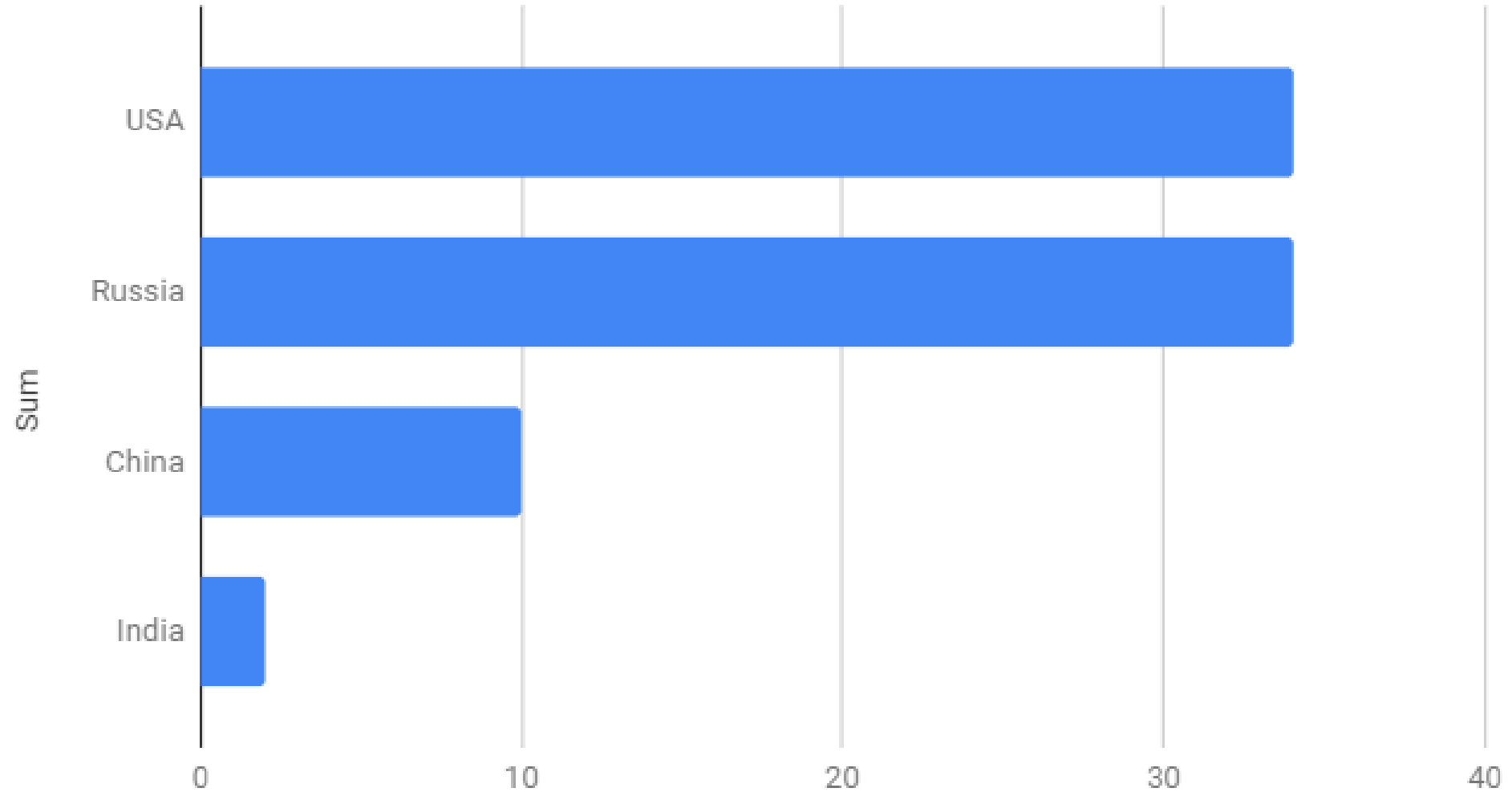
2023 Global Assessment

| | U.S. | Russia | China | India | Aus. | France | Iran | Japan | North Korea | South Korea | U.K. |
|-----------------------------|------|--------|-------|-------|------|--------|------|-------|-------------|-------------|------|
| LEO Co-Orbital | □ | ▲ | □ | ● | ● | ● | ● | ● | ● | ● | ● |
| MEO/GEO Co-Orbital | □ | ▲ | □ | ● | ● | ● | ● | ● | ● | ● | ● |
| LEO Direct Ascent | □ | □ | ▲ | □ | ● | ● | ● | ● | ● | ● | ● |
| MEO/GEO Direct Ascent | □ | □ | □ | ● | ● | ● | ● | ● | ● | ● | ● |
| Directed Energy | □ | □ | □ | ● | ● | □ | ● | ● | ● | ● | ● |
| Electronic Warfare | ▲ | ▲ | ▲ | □ | □ | □ | □ | ● | □ | □ | ● |
| Space Situational Awareness | ▲ | ▲ | ▲ | □ | □ | □ | □ | □ | ● | □ | □ |

Legend: none ● some □ significant ▲



ASAT Tests by Country





ASAT Tests by Year

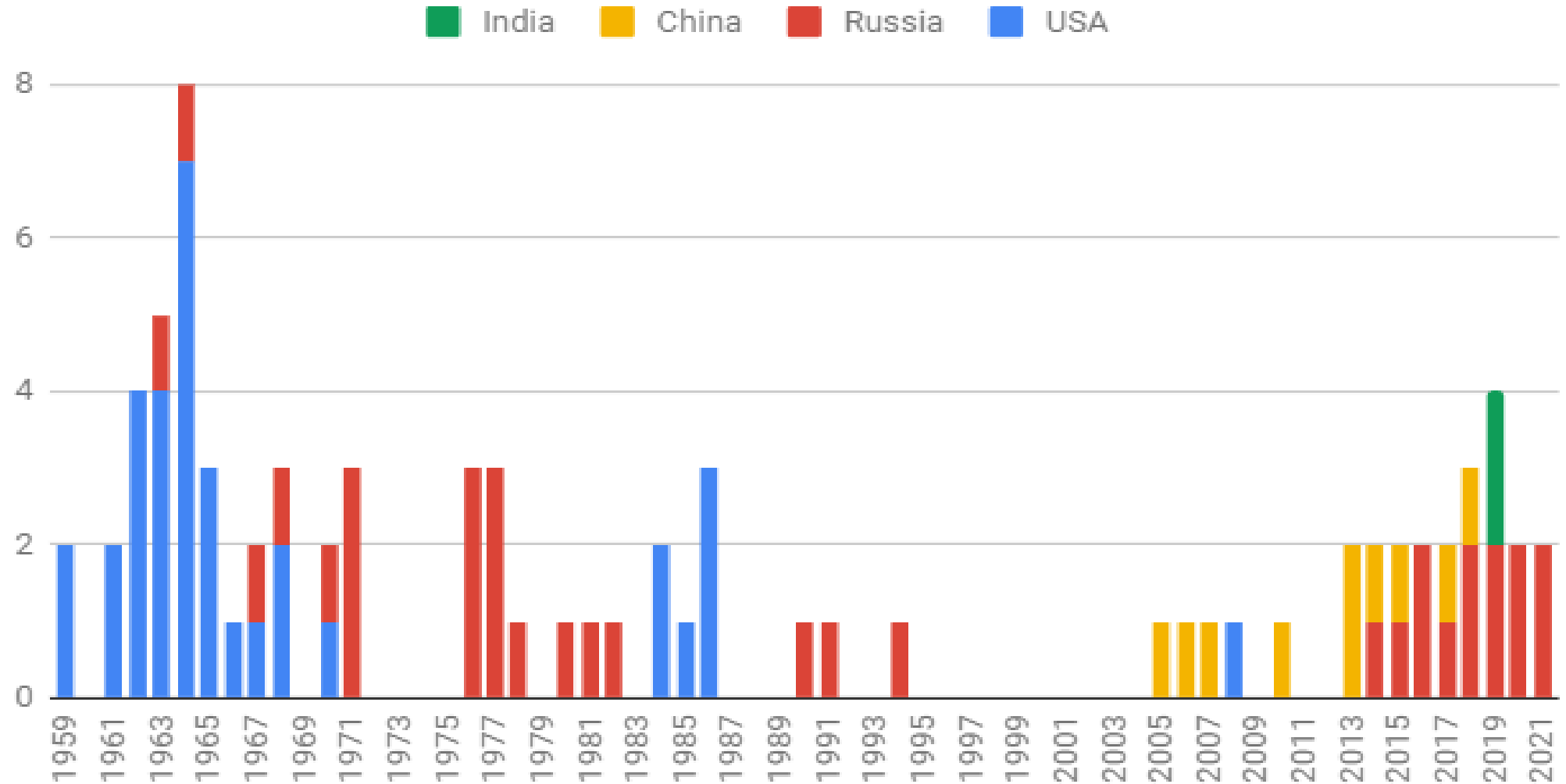




TABLE 5-1 – ORBITAL DEBRIS CREATED BY ASAT TESTS IN SPACE

| DATE | COUNTRY | ASAT SYSTEM | TARGET | INTERCEPT ALTITUDE | TRACKED DEBRIS | DEBRIS STILL ON ORBIT | TOTAL DEBRIS LIFESPAN |
|----------------|---------|---------------|-------------|--------------------|----------------|-----------------------|-----------------------|
| Oct. 20, 1968 | Russia | IS | Cosmos 248 | | 252 | 79 | 50+ years |
| Oct. 23, 1970 | Russia | IS | Cosmos 373 | | 147 | 35 | 50+ years |
| Feb. 25, 1971 | Russia | IS | Cosmos 394 | | 118 | 45 | 50+ years |
| Dec. 3, 1971 | Russia | IS | Cosmos 459 | | 29 | 0 | 3.3 years |
| Dec. 17, 1976 | Russia | IS | Cosmos 880 | | 127 | 57 | 45+ years |
| May 19, 1978 | Russia | IS-M | Cosmos 970 | | 73 | 64 | 40+ years |
| Apr. 18, 1980 | Russia | IS-M | Cosmos 1171 | | 48 | 6 | 40+ years |
| Jun. 18, 1982 | Russia | IS-M | Cosmos 1375 | | 64 | 60 | 35+ years |
| Sept. 13, 1985 | U.S. | ASM-135 | Solwind | 530 km | 287 | 0 | 18+ years |
| Sept. 5, 1986 | U.S. | Delta 180 PAS | Delta 2 R/B | | 17 | 0 | < 1 year |
| Dec. 26, 1994 | Russia | Naryad-V? | Unknown | | 27 | 24 | 25+ years |
| Jan. 11, 2007 | China | SC-19 | FengYun 1C | 880 km | 3536 | 2786 | 15+ years |
| Feb. 20, 2008 | U.S. | SM-3 | USA 193 | 220 km | 175 | 0 | 1+ year |
| Mar. 27, 2019 | India | PDV-MK II | Microsat-R | 300 km | 130 | 1 | 3+ years |
| Aug.-Dec. 2019 | Russia | Cosmos 2535 | Cosmos 2536 | | 30 | 16 | 3+ years |
| Nov. 15, 2021 | Russia | Nudol | Cosmos 1408 | 470 km | 1790 | 300 | Unknown |
| Total | | | | | 6850 | 3472 | |



Close approaches and effects on space stability

- Uncoordinated close approaches: potential for (inadvertent) escalation
- Not as easy to make hard and fast requirements about
- Different risk assessments by different actors in space
- Very few hard “rules” about what is and isn’t allowed
 - Intent is key – how do you demonstrate intent?
 - Need for rules of the road: right of way, ways to quickly communicate amongst actors, IncSea for space?
 - Role of space situational awareness and its limitations



Responsible behavior in space

- Just wrapped up two-year process of UN Open-ended Working Group on Reducing Space Threats
 - Success? Yes and no
- Interest converging on many issue areas, including avoiding deliberate creation of debris, need for rules on actions (notifications, consultations) prior to conducting rendezvous and proximity operations, value of TCBMs
- Jessica West (Ploughshares) analysis of types of recommendations for responsible behavior: operating with due regard, sharing information, avoid contamination of space environment, avoid harmful interference, non-use of force



Tools for improving communications, transparency

- **Lexicon for Outer Space Security**
 - Intended to facilitate shared understandings of key topics and terms
 - Three types of terms:
 - Acronyms
 - Common definitions
 - Terminology frequently used in space security discussions that could benefit from further clarification
- **Space Security Portal (<https://spacesecurityportal.org/>)**
 - Interactive map of global space governance landscape
 - Seeks to support informed participation by interested stakeholders and support transparency, information-sharing, and capacity-building



US-India Cooperation in Space

- Signed SSA agreement
- Multilateral discussions on space security – some space between US and Indian positions
- The Moon
 - Artemis Accords helps possibility of cooperation
 - China-Russia International Lunar Research Station possible competing governance model
 - 106 cislunar and lunar missions by 19 countries and one multilateral organization (ESA)
 - Complications on Earth replicating on the Moon?

Questions?

Thanks.

Victoria Samson,
vsamson@swfound.org

@SWFoundation

