



Promoting Cooperative Solutions for Space Sustainability

Global Counterspace Proliferation and Space Arms Control

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Defense Threat Reduction Agency Strategic Forum
April 21, 2021

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Overview

- Counterspace proliferation
 - Definitions
 - Current global capabilities
 - Historical trends
- Space arms control
 - Brief history
 - Current initiatives
 - Challenges



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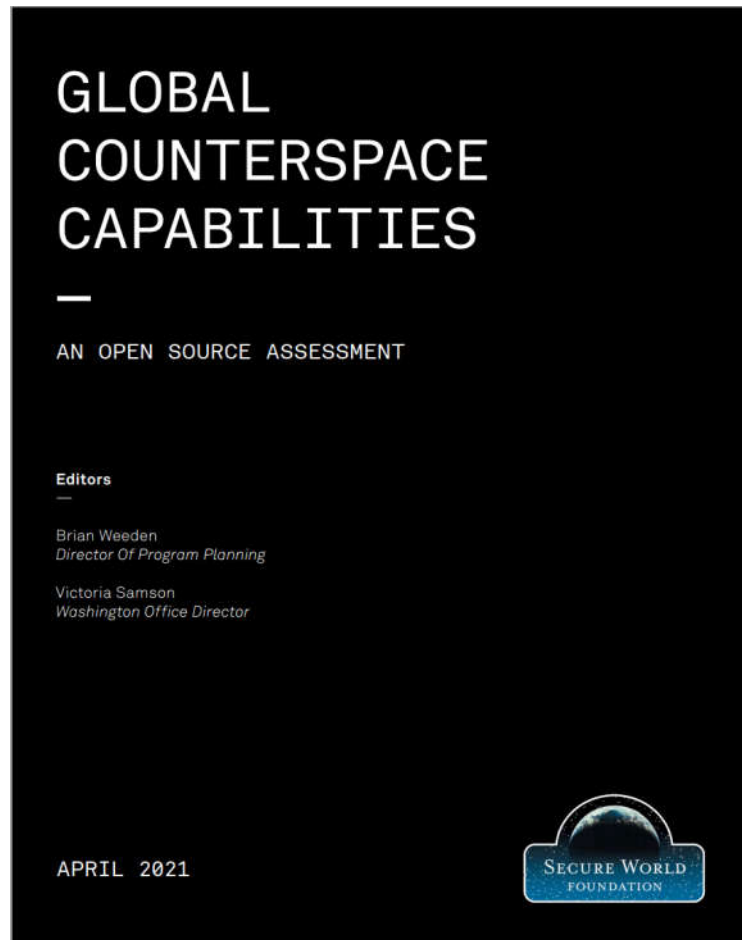
Categories of counterspace capabilities

- **Direct Ascent:** weapons that use ground, air-, or sea-launched missiles with interceptors that are used to kinetically destroy satellites through force of impact, but are not placed into orbit themselves;
- **Co-orbital:** weapons that are placed into orbit and then maneuver to approach the target to attack it by various means, including destructive and non-destructive;
- **Directed Energy:** weapons that use focused energy, such as laser, particle, or microwave beams to interfere or destroy space systems;
- **Electronic Warfare:** weapons that use radiofrequency energy to interfere with or jam the communications to or from satellites;
- **Cyber:** weapons that use software and network techniques to compromise, control, interfere, or destroy computer systems.
- **Space Situational Awareness:** knowledge about the space environment and human space activities that enables both offensive and defense counterspace operations



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Proliferation of counterspace threats



[Secure World Foundation \(2021\)](#)



[Center for Strategic and International Studies \(2021\)](#)

- Recapitalizing several counterspace capabilities they had during the Cold War
- Multiple tests of ground-based DA-ASAT / mid-course missile defense interceptors
 - But system not likely operational yet
- Operational deployment of ground-based laser dazzlers
- Multiple demonstrations of on-orbit rendezvous and proximity operations (RPO) in both LEO and GEO
 - Two of which involved high-speed releases of “subsattellites”
- Operational use of EW capabilities to support integrated military operations in Syria and Ukraine
- Good SSA capabilities (better in GEO than LEO)
- Recent reorganization combines space, air defense, and missile defense

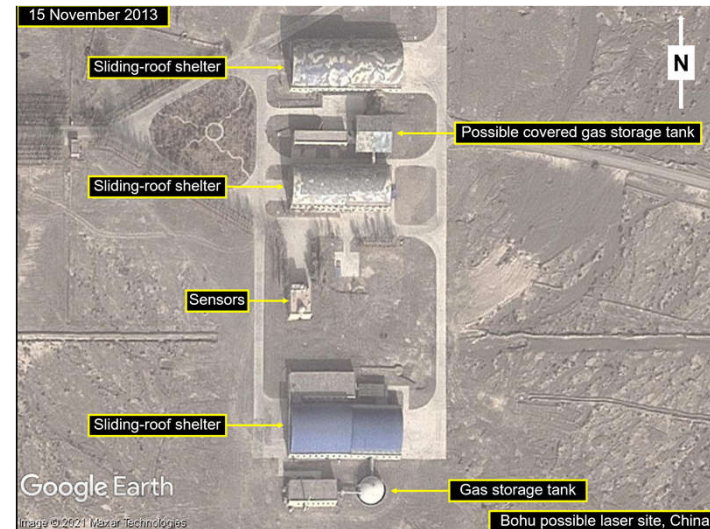


Russian Peresvet mobile laser dazzler



Russian Nudol mobile DA-ASAT

- Sustained effort to develop a wide range of counterspace technologies
- Multiple tests of ground-based DA-ASATs / mid-course missile defense interceptors
 - Could be developing as many as 3 different types
 - Likely operational deployment of counter LEO capability
- Multiple demonstrations of on-orbit RPO in LEO and GEO but unclear if weapons-related
 - Could be general tech development and/or intelligence collection
- Likely strong EW and DEW capabilities, but no public evidence of use in current military ops
- Improving SSA capabilities (but still likely limited)
- Strong focus on doctrinal/organizational integration of counterspace
 - Strategic Support Force



Likely Chinese DEW installation near Bohu



DF-21 MRBM, which is the basis for the SC-19 mobile DA-ASAT

Iran and North Korea

- Nascent space programs with very limited technical capabilities
- Likely to have some components for a DA-ASAT but not all and no indication of any dedicated R&D or testing
- Very limited capabilities for sophisticated satellites or RPO, no indication of any dedicated R&D or testing
- Demonstrated operational use of EW against commercial SATCOM and public GPS
- Very limited SSA capabilities



New IRGC military space launch pad near Shahrud

- Big shift since 2008 to add dedicated military space program to long history of civil efforts
- Existing BMD and ballistic missile programs provided baseline for DA-ASAT capability
- Successful test in March 2019 with destruction of Microsat-R
- Recently signaled interest in DEW



*“Gun camera” footage from official DRDO video on Mission Shakti.
Source: <https://www.youtube.com/watch?v=KR79t6z7fc>*



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France and Japan

- France
 - Recent shift to put stronger focus on military space program and counterspace capabilities
 - Currently developing “active defense” capability to counter hostile GEO RPO
 - Small satellites equipped with SSA sensors and DEW capabilities
 - Also bolstering SSA capabilities (ground and space-based)
- Japan
 - Passed Basic Space Law in 2008 that allowed for national security-related space activities
 - Has expressed interest in developing offensive and defensive counterspace capabilities & and is actively exploring whether or not to develop them
 - Bolstering SSA capabilities (ground and space-based)

- Had multiple offensive ASAT programs during the Cold War
- Currently conducting multiple tests & ops mission of RPO in LEO and GEO
- No acknowledged current DA-ASAT capability, but significant hit-to-kill BMD that can be used in ASAT role
- Strong EW and cyber capabilities
- Significant DEW R&D program
- Large reorganization underway with creation of US Space Force and reestablishment of US Space Command
- Policy/doctrinal focus on space warfighting



*U.S. Counter Communications System
Block 10.2. Credit: [U.S. Space Force](#)*



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Global assessment

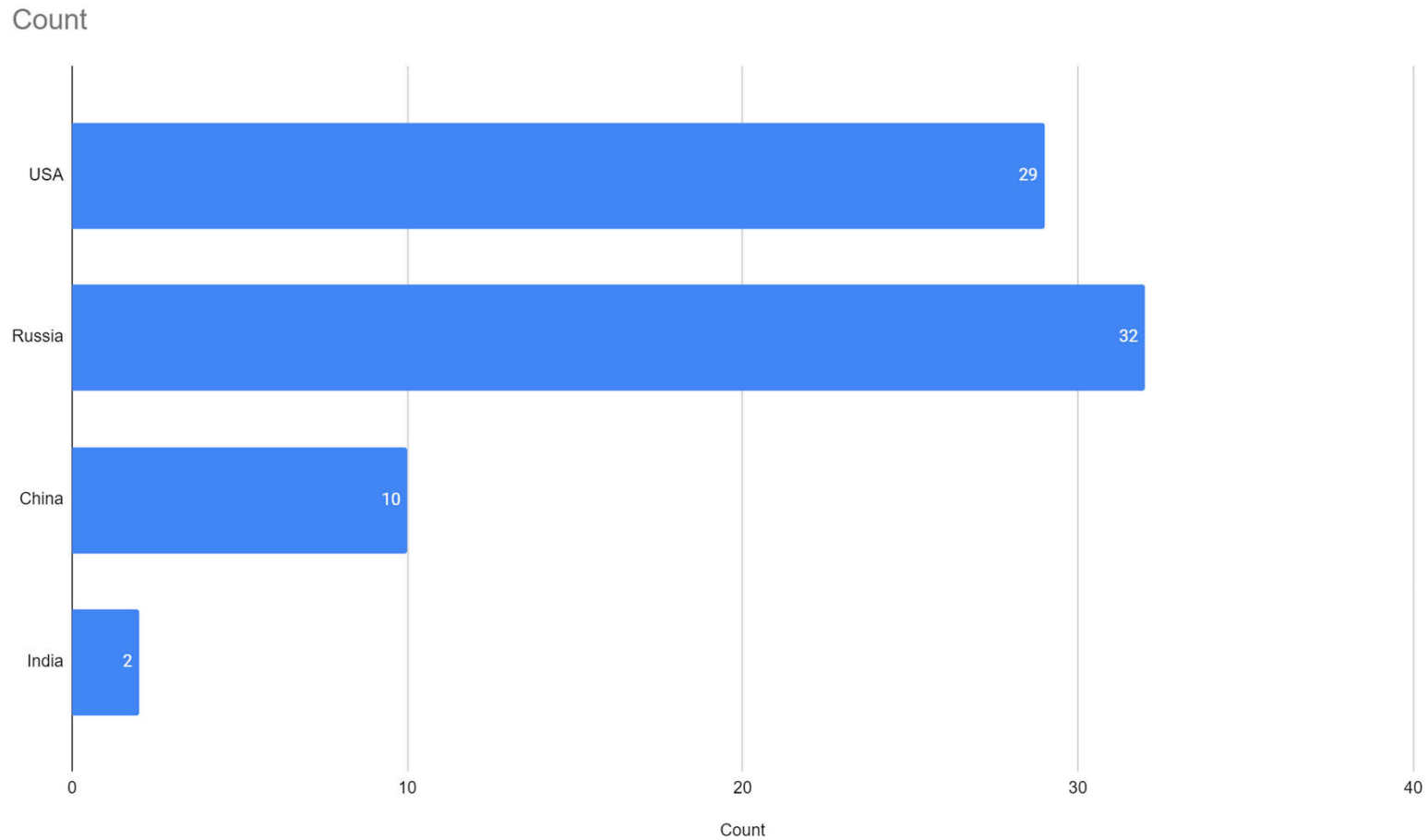
	China	Russia	U.S.	France	India	Iran	Japan	North Korea
LEO Co-Orbital	Y	G	Y	R	R	R	R	R
MEO/GEO Co-Orbital	Y	Y	Y	R	R	R	R	R
LEO Direct Ascent	G	Y	Y	R	Y	R	R	R
MEO/GEO Direct Ascent	Y	Y	Y	R	R	R	R	R
Directed Energy	Y	Y	Y	Y	R	R	R	R
Electronic Warfare	G	G	G	Y	Y	Y	R	Y
Space Situational Awareness	G	G	G	Y	Y	Y	Y	R

Legend: none **R** some **Y** significant **G**



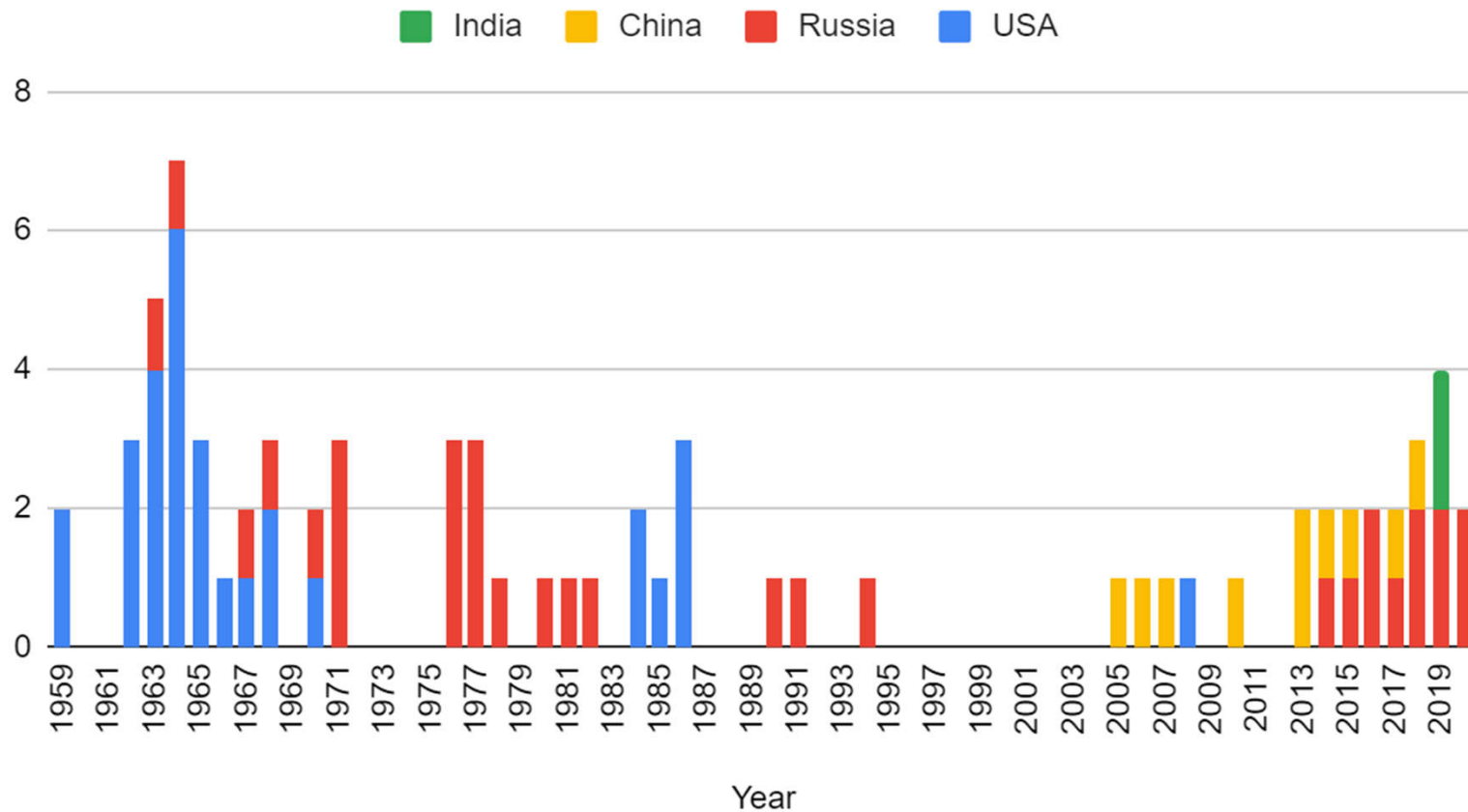
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ASAT tests by country



Source: [History of ASAT Tests in Space](#) (SWF)

ASAT Tests By Country and Year



Source: [History of ASAT Tests in Space \(SWF\)](#)



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Space Arms Control

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US policy on space arms control

- From Eisenhower through Carter, the US was supportive and actively engaged in space arms control efforts
 - 1967 Outer Space Treaty banned placement of WMD in orbit and military installations, maneuvers, & weapons testing on the Moon and other celestial bodies
 - Language on “non-interference with national technical means” in nuclear arms control treaties
 - Carter Admin pursued “dual track” development of operational US ASAT system and arms control discussions with Soviets
- Things changed under Reagan Admin and the push for SDI
 - Gorbachev wanted to limit SDI to laboratory as part of new nuclear arms control, but Reagan refused
- With exception of Bush W Admin, every administration since has been open to space arms control but not made it a priority
 - Strong preference for ensuring US freedom of action in space
 - Considerable domestic political resistance to new “treaties” since 1980s



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2020 U.S. National Space Policy

- The Secretary of State, in coordination with the heads of agencies, shall:
 - Carry out diplomatic and public diplomacy efforts to strengthen the understanding of, and support for, United States national space policies and programs and to promote the international use of United States space capabilities, systems, and services;
 - Encourage international support for the recovery and use of outer space resources;
 - Lead the consideration of proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies;
 - Pursue bilateral and multilateral transparency and confidence-building measures to encourage responsible actions in, and the peaceful use of, outer space to strengthen the safety, stability, security, and long-term sustainability of space activities, to increase predictability and reduce the risk of misunderstanding and inadvertent conflict escalation; and
 - Cooperate with likeminded international partners to establish standards of safe and responsible behavior, including openness, transparency, and predictability, to facilitate the detection, identification, and attribution of actions in space that are inconsistent with the safety, stability, security, and long-term sustainability of space activities.



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Recent multilateral initiatives

- Formal multilateral discussions on space arms control in the Conference on Disarmament (CD) have been at a standstill for decades
- Since 2008, Russia and China have been pushing the Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects (PPWT)
 - Prohibits placement of weapons in outer space and threat or use of force against space objects
 - Does not prohibit development or deployment of ground-based ASAT weapons
- Russia has also recently floated a proposal for “No First Placement of Weapons in Space”
- The US has strongly opposed these efforts but has not offered an alternative



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Shift to norms/TCBMs

- EU-initiative for a Space Code of Conduct
 - EU members agreed to Code in 2008, then opened for international participation
 - US rejection led to new round of negotiations on International Code of Conduct in 2012
 - Ultimately failed in 2015 due to lobbying from Russia and China and lack of support from the US
- Group of Governmental Experts (GGE) on Transparency and Confidence-building Measures (TCBMs) in Outer Space Activities
 - Successful in coming to consensus in 2013, but little follow-thru
- GGE on Further Practical Measures for the Prevention of an Arms Race in outer space (PAROS)
 - Met in 2019, could not come to consensus & leaked draft report undermined confidence in future processes
- UK resolution “Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours”
 - Passed UNGA in December 2020
 - States are to submit nation views by May 3, will be reported to UNGA this fall



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Key Issues

- US, Russia, China, and India are all pursuing DA-ASATs for different reasons
 - Russia: prevent US space-based missile defense from undermining nuclear deterrent
 - China: deter US from interfering in its backyard by holding US ships at risk
 - US: counter Chinese ISR/ASBMs to enable the US to operate in First Island Chain
 - India: Be seen as a space power & get a seat at the table
- Linkage between space arms control, missile defense, and nuclear stability
- Challenges in defining what a “space weapon” is
 - Current movement to shift to controlling actions instead of things
- Verification regime?
 - SSA could be the foundation, but a lot more work needs to be done



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Thank you. Questions?

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