

At one end of the spectrum are relatively simple and inexpensive options, such as attacks on ground stations or jamming signals sent from satellites to receivers on Earth. Mid-range means of interference include: using low-powered lasers to "dazzle" an imaging satellite's optical sensors; launching a medium-range ballistic missile at a satellite, putting debris in its vicinity; or creating an intense electromagnetic pulse that generates high levels of persistent radiation. High-end options available only to advanced space-faring nations and sometimes only in the research stage, include using high-powered ground-based lasers with adaptive optics or space-based high-powered microwaves to disrupt, damage, or destroy a satellite without creating space debris.

The more countries depend on satellites for military, economic, and political ends, the more tempting it may be for potential adversaries to interfere with these satellites, particularly when doing so could let a much weaker player exploit its adversary's vulnerabilities or enable a much stronger player to preserve its overwhelming tactical military advantages. Of course, there are technical constraints and practical complications associated with each potential form of interference, and nations can adopt countermeasures if the risk to their assets outweighs the added expense. Furthermore, the same trends that have increased capabilities and incentives to interfere with space assets have also increased disincentives. These include the higher probability of retaliatory attacks; the greater likelihood that satellites other than the intended target would become collateral damage; and the potentially massive, unpredictable, and uncontrollable economic consequences if global financial markets were to get spooked by hostile action in space between economically entwined countries.<sup>19</sup> As capabilities and incentives for interference with space assets increase, though, clearer rules and stronger mutual restraints are needed to reinforce these disincentives. This is especially the case with respect to actions that would not necessarily violate the OST, but that would reduce space security or damage the space environment.

The OST needs to be supplemented with more explicit rules protecting peaceful satellites and regulating potentially dangerous space activities for two other, equally important reasons. One involves changes in the security context since 1967, especially in the principles guiding U.S. security policy, that compound the technological reasons why it has become increasingly difficult to differentiate between "passive" military support activities traditionally accepted as "peaceful" (denoting "non-aggressive") and more "active" support for on-going military operations that might not be consistent with international law. The other rationale reflects the OST's inadequate process for members to make joint decisions about contentions questions, verify compliance, and manage compliance concerns—concerns shared with other early arms control accords.

When the OST was negotiated, the only two governments with major space programs were adversaries whose relationship revolved around mutual deterrence. Early U.S.

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<sup>19</sup> Some people believe that the primary reason why the United States and the Soviet Union never attacked each other's satellites during the Cold War was because they feared that doing so would lead to nuclear war, and that the diminished likelihood of large-scale nuclear war now means that countries will be less hesitant to interfere with each other's satellites if doing so could provide some tactical military advantage. This underestimates the residual risk that interference with space assets in the context of a crisis or a conventional conflict could escalate into nuclear war. It also ignores the fact that the United States and China are highly economically interdependent and both countries' overall economic performance also depends on confidence in global financial markets that are beyond either government's control.