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The Proliferation of Space Warfare Technology

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Theme: **Militarization and WMD**
In-depth Report: **Nuclear War**

Article Highlights

- *Given how easily information can spread about the globe today, it's inevitable that space warfare technology will proliferate.*
- *And once one country sets its sights on space domination, other countries are sure to follow, spurring a second arms race of sorts.*
- *That's why the international community and U.S. policy makers need to begin discussing the ramifications of pursuing military space immediately.*

The November 2007 National Nano Engineering conference in Boston on advanced nanotechnology applications for commercial and military space systems included dozens of speakers and presentations on cutting-edge space applications. Hundreds of people attended, with nearly every seat in the hotel's grand ballroom filled for the first session. The list of invited speakers included researchers from the Naval Research Laboratory; the National Institute of Standards and Technology; NASA Goddard Space Flight Center; the national laboratories; international universities; and private space systems developers. Each explained in detail the recent advancements made in their respective fields.

Countless opportunities unfolded in all directions–sources for funding, publicity, potential collaborators–and everyone raced around to seize the moment. At the National Reconnaissance Office table there were free pencils and coasters, while nearby, university researchers mingled with officials from the defense industry and foreign nationals on how to best harden satellites against electromagnetic interference using the latest progress in nanomaterials.

When information can be transferred across the globe so easily and instantaneously, one must ask if it's possible for a nation to dominate a given field of technology. And when NASA and U.S. government research laboratories continue to work together with emerging smaller space developers, universities, and researchers throughout the world, can one remain assured that sensitive technologies developed in the United States will remain here?

To answer these questions, we need to look at the impact of the delineation between academic versus military research within a global economy. Examples of the overlap of military and academic research easily can be observed in conferences and invited talks. But in the future, the lines that separate military and civilian technologies will become even more blurred as broad-based collaborations continue to develop multi-use systems with both peaceful commercial and destructive military applications. This would result in the further inability of the arms control community to classify and define space systems into their respective categories and thus, develop meaningful arms control treaties.

Furthermore, as peaceful scientific applications progress in a global fashion, private space system developers have the benefits of accessing both domestic and foreign markets, undermining U.S. national space security plans and the pursuit of military space dominance.

U.S. policy makers might respond to these developments by encouraging a climate of secrecy to prevent security vulnerabilities. But if such a policy is pursued, companies developing technologies for commercial applications in the United States will suffocate in isolation, while those developing applications in support of military space dominance will continue to flourish. Rival nations will then likely take reciprocal actions, which would further claims by U.S. war planners that other spacefaring nations are working toward the development of space warfare systems. In this type of scenario–and in the absence of a well-defined arms control treaty–space warfare technology proliferation and espionage would continue to grow globally and the existing military space race would accelerate.

In addition, the realignment of the global economy will continue to shift the international space power balance in the future, as international players such as India and China will continue to effectively challenge U.S. hegemony in space. For nations that possess the wealth, infrastructure, and knowledge to develop space warfare technologies, their ability to succeed will only require the will or the need to do so. The "brain drain" that hindered the space programs of many rival nations in decades past weighs less on them today. Plus, the stagnancy of foreign economies that resulted in a flood of scientific minds to the United States is ebbing; many expatriates are now returning home to profitable jobs in booming domestic defense and space industries.

For its part, the United States continues to strive for technologies that will keep its soldiers safe, support bloodless wars, and allow war to be waged from air-conditioned control rooms–all of which can be achieved only if Washington has a dominant role in the development of advanced technologies that allow for the evolution of current space capabilities. Technologies such as nanotechnology, robotics, and artificial intelligence PDF are seen as the leading candidates for facilitating such an evolution. A new U.S. Air Force television ad campaign that shows young men and women combating cyber warfare from the comfort of a computer terminal makes this evident. Such images serve as a tool to win over public opinion, enabling national consensus in favor of the weaponization of space.

Will a similar sentiment resonate with the international community? Is it possible that in the future we will witness the international community embrace and employ nondestructive methods to disrupt or degrade the space systems of hostile nations in support of peacekeeping and casualty reductions? And once the space warfare threshold is crossed, will a nation on the verge of defeat be left with no choice but to attack the space assets that are decimating its forces or the ground stations that are critical to a space-based weapons functionality and operational integrity?

There is reality to consider. In the coming years, mastery of space systems will be the prerequisite to ensuring victory in warfare, likely forcing even the most reluctant nations to pursue advanced military space applications. Obviously then, significant efforts toward protecting and attacking critical military space systems will be pursued as well. Over time, this also will pertain to commercial systems, as the societal role of commercial space assets and the economic value of the services they provide will increase exponentially. It is this increased economic value of space assets–combined with affordability factors in the space systems industry–that make the cost-benefit ratio of protecting commercial systems a

worthwhile investment.

It follows that as reliance on space for economic growth continues, the range of possible deterrents and responses to a space systems attack will become increasingly severe and include the possible use of nuclear weapons. Full-scale attacks on space systems will be capable of delivering catastrophic effects–even limited acts of space warfare could result in rapid conflict and light-speed escalation scenarios.

It is a societal constant spanning the history of warfare that military technology can remain a secret for only so long. From the rocket to the hydrogen bomb, awesome technological power has inevitably proliferated. And it can be expected that a nation in possession of a key technological advantage wouldn't be willing to relinquish its advantage simply for the cause of international peace. Therefore, an international consensus must be reached between the United States and other leaders in nanotechnology, robotics, and artificial intelligence to reduce future tension and potential conflict. We also could begin international discussions to immediately ban or regulate space-warfare enabling technologies.

If meaningful international discussions fail, advanced space warfare systems will be delivered to the war planners of multiple countries and non-state actors with disastrous consequences for future generations. The proliferation processes will continue to accelerate, creating entirely new markets for the defense industry to exploit and further exacerbating an already volatile international security environment. In anticipation of such an outcome, it's important for U.S. policy makers and members of the country's scientific community to begin discussing the societal, ethical, and security ramifications of racing to pursue military space technologies that incorporate these fields.

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