

NASA/JPL-Caltech/Malin Space Science Systems

**A pause
button
for**

MILITARIZING SPACE

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38 AEROSPACE AMERICA/APRIL 2016

Earth, taken by the JunoCam color camera aboard NASA's Juno spacecraft, which is headed to Jupiter.

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The Obama administration's faith in diplomacy is well known. But when it comes to curbing the militarization of space, the administration's rhetoric has turned more bellicose than diplomatic. Defense analyst *Theresa Hitchens* says it's time for the administration to take a strategic pause to find a better course.

Through much of Barack Obama's presidency, strategic restraint was his administration's approach to maintaining security in space. The U.S. would restrain itself from introducing offensive capabilities in hopes of moderating the behavior of others, whether friends or potential foes. The Obama administration adopted this strategy early on despite, or perhaps because of, China's 2007 destruction of one of its own weather satellites by a ballistic missile. That was followed by the Bush administration's shutdown in 2008 of a malfunctioning American spy satellite. Within a year, China and the U.S. each had demonstrated an antisatellite weapon, though the U.S. maintains that Operation Burnt Frost was meant to protect people on the ground from debris. Regardless, the Obama administration decided that a better approach would be to establish norms of behavior in space that discourage such tests.

That, unfortunately, isn't what unfolded.

Since 2013, each of the leading space powers has conducted missions that the others consider provocative. Diplomatic efforts to rein in destabilizing conduct have foundered, and at last year's Space Symposium in Colorado Springs, the U.S. began pivoting away from strategic restraint. Air Force Secretary Deborah Lee James declared: "We must prepare for the potentiality of conflict that might extend from Earth one day into space."

This year, shortly after the Obama administration released its 2017 budget request, U.S. Defense Secretary Ashton Carter told an audience that "there are some in this world" who want to thwart U.S. technical

"dominance" in space. "We're investing now so we stay ahead of them," he explained.

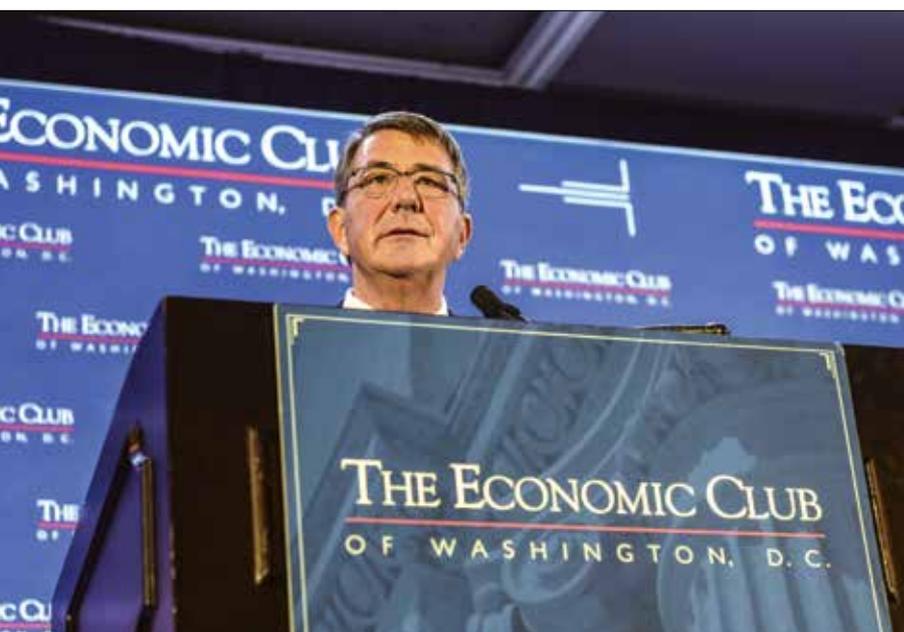
We are witnessing a drift toward the weaponization of space. If warfare were to break out in space, that would be uniquely dangerous because the environment of space is itself unique. Unlike ships on the high seas, another global commons, satellites when destroyed do not sink out of the way — instead they become uncontrolled and potentially lethal debris. Even tiny pieces of debris that cannot be detected with current space surveillance capabilities can kill an operational satellite because of the impact velocities. Further, because of the dual-use nature of space technologies, weapons placed in space would be difficult or impossible to differentiate from benign satellites, meaning everything would become a potential target. Civilians and the U.S. military each rely on commercially-operated communications satellites and the GPS constellation. Attacks on those spacecraft could cripple the global economy.

Rather than being goaded toward weaponization of space, the U.S. national security space community needs to take a strategic pause to consider whether there are alternatives. That does not mean that the U.S.'s concerns over China and Russia are unwarranted. Far from it.

Anti-satellite weapons

In May 2013, China launched a ballistic missile way beyond the 800-kilometer altitude where it destroyed its FY-1C weather satellite in 2007. The missile headed toward the geosynchronous satellite ring, which is home to most commercial communications

satellites and many key U.S. intelligence and military satellites. The list includes the Advanced Extremely High Frequency comsats, which provide secure, jam-resistant communications for commanders and the president; the Wideband Global Satcom constellation, which provides broadband for troops and planners; and the Space Based Infrared System, the missile-warning satellites that are a key element of the country's nuclear deterrence and missile defense strategies.



Department of Defense

U.S. Secretary of Defense Ashton Carter told an audience in February that the Pentagon was working to maintain U.S. technical "dominance" in space.

A Chinese Academy of Sciences press release described the launch as a "scientific research mission" and noted that the altitude was 10,000 kilometers, considerably lower than the 36,000-kilometer GEO orbit. However, U.S. intelligence community and Pentagon officials concluded that the missile nearly reached GEO, and characterized it a test of a new ballistic missile-based anti-satellite, or ASAT, weapon. Space-policy wonks had long described GEO as a sanctuary from ASAT weapons given the distance and the unwillingness of governments to set a dangerous precedent. If the U.S. assessment of the Chinese launch is accurate, that sanctuary has now been violated.

The missile in the GEO test did not strike anything, and that was probably by intent. China's overt anti-satellite test in 2007 was the first such test in the world in two decades, and it sparked international opprobrium. The missile was most likely topped

with a kinetic energy (hit-to-kill) kill vehicle. It created mass quantities of dangerous space debris. China has continued to experiment with non-destructive ballistic missile launches that garner less attention. The U.S. deems these as part of an ongoing Chinese ASAT testing program, but China has asserted they are missile-defense related.

Maneuverable satellites

In December 2013, Russia orbited a small maneuvering satellite in low Earth orbit and it did so again in May 2014. In each case, the Russian government at first announced that a Briz K-M rocket carried three military Cosmos satellites, but later, when registering these launches with the United Nations, Russia said there was a fourth satellite on each flight. Defense department officials and amateur observers tracked these small sats during the maneuvers. Some in the Pentagon suggested that Russia might have been practicing an offensive capability. Most worrisome was the September 2014 launch of another Russian maneuvering satellite, this one into geosynchronous orbit. After drifting back and forth for a few months, the satellite parked between two operational Intelsat communications satellites for about five months. Russia has not registered this satellite with the United Nations, as is required by the 1976 Registration Convention to which Russia is a signatory along with the United States and most satellite operating nations. Intelsat alleged that the Russian satellite came within 10 kilometers of one of its communications satellites, which is by no means standard operational procedure and certainly would represent a potential danger of collision. Intelsat sought an explanation from the Russian operator (through the U.S. Defense Department) to no avail.

"This is not normal behavior and we're concerned," Kay Sears, president of Intelsat General, the government services arm of Intelsat, said in an October 8 interview with Space News.

In a mission that seems similar in some respects to the Russian experiments, China in 2013 launched three small satellites into LEO, one of which was equipped with a robotic grappling arm. One of the satellites conducted close proximity operations around a companion satellite at least twice, once in 2013 and once in 2014. Just as with

the Russian maneuvers, Pentagon officials voiced concerns that China may have been testing technologies for reaching out and touching another country's satellites. Chinese press reports said the satellites were testing capabilities to monitor orbital debris and conduct on-orbit maintenance operations related to potential debris removal or Chinese space station activities.

A troubling aspect of these episodes is a lack of transparency. Every nation has its secrets, but as noted, spacefaring nations are supposed to register a spacecraft's name and basic function with the United Nations. The United States typically registers even National Reconnaissance Office spy satellites, by providing the date of launch, the basic parameters of the initial orbit and the name of the agency that sponsored the launch. That said, the U.S. has at times played fast and loose with registration of secret satellites, either by registering years late or failing to provide accurate orbital data. Rarely are the final orbits of secret satellites provided. The Russian situation in GEO is particularly egregious, however, due to the satellite's behavior and Moscow's refusal to answer questions from either Intelsat or the U.S. government.

In early 2014, the U.S. stepped forward for a moment of transparency that it perhaps hoped would elicit a similar openness from China and Russia. At an Air Force conference in Florida, the service revealed the existence of a satellite development program called GSSAP, short for Geosynchronous Space Situational Awareness Program. Five months later, in July, the U.S. launched two GSSAPs to near geosynchronous orbit. Two more of these satellites are scheduled to launch sometime this year. These spacecraft drift along and look outward at other satellites with their electro-optical cameras. When commanded, a GSSAP can maneuver close to another satellite in a process the Pentagon calls RPO, short for rendezvous and proximity operations. None of this is a secret: "RPO allows for the space vehicle to maneuver near a resident space object of interest, enabling characterization for anomaly resolution and enhanced surveillance, while maintaining flight safety," the Air Force says in its GSSAP fact sheet. The U.S. has not released orbital parameters for GSSAP or its maneuvers; however, the satellites are watched closely by amateur satellite trackers around the world who have reported no

maneuvers of concern regarding potential collisions — unlike the case of the Russian satellite in GEO.

Diplomacy runs aground

The Obama administration has pursued diplomatic solutions to improve space security more vigorously than any since the Jimmy Carter era. Those efforts have yielded some, but not nearly enough, rewards.

The U.S., working closely with Russia, led the way in achieving a consensus report in 2013 from the U.N. Group of Governmental Experts on Transparency and Confidence Building in Outer Space Activities.

The Bush administration portrayed its 2008 decision to shoot down an aging American spy satellite with a ballistic missile as a safety-related move. Many were skeptical of that rationale.



U.S. Navy

The group recommended voluntary, but significant, actions toward building trust and dampening risk perceptions. These recommendations included greater cooperation on space situational awareness, better compliance with and improvement of the Registration Convention to include reporting maneuvers, and information exchanges on national space security activities. But the Group of Governmental Experts report has been in limbo since its approval by the U.N. General Assembly, with no nation moving to establish a process for implementing its recommendations, even such basic ones as establishing points of contact for inquiries about space activities.

Washington also sought to aid the European Union's efforts to establish an International Code of Conduct designed to set norms of responsible behavior in space. The progress toward a Code of Conduct ended in July 2015, when Russia, China, Brazil, South Africa, India and the nations of the Non-Aligned Movement insisted that any negotiating process be placed under an open-ended U.N. mandate, meaning that discussions could go on for many years as there is no deadline or requirement to stick to the current text. That was exactly the process the European Union and the U.S. were trying to avoid.

The U.S. State Department has been a leading player in an initiative by the U.N.'s Committee for Peaceful Uses of Outer Space to establish best practices that would ensure the long-term sustainability of space for humans. This initiative, like the Code, is also being bogged down by a West vs. the Rest dynamic. In particular, many developing nations are suspicious of Western motives, thinking the U.S. and its allies might be trying to deny them parity in the space marketplace or seeking to keep military advantage.

But the key reason for the diplomatic molasses is the fallout of the Ukrainian crisis on Russian-Western relations. Russia has reversed course and become a serious roadblock to multilateral progress.

Underlying this lackluster diplomatic performance is a disconnect over the best way to keep war from ever breaking out in space. The U.S., as the leading space power, favors establishing politically binding norms. These would be voluntary codes of behavior that states would pledge to uphold. Washington is still not willing to pursue a legally

binding treaty, as advocated by Russia and China and embodied in their proposal for a Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Use of Force against Outer Space Objects. The PPWT, as it is called, is flawed in many respects, especially in the fact that it does not specifically cover ground-based ASATs and only vaguely defines what would constitute a weapon in space. That said, if the U.S. wanted a binding treaty, it could put forward a treaty proposal that it could accept.

It's tempting to argue that the Obama administration should have done more on the diplomatic front, but the reality has been that other geopolitical problems have sucked up most of the diplomatic bandwidth. Further, space arms control remains a contentious issue within the Republican-led Congress, with those who champion U.S. missile defense concerned that arms control initiatives could hamper their efforts. Pushing for space arms control would have taken political capital away from other high-priority issues such as health care reform.

What now?

Today's difficult state of affairs could be exacerbated by Washington's shift away from a strategic restraint. As one senior national security space official told me privately, "strategic restraint has failed." That is debatable, but evidence suggests that the Obama administration and Congress perceive it as so. The Pentagon in the summer of 2014 undertook a classified Space Portfolio Review that looked at threats, the survivability of satellites and the capabilities to respond to the threats. Congress jumped into the fray in the fiscal 2015 National Defense Authorization Act, ordering the Defense Secretary and the Director of National Intelligence to report on the role of "offensive space operations" in deterring and defeating threats to U.S. spacecraft, as well as mandating new spending on the development of "offensive space control and active defense strategies and capabilities."

According to an April 15, 2015 report in *Breaking Defense*, Deputy Defense Secretary Robert Work, in a classified session, invoked the need for the United States to emphasize "space control" — a military term of art that was all but eliminated from U.S. declaratory policy as too incendiary earlier in the Obama administration.

This was followed by the Pentagon's move in the summer of 2015 to reprogram between \$5 billion and \$8 billion (the exact figure remains unknown because some Pentagon spending and National Reconnaissance Office budgets are classified) in the 2016 to 2020 budget to "space protection." And now, Secretary Carter has pledged that the 2017 budget will target more spending on "negating" adversary counterspace capabilities. U.S. officials have not so far elucidated what types of offensive capabilities might be pursued, except to repeatedly stress that debris-creating weapons are still considered verboten because of their non-discriminatory ability to do harm.

The U.S. should not allow fear or the actions of potential adversaries to dictate its national security space strategy. It is not in U.S. interest for space to become a potential battlefield. Despite advances in Russian and Chinese capabilities, the U.S. remains the country most reliant on satellites, both economically and militarily. It is also important to remember that the U.S. has demonstrated or deployed similar technologies to those now being tested by Russia and China. A "take-the-fight-to-the-enemy" strategy is not a wise choice at this time.

A strategic pause would give time to decide how to passively protect both U.S. government and commercial satellites. This could include considering larger constellations of satellites to ensure greater redundancy and improving anti-jamming capabilities. Methods could be identified to ensure that missions or services enabled by satellites, such as positioning and timing services provided by GPS and communications, can be completed even in a degraded space environment. Perhaps some of these missions and services could be performed in an emergency by aircraft, blimps or by cellular communications. Diplomacy could be ramped up, via both more concrete discussions with Russia and China about what exactly they see as in their interests in space as well as greater efforts to find multilateral consensus on setting norms of behavior. A good place to start would be a commitment by all to forego debris-creating ASATs that would put all satellites at risk. Diplomacy will be particularly difficult as long as Russia is in its current mood as geopolitical spoiler, but that does not mean progress will be impossible in the long run. We should not forget Russia



At the 2015 Space Symposium in Colorado, Air Force Secretary Deborah Lee James signaled the Obama administration's pivot away from strategic restraint by saying, "We must prepare for the potentiality of conflict that might extend from Earth one day into space."

chaired the successful U.N. Group of Governmental Experts process. The U.S. could remind Moscow of that fact and challenge the Russians to again take the lead in implementing the 2013 report.

This does not mean that the U.S. should abandon research and development of technologies to defeat an adversary's offensive counterspace weapons. That said, it is not necessary to have tit-for-tat ASAT capabilities. There are other, cheaper airborne and terrestrial solutions, such as bombing ASAT launch pads and jamming. This is no time for the U.S. to toss up its collective hands in despair over Russia and Chinese technological developments and go on the offensive. That will not prove to be a winning move for the U.S. this early in the game. An arms race in space is to no one's benefit, and is not a race that the U.S. should allow itself to be dragged into easily.



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