

A BAN ON DESTRUCTIVE ANTI-SATELLITE WEAPONS: USEFUL AND FEASIBLE

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INTRODUCTION

The human presence in outer space has been relatively short—it has only been 50 years since Sputnik I was launched—and just now are we approaching the era in which we move beyond “what can we do?” to “what should we do?” in outer space. How do we care for this resource so that it can be used for many generations beyond this one? To be sure, for the most part, outer space is used well and in an orderly manner, and supports the operation of over 800 satellites amidst the detritus of 50 years of launches. We are developing intelligent policies for dealing with the most likely sources of conflict—overcrowding, the allocation of orbits and the creation of incidental debris. These are the most likely sources of conflict, but also those that have the most direct solutions.

A much more complicated set of issues is how to manage the likely inevitable conflict over the military utility of space.

The two baskets of issues, the environmental issues that threaten the sustainable use of outer space and the strategic issues that can engender instability and exacerbate conflict on the ground, are distinct, and separate approaches can be very useful. But they are also deeply intertwined in important ways: a failure in managing security problems will likely result in an environmental crisis in outer space, and vice versa.

Space operations could become too dangerous or too expensive because of the threat and use of ASAT weapons. If the transition to a future regime is not managed well, and satellites are seen as legitimate targets and outer space is cluttered with debris, outer space will become less and less useful, rather than more and more useful.

And when the uses of outer space are contested, it is critical that the conflict is managed in the most graceful manner possible and that it does not lead to dangerous reactions on Earth. For example, in simulated war games, when US reconnaissance satellites are lost, conflict quickly and violently escalates. The loss of early warning satellites (even if due to natural causes) in a world where ASAT weapons exist and proliferate can be expected to result in the same. The testing of destructive ASAT weapons indicates not only that the weapons exist, but also generates debris that increases the risk of accidentally disabling a satellite—the risks reinforce each other.

Conflict may be inevitable, but from that it does not follow that weapons in outer space are inevitable. It is likely that a mixture of arms control measures, “rules of the road”, and confidence-building measures will yield the greatest amount of collective security as well as preserve the many benefits of outer space for the long term.

MOVING FORWARD: A BAN ON DESTRUCTIVE ASAT WEAPONS

In this conference, we have heard a number of good ideas of ways to move forward, from the comprehensive treaty addressing space-based and ASAT weapons offered by the Russia, to the “rules of the road” discussed by Michael Krepon, to the ideas about more specific pieces of the puzzle that Kiran Nair, Jeffrey Lewis and David Wright alluded to. The speakers have elegantly set the context for me, and I am offering some ideas of where to start.

As my colleague David Wright mentioned, dangerous amounts of debris will be generated from the testing and use of destructive ASAT weapons and, depending on the altitude of the target, could persist for many generations. If the use and testing of such weapons were unrestrained, regions of outer space could become unusable for decades or centuries. Jeffrey Lewis argued that hit-to-kill weapons were the most pressing and central threat to satellites and a technology that many countries may want to acquire, and Kiran Nair suggested that destructive ASAT weapons are not particularly useful and might be ripe for a ban.

BENEFITS OF THE BAN:**SAFEGUARDING THE SPACE ENVIRONMENT AND IMPROVING SECURITY**

I propose that this community consider a multilateral ban on the testing and use of destructive ASAT weapons, particularly those that generate debris. If this agreement could be negotiated and respected, the single biggest threat to a sustainable space environment could be mitigated—the destruction of a single large satellite could yield as much debris as would have been eliminated by 70–80 years of careful observance of the kind of debris mitigation guidelines that will soon be before the United Nations Fourth Committee and General Committee. This protection of the space environment would be the primary benefit, and a meaningful one.

Another benefit would be making illegal the simplest but also the most immediate and irreversible threats to satellites. Kinetic-energy ASAT (KE-ASAT) weapons, those which use the force of impact to destroy a satellite, are operationally attractive: their effects are predictable beforehand and are easily verifiable afterward. This is the type of weapon tested in January 2007 by China. And indeed, this was the main type of ASAT weapon the United States pursued decades ago in the Cold War. (At the same time, the Soviet Union developed its own co-orbital ASAT system. It was permanently destructive of its target satellite, but approached the target at a much lower speed and then used an explosive to propel shrapnel towards it. This weapon did produce debris but not to the extent that KE-ASAT weapons do.) The United States abandoned these weapons for a variety of reasons, but a primary one was the debris that they would create. Indeed, until a few years ago, the United States was still tracking pieces from the Soviet and US KE-ASAT weapon tests of the 1980s.

We propose a ban on both the testing and use of destructive weapons against satellites. The benefits are obvious, and I hope that all countries that wish to keep outer space usable in the long term will consider the idea carefully.

WHAT THE BAN WOULD INCLUDE AND HOW IT MAY BE VERIFIED

The specifics should be straightforward: the ban could be, for example, on hit-to-kill kinetic energy attacks on satellites, or it could set a limit on the pieces of large debris resulting from any satellite attack, or it could ban attacks which would result in the total destruction of a satellite (the total

destruction of a satellite can be predicted by the expected velocities and masses of the satellite and weapon).

Such a ban should be verifiable from the ground, perhaps with already existing observational assets, perhaps with additional assets and coordination among observers. Countries that consider this idea could convene a panel of experts who could assess existing national technical means and their suitability for the purpose.

For example, early warning sensors could detect all launches—any test of a ground-launched hit-to-kill asset would be detected by these; China's ASAT test, as well as the tests leading up to it (that did not destroy a satellite), were detected in this way by the United States, and perhaps Russia as well. Ground-based assets such as radar could determine the trajectory once the launch was detected. Clearly, if a launch notification protocol were in place, it would simplify the step of detecting launches that need to be followed up.

Additionally, preferably with, but perhaps initially without, launch detection, all possible satellite targets for a destructive ASAT test can be monitored to verify that they have not been destroyed. The US Space Surveillance Network (SSN) regularly tracks thousands of objects larger than 10cm; its tracking of active satellites and inactive satellites and large pieces of debris is considered to be complete.

Such a system is overkill for verifying a ban on destructive ASAT weapons. Developing an independent capability to track all possible targets is a much simpler and focused task than trying to replicate the US SSN catalogue, as the number and type of targets is tightly circumscribed—and the most basic system would be charged just with tracking these objects, perhaps only objects bigger than half a metre or a metre and verifying that they are intact. For example, a study done in the European Union showed that a system that could replicate most of the SSN catalogue (not just big satellites) could be developed for quite a modest expense. And certainly the owners of those satellites themselves track their own satellites much more regularly than does the SSN. The absence of an object and the creation of debris are events that are noticed relatively quickly.

Of course, such a scheme does not prevent tests, it simply verifies that they are happening or not happening.

Indeed, I expect that an immediate criticism of this idea is that even if testing is stopped, such a ban does not prevent “heirloom” ASAT weapons being used in a crisis, and barrier to a breakout capability is only modest. That is correct, although I would like to point out that there is likely to be measurable value in such an agreement anyway. There is great value in the absence of the debris that would have been generated by testing programmes, as well as in the decreased likelihood of the use of such weapons in a conflict because of low confidence in an untested or incompletely tested system. Bans on tests can be useful, just as the Comprehensive Nuclear-Test-Ban Treaty.

This brings me to some issues that should be considered carefully. The first is our “Inconvenient Truth”: missile defence testing. As we have discussed here, missile defence uses essentially the same technology as do hit-to-kill ASAT weapons. How do we ban destructive ASAT tests, when we assume the United States will elect to continue its ground-based missile defence tests?

Currently, the missile defence tests consist of intercepts of a missile, at suborbital altitudes. A ban on destructive ASAT weapon tests would prohibit the missile defence interceptors to be tested explicitly against satellites, and the ban could set an upper altitude limit for tests. This, of course, does not keep other countries from developing hit-to-kill technology and testing it as a missile defence in order to develop their own de facto ASAT capability. This situation stands in curious contrast to that in the 1980s, when ASAT tests were considered a roundabout way to develop missile defence capabilities, which were then banned by the Anti-Ballistic Missile treaty.

So it will be important to understand the possibilities of limiting high-altitude missile defence tests; it is also important to understand how much confidence a missile defence system tested at low altitudes could have as an ASAT system at high altitudes. A KE-ASAT ban may likely have its limits vis-à-vis missile defence testing; but it may yet be meaningful, as the Comprehensive Nuclear-Test-Ban Treaty is meaningful despite not banning hydrodynamic testing.

ADDITIONAL, MUTUALLY REINFORCING MEASURES

Such an agreement would be particularly powerful if it comes in the context of other efforts to deter the use of destructive ASAT weapons in a conflict,

and they should be pursued alongside a test ban. Some important examples of these efforts are:

- To have a clear and declared set of consequences for the destruction of a satellite. There are various pieces of international law which already address intentional interference with a satellite, including pieces of the Outer Space Treaty and the Liability Convention.
- To reduce the attractiveness of satellites as targets. Satellites are vulnerable and valuable—a difficult combination. They should be part of a redundant system; if they are an actors' Achilles' heel, it is due to poor planning. Countries with a lot of resources, such as the United States, can provide backup capabilities for the most critical satellite functions, and can distribute satellite function over a number of smaller satellites, making each less valuable. Countries with fewer space assets are likely not to have such high reliance on satellites, and so the satellite might not present as a critical target. As well the availability of high-quality commercial remote-sensing satellites makes the logic of targeting low-flying reconnaissance satellites less compelling. Such a provocative attack will be less likely if the loss does not cripple an adversary's capability.
- To employ simple ASAT countermeasures, such as decoys or flares to further reduce confidence in an attack.
- To complicate the decision to use destructive weapons against targets: the more international the set of owners and users of a satellite, the more complicated the decision would be to use a weapon against it.

CONCLUSIONS

I believe such an agreement can have value. It is not a new idea, but it is one that might be timely, as Russia and the United States have largely abandoned such programmes, and recent events have emphasized just what is at stake when destructive ASAT weapons that create debris are used.

A destructive ASAT weapon ban will derive greater relevance and usefulness as part of a comprehensive regime of arms control measures, "rules of the road" and confidence-building measures. It cannot guard against other types of ASAT threats. But particularly if it is coupled with other suggested work—such as unilateral statements of "no first deployment" of weapons in

space akin to that made by Russia, “rules of the road” that promote orderly and transparent conduct in outer space suggested by a number of countries and non-governmental organizations, and space traffic management and other confidence-building measures as advocated by Canada and others—it can prove to be a useful and meaningful tool to increase the secure and sustainable use of outer space for all.