

White Paper: National Security and Space

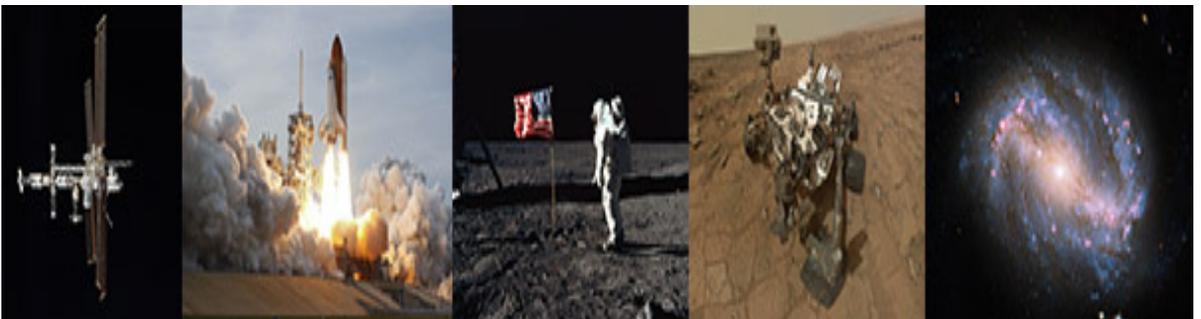
Part 2: Overcoming Asymmetric Risks in Space

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In Brief:

- The U.S. needs to overhaul its military space-launch capabilities in order to be able to rapidly respond if satellites are destroyed or damaged during a crisis.
- Military and intelligence satellites are vulnerable to attack and disruption, be it declared or deniable.
- Air Force efforts to improve competition in military space launch need to be sped up by leveraging commercial-sector suppliers and business models.
- The Defense Department should encourage entrepreneurship within the military and commercial segments of the space launch market to give the Defense Department innovative and cost-effective space access.
- The U.S. must set a national security strategy for space that prioritizes resilience, including the ability to rapidly and affordably replace damaged or destroyed military and relevant civilian space assets.



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The U.S. space program originated in a spirit of competition and national rivalry.

The Project Mercury astronaut program thrived on it, pitting man against man to be the first American to lay claim to orbiting the Earth. Later, President Kennedy made it clear that America wanted U.S. astronauts first to the moon, their boot prints testament to one country's national will over another.

This speed, rivalry and ingenuity all happened within the confines of some of the biggest and most complex organizations ever established by man, including the Cold War-era Department of Defense and NASA, among others. Today, dynamic and innovative approaches to space launch are likely to be found outside of traditional government contracting circles than within them.

Now, well into the 21st Century, the U.S. is at a critical point in its progress as a space-going nation, as the Space Shuttle program has retired and civilian satellite technology and sensors are catching up to military counterparts.

What is most exciting is that the government monopoly on space flight is eroding at the same time that space flight has captured the attention of some of America's most successful technology entrepreneurs. This is the kind of evolution that has the potential to improve American competitiveness by investing in innovative aerospace research and development, a source of advantage for U.S. firms, while offering the potential to benefit an array of high-tech sectors that could yield gains from inexpensive space access.

This is about much more than business, however. Ultimately, competition matters for national security reasons.



Since the mid-1960's, when the Department of Defense (DoD) initiated the Defense Meteorological Satellite Program (DMSP), low, earth-orbiting satellites have provided the military with important environmental information. Each DMSP satellite has a 101 minute orbit and provides global coverage twice per day. (Photo from NOAA)

Dependence on satellites is undeniable, so is their vulnerability

The U.S. needs an innovative, resilient and economical way to assure space access, particularly for military and government launch programs. America's Global Positioning System, secure communications and surveillance satellites are lynchpins of the country's armed forces. Beyond these government assets, the U.S. military already relies heavily on the private sector's space-based capabilities. According to a 2013 Defense Business Board report, the U.S. spends about \$640 million on commercial satellite services for 40% of its communications.

All of these satellites make easy targets, representing a potential and growing vulnerability.

For an adversary who seeks to rob U.S. forces of their ability to precisely target in an urban area, know the location of friendly forces or disrupt sharing of up-to-the minute intelligence gleaned during an ongoing operation, there is no better weak link than space assets.

During the Cold War, the U.S. and the Soviet Union spent billions on costly anti-satellite programs before effectively giving up on the effort because of expense and complexity. More than 30 years later, the reliance on satellite systems has only grown, along with the means to break or weaken that technological link. Mainstay technologies used by U.S. armed forces today, including satellite-guided munitions dependent on GPS coordinates and unmanned aerial vehicle control, must be reliable. Measures such as keeping dormant GPS satellites in orbit in case an urgent replacement is needed are one step currently in place to ensure uninterrupted service.¹ In the context of a large-scale conflict, even those spares could be overwhelmed, particularly if they are also targeted by an adversary.

An asymmetric-minded adversary needs to only degrade or disrupt the capabilities of a communications satellite, such as nudging it out of orbit or inducing its operator to burn out its fuel source with repeated maneuvers, to render it unusable.² Collisions or deliberate debris clouds, let alone ground-based anti-satellite weapons such as missiles, are also a threat.

A hostile move that falls short of a commonly understood legal definition of an act of war could be just as debilitating from an operational perspective. Moreover, it is possible in the coming years that there will be times when a key strategic satellite capability is taken offline, but its cause is unknown or not directly attributable to a specific adversary. Having resiliency built into the U.S. national security strategy for space will help mitigate such risks.

China's open demonstration of its anti-satellite capabilities, starting in 2007, continue to concern the Defense Department because of the threat to U.S. space assets.³



“PLA strategists regard the ability to utilize space and deny adversaries access to space as central to enabling modern, informatized warfare,” according to a 2013 Defense Department assessment of China's military. The annual report to Congress cited People's Liberation Army statements of the importance of anti-satellite operations against reconnaissance, communications, early warning and navigation satellites.⁴

In China's own 2013 defense white paper, the strategic importance of space, along with cyberspace as new and contested domains is made clear.⁵

While far from the challenge posed by the Soviet Union, Russia today presents a thorny situation for U.S. policymakers. It is currently a lynchpin of NASA's manned space program yet President Vladimir Putin's will to intervene in Ukraine's Crimea region and his desire to check further NATO's eastern advance mean that past assumptions about Russia's future must be reexamined. Russia has anti-satellite capabilities too, which

could be brought to the fore, even in an indirect way, during a future crisis. Within foreign policy circles, an overall awareness of the spectrum of threats in space is growing.

A recent Council on Foreign Relations report highlighted and singled out China’s capability to disrupt U.S. space operations, as well as other potential threats from countries such as North Korea.

“As space systems increasingly perform and support critical operations, a variety of plausible near-term incidents in outer space could precipitate or exacerbate an international crisis,” the CFR report said. “The most grave space contingencies—viewed from the perspective of U.S. interests and international stability—are likely to result from either intentional interference with space systems or the inadvertent effects of irresponsible state behavior in outer space.”⁶

U.S. national security strategy needs to be able to hold up in the face of such threats. They are predictable and solvable if action is taken. Yet, without the ability to rapidly and affordably send new satellites back into orbit, the credibility of such a strategy is diminished.

One of the best ways to do this is to ensure that the Defense Department and NASA can move quickly, should the need arise.

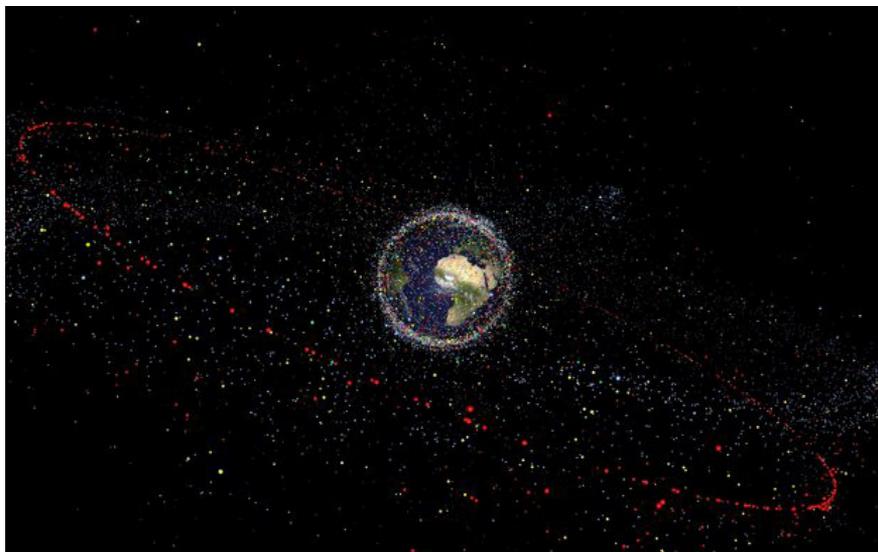
Find a national security strategy in space that reduces risks

A first step should be to launch a national strategy that acknowledges the need for a faster rate of launch than the U.S. currently prioritizes.

In a time of budget cuts, of course, this is a difficult proposition. But that is something that might change if costs were lower. Moreover, by encouraging commercial-sector buying practices on the part of the government, firms whose legacy is in selling to the Air Force would be more competitive in the open market.

The Air Force, in particular, should explore opportunities to move beyond FAR-based acquisitions in order to leverage a broader array of suppliers that might otherwise be able to compete for government work.

NASA’s employment of commercial launch providers for cargo to the International Space Station is a model that should be explored for the Air Force’s approach to military launch through the Evolved Expendable



Distribution of debris

Launch Vehicle program, whose heavy rockets carry some of the nation's most sensitive military payloads. The Defense Department, however, relies on Russia's RD-180 main rocket engine to power the Atlas V rocket, a mainstay of the EELV program. The liquid propulsion RD-180 engine is designed and built by Russia's NPO Energomash, and the U.S. only had a 2-year supply of RD-180 engines to sustain current launch rates.

Turning to on-hand launch alternatives makes sense and avoids the creation of any sort of alternative-engine development gap that an adversary could exploit during the window between the debut of an alternative U.S. design, which could take up to 5 years and cost \$1 billion.⁷

Moreover, this could encourage entrepreneurship in the commercial sector and within the defense sector. Already, the Air Force is studying commercial market launch options for the EELV program. Within the latter, this is especially important given the opportunity within a declining budget environment to break with past practices in favor of new ones that better reward U.S. taxpayers, warfighters and investors.

Avoiding playing catch-up again

In any competition, the worst place to be is watching a rival increase their advantage step by step. The U.S. has been behind in the space race before. That is where it started when the Sputnik orbit shattered any sense of American inevitability in space. The U.S. risks falling behind again and awakening to a Sputnik-like reframing of what it takes to hold on to a strategic edge in space. It is not an investment made once and forgotten. It is an ongoing commitment that relies on harnessing the most dynamic and innovative organizations through competition, be it pitting astronaut against astronaut, or company against company.

Moreover, as events with Russia have shown, U.S. defense strategy must be able to evolve quickly to fast-moving shifts in geopolitical and technological paradigms. America's space policy needs to be able to keep up.

About the Author:

August Cole, a writer and analyst specializing in national security issues, is an adjunct fellow at the American Security Project. From 2007 to 2010, August reported on the defense industry for the Wall Street Journal. He has also worked as an editor and reporter at MarketWatch.com where he covered the aerospace and defense business, among other responsibilities. August is also a member of the International Institute for Strategic Studies. Examples of his work can be found at www.augustcole.com.

Further Reading:

www.NationalSecurityandSpace.org

[The Negative Effects of the United States' Reliance on Russia for Rocket Engines – Undermining Ukraine Sanctions](#)

[Secured Space Access is Needed Now – Time to look at the Commercial Market](#)

[FACT SHEET – Current Space Launch Vehicles Used by the United States](#)

[WHITE PAPER – National Security and Space – The Next Space Race: Competition National Security and America's Space Challenge](#)

[Senators Call on DOD for Competition in Air Force Space Launch Program](#)

[Cheney: The Pentagon's review of the RD-180 engine is an important step for US space program as well as our national security](#)

[RD-180 – The Jeopardized Russian Backbone of the US Space Program](#)

Endnotes

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7. [Butler, Amy. “U.S. RD-180 Coproduction Would Cost \\$1 Billion.” Aviation Week and Space Technology. March 24, 2014. http://www.aviationweek.com/Article.aspx?id=/article-xml/AW_03_24_2014_p28-673866.xml](http://www.aviationweek.com/Article.aspx?id=/article-xml/AW_03_24_2014_p28-673866.xml) (Accessed March 25, 2014)

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Gone are the days when a nation's security could be measured by bombers and battleships. Security in this new era requires harnessing all of America's strengths: the force of our diplomacy; the might of our military; the vigor and competitiveness of our economy; and the power of our ideals.

We believe that America must lead in the pursuit of our common goals and shared security. We must confront international challenges with our partners and with all the tools at our disposal and address emerging problems before they become security crises. And to do this we must forge a bipartisan consensus here at home.

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We live in a time when the threats to our security are as complex and diverse as terrorism, nuclear proliferation, climate change, energy challenges, and our economic wellbeing. Partisan bickering and age old solutions simply won't solve our problems. America – and the world - needs an honest dialogue about security that is as robust as it is realistic.

ASP exists to promote that dialogue, to forge that consensus, and to spur constructive action so that America meets the challenges to its security while seizing the opportunities that abound.



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