ISSUE BRIEF

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SPACE DEBRIS: A CHALLENGE TO SPACE ASSETS

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In January 2022, a Chinese satellite was nearly hit by a piece of debris created by Russia's recent anti-satellite test (ASAT). According to the Space Debris Monitoring and Application Center of the China National Space Administration, it came within striking distance of a Chinese satellite that was "extremely dangerous." This is just the tip of the iceberg that is presented by space debris. Any time an ASAT is conducted or other destructive activity occurs in outer space, it creates thousands of pieces of debris – big and small – that threaten satellites and space stations. With the world increasingly relying on satellites for civil as well as military purposes space debris is an issue that warrants attention.

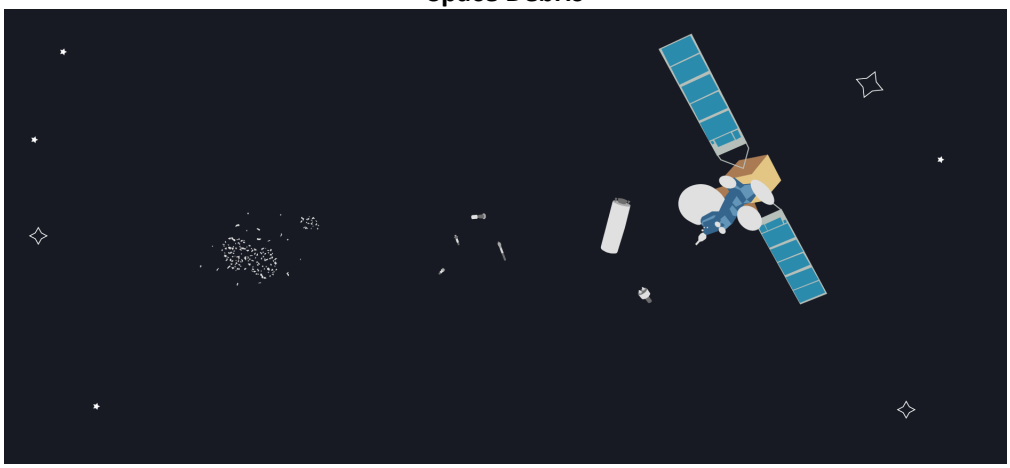
According to Chinese sources the debris came as close as 14.5 meters (approximately 48 feet) from the satellite and a collision could have caused a "hypersonic shockwave." Russia conducted a direct-ascent ASAT in November 2021, which has been condemned by the US and Western allies as dangerous and irresponsible. According to the US Space Command, the Russian test generated "more than 1,500 pieces of trackable orbital debris and will likely generate hundreds of thousands of pieces of smaller orbital debris."[1] However, this has not been the only ASAT test in recent years. China, Russia, the US and India have also conducted ASAT tests.

1 Kristin Fisher, "Debris from Russian Missile Test nearly Strikes a Chinese Satellite," *CNN*, https://edition.cnn.com/2022/01/21/world/russian-missile-test-debris-chinese-satellite-intl/index.html

Space debris encompasses both natural objects like meteoroids and artificial orbital debris. While meteoroids are in orbit about the sun, most man-made debris is in orbit about the Earth and includes nonfunctional spacecraft, abandoned launch vehicle stages, mission-related debris and debris from ASAT activities.

Space debris is problematic because it travels at tremendous speeds and is harmful to space stations and satellites. Both debris and spacecraft travel at extremely high speeds (at 15700 mph) so even a small piece of debris can create havoc to satellites and space assets. More than 27,000 pieces of orbital debris are tracked by the Department of Defense's global Space Surveillance Network (SSN) sensors. However, there are thousands of pieces of more debris that are too small to be tracked, but still capable of harming space activities.[2]

Space Debris



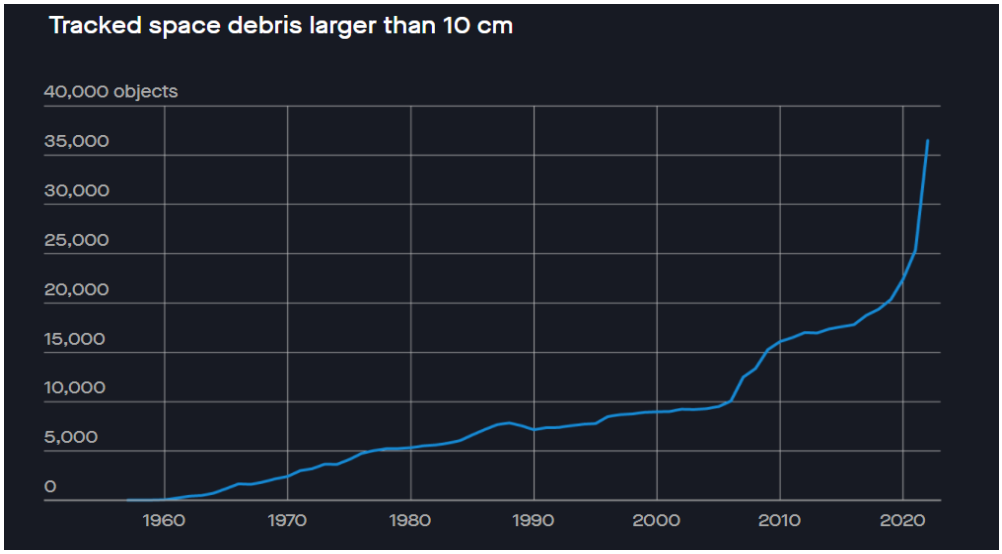
330 million+ objects less than 1 cm | **1 million+ objects more than 1 cm** | **36,500+ objects greater than 10 cm**

Source: Clarisa Diaz "The World Urgently needs a New Way to Track Space Junk," February 3, 2022, https://qz.com/2117677/the-world-urgently-needs-a-new-way-to-track-space-junk/

With increasing ASATs in recent years and a move towards offensive space capabilities, space debris is set to increase. Moreover, space junk remains orbiting around space for a long time. There is a recent warning from astronomers that a piece of space junk from a SpaceX rocket launched by the US in 2015 is hurtling toward the moon and is set to crash on the moon on March 4.[3]

2 "Space Debris and Human Spacecraft," NASA, May 26, 2021, https://www.nasa.gov/mission_pages/station/news/orbital_debris.html

3 "A Piece of Space Junk the Size of a School Bus is Barreling Straight Toward the Moon," NPR, February 2, 2022, https://www.npr.org/2022/02/02/1077306944/rocket-spacex-moon-crash

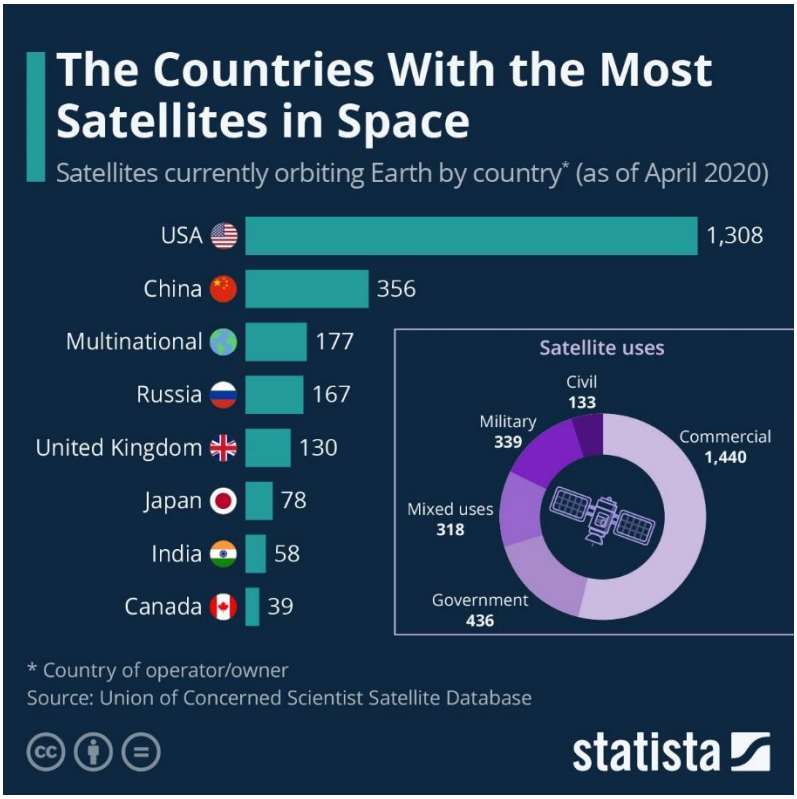


Source: Diaz " The World Urgently needs a New Way to Track Space Junk."

Some experts are saying that humanity could get to the point where there is so much debris that we will not be able to launch any more satellites into space in 50 years. Another huge concern is Kessler's Syndrome. This is when objects in space start colliding with each other, causing a cascading effect and creating more.[4]

This issue is compounded by a lack of political will by great powers to discuss any sort of arms control in outer space. There are also no regulations or efforts to discuss, control and mitigate space debris in the international arena. This is a cause of concern since the world is increasingly relying on satellites for activities ranging from telecommunication, health and agriculture sector, disaster management, navigation, as well as for military purposes. Space capabilities are an integral part of national, regional and global security. It is thus important to take measures to keep it safe for space activities.

4 Ibid.



Possible ways to control, regulate and mitigate the menace of space activities are vital to keeping space safe for our generations to come. Possible measures could be a mechanism for notification of outer space activities such as pre-notification of launches, possible break-ups in orbits or re-entry of space objects that may cause harm in the earth's atmosphere and on Earth. A commitment to outer space law is needed. A step could be wider adherence with the UN Convention on Registration of Outer Space Objects (1975) which has 25 signatories and 71 parties including India and Pakistan.[5] Under this convention, state parties are required to provide basic information about their satellites launched into outer space.

Countries with most space satellites and assets are most vulnerable to ASATs, offensive space capabilities and space debris. The largest satellites and space assets are owned by the US, China and Russia. World powers, thus, need to work on negotiating an ASAT treaty and managing space debris. World powers need to come together and make concerted efforts to regulate space. Space is a global commons that needs to be kept safe for humanity. Thus, there is an urgent need to discuss the problem and possible solutions to space debris.

5 "Convention on Registration of Outer Space Objects," https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXIV-1&chapter=24&Temp=mtdsg3&clang=_en

