

# Bringing Order to Orbital Chaos?

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Three weeks ago, on 15 November 2021, a [Russian anti-satellite \(ASAT\) weapons test](#) was reported, raising serious [legal and political questions](#) about the prohibition of the use of force in outer space. Not only did the weapon target an old Russian satellite, whose destruction generated thousands of pieces of traceable orbital debris, but for the first time, the debris created from the collision directly endangered human lives in space. Astronauts aboard the International Space Station (ISS) had to take refuge in their docked capsules. The repercussions could be serious, since space debris linger in orbit for years to come, potentially causing more collisions (the so-called "[Kessler effect](#)"). US officials have categorized the move as "dangerous and irresponsible behaviour" which reignited concerns about an escalating arms race in space. [Russia](#), for its part, admitted to conducting an ASAT test but denied being the cause of any "dangerous" behaviour.

Outer space is an area beyond national jurisdiction, where intentional collision may create unintended consequences. A fast-growing problem derived from space exploration and experimentation is the proliferation of space debris, which can be [defined](#) as "[a]ll man-made space objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional". "[Hazardous](#)" space debris refers to separate parts and fragmented space objects that are likely to cause damage. Space exploration has enabled the modern world to achieve results in telecommunication, climate research, meteorology, navigation, and Earth observation. However, sending an unfathomable amount of objects into the Earth's orbit has resulted in enormous quantities of residual material being [dumped](#) in space.

The Russian incident is not an isolated one. On 11 January 2007, China conducted an ASAT test, targeting one of its non-operational weather satellites ([FY-1C Fengyun](#)). The collision created one of the largest space debris clouds ever observed and presented severe outer space complications. Among these is a considerable amount of space debris that will reside in low Earth orbit for several decades, posing a threat to other space objects, such as the ISS. Despite the risk of harm, China has not been held responsible for the incident under international law due to the fragility of the outer space regime and to [political motivations](#). This precedent raises the question of whether, and if so how, Russia will be held responsible for the cloud of space debris it generated two weeks ago.

The [1967 Outer Space Treaty](#) (OST) does not prohibit the placement or use of ASAT weapons in outer space. It only prohibits nuclear weapons or weapons of mass destruction from being used in outer space, meaning ASAT weapons are [excluded](#) from this provision. Nevertheless, such an operation is still subject to certain conditions such as Article IX of the OST stating:

“if a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space (...) would cause potentially harmful interference with activities of other States Parties (...), it shall undertake appropriate international consultations before proceeding with any such activity or experiment”.

At issue here is the allegation that Russia did not consult with other states parties before conducting the ASAT test, putting the lives of the astronauts onboard the ISS at risk and placing Russia in direct violation of the OST, to which it is a party. However, due to competition between major spacefaring nations, interest in the development of ASAT weapons by other States, and the general reluctance of States to reveal too much about their space activities, given the high geopolitical value of such information, there is a [lack of practical application](#) of Article IX, making it a dead letter more than an enforceable provision.

Despite the limitations of the current outer space regime, the severe threat to space security posed by Russia’s ASAT test may engage its international responsibility. According to Article VIII of the OST, launching States shall retain “jurisdiction and control” over their space object. Since a space object may also include [parts of a satellite](#), Article VIII could also be applied to strengthen the liability claim by arguing that Russia lost control of the debris generated by the destruction of its satellite, thus failing to meet its obligation under the OST.

One could also interpret the OST per the standard of care provided for in Article 3 of the [2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities](#) and argue that the launching State, in this case Russia, had a duty of due diligence to prevent the collision of space objects in the name of space sustainability. Moreover, the intentional destruction of Russia’s satellite directly contradicts its [commitment](#) to maintaining a weapon-free outer space. This is evidenced by its draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, and its support for the adoption of the 2018 Guidelines for the Long-term Sustainability of Space Activities. By creating a cloud of dangerous space debris despite its commitment to keeping outer space safe, Russia’s behaviour violates the [principle of estoppel](#), according to which states must refrain from acting inconsistently to the detriment of other states.

Although Russia could be scrutinized for engendering a risk of significant harm, space politics may once again overcome an evolutionary interpretation of the OST. Launching states have a wide margin of appreciation in experimenting with test-missiles, due to weak enforcement of the liability regime in outer space law, as evidenced by the 2007 Chinese precedent. The fact that several spacefaring nation-states have [operational ASAT systems](#) and are interested in conducting their own operations complicates the case for liability.

However, Russia could be held liable if the space debris it created damaged the ISS or harmed the lives of the astronauts on board. Under Article VII of the 1972 Liability Convention, the fault of Russia would have to be proven, requiring the Claimant State to establish that Russia did not comply with neither international nor its own standards of debris mitigation. Similarly, one could also make the case that allowing

the destruction of satellites to continue unabated is tantamount to depriving the OST of its purpose and goal, which is to conduct science, share resources and to guarantee that space remains the common heritage of humanity.

To summarize, although the OST created an innovative regime of outer space governance in 1967, the Chinese and Russian incidents confirm there are significant shortcomings in keeping up with the contemporary space race. Among them, there is [no precise process or clear understanding of obligation](#) for those involved in the launch, operation, and disposal of space objects or debris. The ultimate question is whether nation-states will continue to value space activities over the atmosphere's sustainability. The only certainty is that until States are held accountable for their actions, it is unlikely there will be any significant improvements to the current outer space regime.

The challenges surrounding existing space law and the apparent impunity of states demonstrate a clear need for reform. The OST reform must take three significant and synchronised steps. First, following [emerging customary international law](#), the launch of ASAT missiles must conform to prior [environmental impact assessment in areas beyond national jurisdiction](#), when such hazardous activities are likely to cause significant harm in outer space. Then, if harm is done, the polluter-pays principle could offer more clarity as to the obligations of launching States and avoid impunity. In this scenario, those who produce space debris would have to bear the costs of managing it to prevent human and environmental damage. This first step would significantly align the outer space regime with the principle of due diligence, the prevention of harm and the polluter-pays principle found in international environmental law.

Second, instead of destroying obsolete satellites, spacefaring nations must attempt to recycle or revive them in conformity with UN principles of sustainable development. An abandoned satellite that is still functional and reusable is not technically waste. It is the launching state's extended responsibility to manage its fleet of abandoned satellites according to environmentally sound procedures. Under the OST, an inter-agency committee could identify and catalogue spacecraft that could be repurposed. Such adaptive re-use, according to space archaeologist [Alice Gorman](#), could contribute to building a cosmic heritage and reduce the need to keep launching new spacecraft. This second step would significantly lower the risk of occurrence of the Kessler syndrome, and align the outer space regime with heritage conservation practices and the model of the circular economy.

Finally, the third step would be to make standards of conduct regarding debris mitigation mandatory, and not simply voluntary. The 1972 Liability Convention must be [clarified](#) to better assess the standards of proof in attributing fault to the launching state for damaging activities. To incentivize interstate collaboration, State parties shall establish an Outer Space Compensation Fund to mutualize their compensation scheme for damage resulting from hazardous space debris collision with another object, especially in cases where the origin of the space debris causing the damage is unknown. This third step would align the outer space regime with [existing liability regimes and compensation funds](#) for damages caused by hazardous activities on earth.

In addition to legal considerations, practical initiatives should also be reviewed, mainly the experimentation and implementation of post-launch clean-up activities by launching states. For instance, to promote sustainability in space activities, the UK Space Agency has invested in two space firms to research the [UK-led mission to remove junk from space](#). Russia could follow suit, notably through the “[Foam Debris Catcher](#)”, a process invented by a Russian start-up that would allow Russia to take responsibility for cleaning up the cloud of debris it generated, provided the debris remains detectable. If enough time elapses and the debris becomes undetectable, virtually nothing can be done by the State to clean it up. Therefore, a mix of legal remedies and technical solutions will inevitably emerge from the rising risks and costs of future space activities.

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