



# CENTRE FOR AIR POWER STUDIES

New Delhi

CAPS InFocus: 24/2021

21 November 2021

## Russia Tests an ASAT Weapon: Space Sustainability Takes a Hit Again

Gp Capt T H Anand Rao  
*Senior Fellow, CAPS*

**Keywords:** ASAT, Debris, Weapons, Satellite, UN, Russia, LEO



**Disclaimer:** The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS]



This work is licensed under Creative Commons Attribution – Non-Commercial – No Derivatives 4.0 International License.

Close on the heels of the 76<sup>th</sup> session of United Nations General Assembly, in which the First Committee approved a draft resolution on “Reducing space threats through norms, rules and principles of responsible behaviors” on November 01, 2021<sup>1</sup>- to address a widespread concern against any debris creating activity in space - the world witnessed yet another Anti-Satellite Test (ASAT), this time by Russia. The global space community is outraged and anguished with Russia for violating the norms of behaviour in space and a total disregard for sustainability of the space environment. India too faced a similar situation when it conducted an ASAT test in March 2019, albeit at a lower altitude with much less debris fallout.

In the early hours of November 15, a new debris field was detected in Low Earth Orbit (LEO) by the United States space surveillance network and Leo Labs (a commercial space tracking entity). The new debris field which was observed at altitudes of 400 – 450 km, was identified as a split up of a Russian dead satellite - Cosmos 1408 - which orbits at an altitude of around 480 km.<sup>2</sup> This event posed an imminent risk of collision with the International Space Station (ISS) which orbits at an altitude of 419 km and forced a debris avoidance action by the crew onboard. A day later, the Russian news agency announced an ASAT missile test that targeted an old Russian satellite with precision and denied allegations by the US and UK that the test had been dangerous for orbiting spacecraft.<sup>3</sup> Media reports have indicated that Cosmos 1408, a satellite which had been in orbit since 1982, was deliberately struck by an A-235 PL-19 Nudol 'satellite killer' missile fired from the Plesetsk cosmodrome. 1500 pieces of debris have been reported from this ASAT event.<sup>4</sup>

There is widespread shock and condemnation for this deliberate act by Russia. Some even termed it as a reckless act which will de-stabilise outer space and lead to weakening the efforts at arms control in space. More countries could follow suite as there are no legal regulations that could prevent weapons proliferating into outer space. Russia on the other hand defended its action. A Russian defence ministry official was quoted saying that Russia was forced to strengthen its defence capabilities because of weapons tests by the US and the formation of a Space Force. He also denied that the test could pose any risk to the ISS.<sup>5</sup> The fact that US, China and India have conducted similar tests in the past could not possibly be a justification for any country to create more debris in space, let alone Russia.

The Americans seem to be more concerned about the risk to the ISS than about the addition of more debris in space. Russian cosmonauts are also onboard the ISS and it is very unlikely that Russia would do anything that could harm this harmonious joint working arrangement. There are speculations though, that Russia perhaps timed the ASAT test to raise tensions in region and alarm US prior to a possible military action on the Uzbekistan border where Russian troops and military

equipment are deployed<sup>6</sup>. The weapon used for the ASAT test is said to be the PL-19 Nudol, which has been launched several times in the past successfully. However, this is the first successful physical impact with a satellite. It can thus be said that the test was a requirement to validate the PL-19 Nudol's ASAT capability. This also means that the Russian ASAT is a likely weapon to be used in any future conflict, debris notwithstanding. It calls into question Russia's commitment to their proposals for long term sustainability of outer space and their inclination to prevent an arms race in outer space. It may be recalled that Russia and China had together drafted the treaty on the Prevention of the Placement of Weapons in Outer Space (PPWT) in 2008 which could not gather a consensus amongst member states. Also, in the response submitted to UN General Assembly following Resolution 75/36 on reducing space threats through norms, rules and principles of responsible behaviours, Russia had expressed a strong desire for prohibition on ASAT testing and on proliferation of debris creating weapons into space.

On the issue of space debris, it is certainly a setback for every space aspiring nation. The worry is not much about the 1500 pieces of debris that have been added to the existing debris count, but it is the spread of debris cloud which ranges from 300 km to 1100 km<sup>7</sup> which is a matter of serious concern. Though most of the debris will re-enter the atmosphere in time durations varying from months to years, some of the debris may stay in orbit for many decades. The uncertain nature of the debris gives rise to many complications. Firstly, this height band has the highest density of satellites and many more satellites in constellations are planned to be inserted. SpaceX has already inserted 1584 Starlink satellites in a 550 km orbit against the planned 12000. One Web has already inserted 358 satellites in a 1200 km orbit. Many more companies are entering the LEO arena, and existing constellations are set to expand. By 2030, it is projected that the active satellite count will reach 100,000<sup>8</sup>. Even today, 83% of all satellites are orbiting in LEO which makes it a very dense environment. Any additional debris creating event will only make the LEO environment more complicated to operate in. Secondly, collision events in LEO may be seen more often due to the absence of any regulations towards space traffic management. Also, most small satellites are not manoeuvrable or have limited collision avoidance capability. Any collision will increase the debris count manifold, making space traffic management more complicated. Thirdly, the existing space observation capabilities have severe limitations, which precludes visibility of small objects with size less than 10 cm. Also, vast portions of outer space remain unscanned. This means that the uncertainty quotient will always remain. We need to develop ways to operate in such an environment.

Russia has taken the world a step backward in their efforts towards reducing threats in space. Though it is not clear as to why they had to do this test, the event may have presented another

opportunity to make a push towards banning kinetic ASAT tests through a test ban treaty. Gathering a consensus on a ban treaty may take time. In the meanwhile, the proposed 'Guidelines for ASAT tests' could be revisited. In 2018, the United Nations Institute for Disarmament Research (UNIDR) had suggested three ASAT guidelines which could not be implemented due to a lack of consensus. The guidelines were<sup>9</sup>:

- States testing ASAT capabilities should not create any space debris.
- If debris is inevitable during an ASAT test, it should be carried out at an altitude sufficiently low so that debris is short-lived.
- Notification needs to be issued prior to an ASAT test, to avoid misidentification.

Notwithstanding the rationale, Russia's action of deliberately creating orbital debris in the most crowded region of Earth orbit is extremely irresponsible. Orbital debris poses a risk of loss of space services and contamination of the space environment, an issue as serious as the global warming phenomena. The reading on the wall is very clear. If we disregard the sanctity of the space environment, space will defy us. Exploitation of outer space needs to be regulated with a firm space governance mechanism. Transparency in space operations and punitive actions for defaulters are the need of the day. The issues brought out need to be viewed dispassionately to resolve them in a time bound manner. The UN mandated establishments can play a proactive role in gathering consensus amongst member states.

## Notes

<sup>1</sup> Meetings Coverage and Press Releases, at <https://www.un.org/press/en/2021/gadis3676.doc.htm>, accessed on November 19, 2021.

<sup>2</sup> Eric Berger, 'New images and analyses reveal extent of Cosmos 1408 debris cloud', web article at <https://arstechnica.com/science/2021/11/new-images-and-analyses-reveal-extent-of-cosmos-1408-debris-cloud/>, accessed on November 17, 2021, and Satellite orbital data for cosmos 1408 at [n2yo.com](https://n2yo.com).

<sup>3</sup> Tom Balmforth, 'Razor-sharp precision': Russia hails anti-satellite weapons test', web article on November 18, 2021, at <https://www.reuters.com/business/aerospace-defense/russia-dismisses-us-criticism-anti-satellite-weapons-test-2021-11-16/>

<sup>4</sup> By Chris Pleasance, Ross Ibbetson for Dailymail news article at <https://www.dailymail.co.uk/news/article-10208207/Dramatic-recording-captures-moment-ISS-crew-scramble-evacuate-Russian-missile-blast.html>

<sup>5</sup> Ibid, n-3

<sup>6</sup> By Alexander Ward and Quint Forgey , 'Russia's anti-satellite test launches debris and sparks tensions' web article on November 15, 2021, at <https://www.politico.com/newsletters/national-security-daily/2021/11/15/russias-anti-satellite-test-launches-debris-and-sparks-tensions-495105>, accessed on November 19, 2021

<sup>7</sup> Ibid, n-2

<sup>8</sup> Irene Clotz, 'Burgeoning Satellite Industry Paving Way To \$1 Trillion Space Economy', August 24, 2021, web article at <https://aviationweek.com/aerospace/program-management/burgeoning-satellite-industry-paving-way-1-trillion-space-economy>

<sup>9</sup> 'Russia earns global ire over anti-satellite missile test: How these tests create problem of 'space junk'', web article at <https://www.firstpost.com/world/russia-earns-global-ire-over-anti-satellite-missile-test-how-these-tests-create-problem-of-space-junk-10140511.html>, accessed on November 19, 2021

