Real Clear Defense: Have Russia And China Already 'Militarized' Space?

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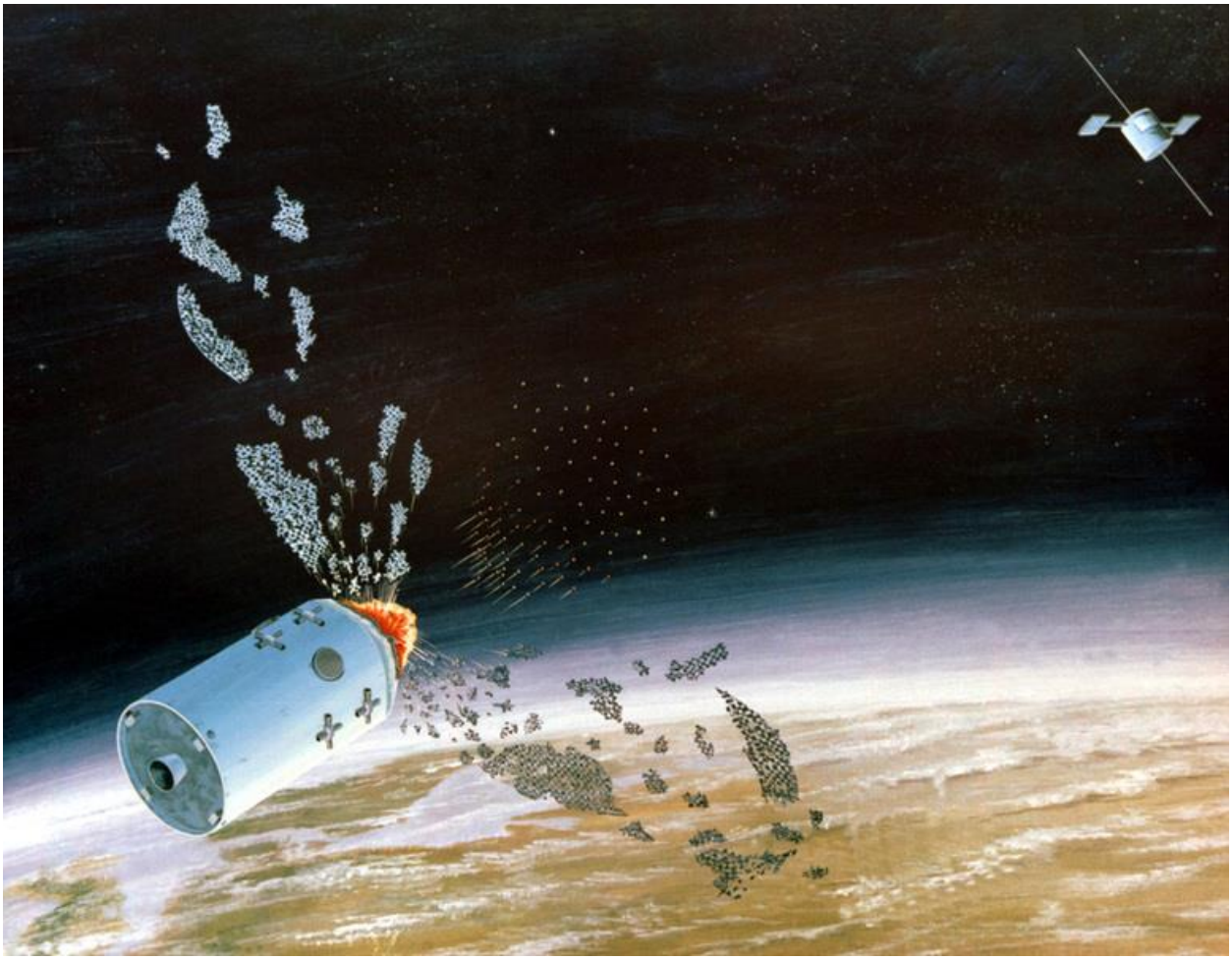
July 16, 2020



Space "Militarization" Hypocrisy

President Trump's U.S. Space Force is constantly under attack, from critics both foreign and domestic, as a giant step toward supposedly violating long-standing international norms and treaties against "militarizing space." Russia, China, and perpetual domestic critics of U.S. defense programs like the Arms Control Association, Union of Concerned Scientists, and Federation of American Scientists are particularly opposed to U.S. space-based missile defenses.[1]

According to Beijing, Moscow, and their like-minded U.S. allies, it is OK to use space satellites for sensors, communications, and global positioning to support terrestrial military operations on land, sea, and air. It is also OK to launch nuclear-armed ballistic missiles and hypersonic warheads through space without being guilty of its "militarization."

But to base defensive weapons in space capable of intercepting nuclear warheads would violate international norms, destabilize the principle of Mutual Assured Destruction (MAD), and ignite another costly and dangerous arms race for control of the "high frontier." Or so it is argued not only by Russia, China, and the American Left, but by enough officials in the U.S. Departments of State and Defense to thwart the near-term deployment of space-based missile defenses.

Disappointed Hopes for U.S. Space Force

Those of us who cheered President Trump's establishment of the U.S. Space Force hoped—and I believe President Trump intended—that it would become the vehicle for quickly resurrecting President Reagan's Strategic Defense Initiative (SDI), the so-called "Star Wars" program. President Reagan's SDI envisioned a space-based "shield" to intercept nuclear missiles, replacing MAD's immoral concept of national suicide with the moral principle of defending life—call the new concept Strategic Assured National Existence (SANE).

But officials at State and Defense worry that "militarizing" space by orbiting anti-missile systems to defend the U.S. homeland will ignite an anti-satellite arms race by Russia and China to threaten America's over 900 satellites.[2] By this thinking, U.S. national security will lose far more than it would gain from space-based defenses—because the U.S. economy and military depends far more on satellites than Russia, China, and other potential adversaries.

Accordingly, even though it is well within U.S. technological capabilities to deploy Brilliant Pebbles space-based missile defenses now, over the next 5 years for $20 billion, the Defense Department and U.S. Space Force have no such plans.[3] Space-based missile defenses currently

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[1] Laura Grego, "Creating A Space Force Would Trigger A Space Arms Race And Threaten US Satellite Security" Union of Concerned Scientists (December 10, 2019).

[2] E. Mazreanu, "Number of Satellites in Space by Country 2019" Statistita.com (September 4, 2019).

[3] Brilliant Pebbles was a successful space-based anti-missile technology developed by the Strategic Defense Initiative that could have been deployed by President Clinton, but who was ideologically opposed to national missile defense, regarding the ABM Treaty and MAD as "the cornerstone of strategic stability." Brilliant Pebbles would have comprised thousands of small, autonomous, space-based interceptors. See Donald Baucom, "The Rise and Fall of Brilliant Pebbles" Journal of Social, Political and Economic Studies (Summer 2004). General (ret.) James Abrahamson and Ambassador Henry Cooper, "America Must Revive Space-Based Defense Initiatives" Newsmax (August 14, 2017).

are relegated to long-term research and development. If State and the Pentagon have their way "Star Wars" will never become reality and "Dr. Strangelove's" MAD will continue forever.

MAD versus SANE

One big problem with this thinking is that MAD is no longer what it used to be. Since the 1960s the criteria for enforcing MAD, established by then Defense Secretary Robert McNamara, is a residual U.S. capability—after a Russian first strike—to deliver 400 equivalent megatons (EMTs), enough to destroy 25% of Russia's population and 75% of its industry.[4] However, due to the New START Treaty, the U.S. has reduced its number of strategic nuclear weapons to 1,500 warheads. This is grossly insufficient, after a Russian disarming first strike, to meet the criteria for enforcing MAD.[5]

Perhaps unsurprisingly, since Moscow consistently does better than the United States in arms control negotiations, Russia can absorb a U.S. nuclear first strike and exceed MAD damage goals against the U.S., killing more than 25% of U.S. population and 75% of U.S. industry by delivering 100 EMTs. Even though the sides have equal numbers of strategic warheads (assuming Russia is not cheating on New START), Russia can do more damage to the United States because U.S. population and industry are much more concentrated in big urban-industrial areas.[6]

Moreover, U.S. National Missile Defenses have fewer than 100 interceptors while U.S. civil defenses are virtually non-existent, in contrast to Russia's many thousands of anti-missile systems and robust civil defenses.

Another big problem with banking on MAD instead of SANE and space-based defenses to deter World War III is that "strategic stability" is not what it used to be, as during the bipolar Cold War between the U.S. and USSR. Russia, China, North Korea, and soon (if not already) Iran comprise a more complex and much more aggressive multi-polar constellation of nuclear powers. The possibilities for nuclear war by design or miscalculation have increased exponentially.

Finally, it could be a fatal mistake for the U.S. to forego SANE's "Star Wars" and continue relying on MAD's "Dr. Strangelove" trusting that China, Russia, and perhaps others have not already "militarized" space with aggressive clandestine programs designed to sweep the skies of U.S. satellites, and thereby win the next war at the outset. Indeed, given China and Russia's contempt for international norms and noncompliance with treaties, it is likely norms and treaties are no significant obstacles to their clandestine militarization of space.

Therefore, State and the Pentagon should consider not only the known space threats from China and Russia, but possible hidden threats, as yet unknown, but well within their technological

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[4] Equivalent Megatons (EMTs) is a metric for counterarea and countervalue destructive capability. One EMT can blast 58 square miles with overpressures of at least 5 psi, enough to destroy all brick buildings. Dr. Peter Vincent Pry, *The Strategic Nuclear Balance: And Why It Matters* (Crane Russak, Taylor and Francis: 1990) "Equivalent Yield" pp. 187-198.

[5] Dr. Peter Vincent Pry, *What The Strategic Posture Commission Never Told You* (White Paper 2010) see "Expert Warns: MAD Is No Longer Mutual" All News Pipeline (March 14, 2018). See also Dr. Peter Vincent Pry, *Nuclear Wars: Exchanges and Outcomes* (Crane Russak, Taylor and Francis: 1990) "Countercity Casualties" pp. 216-223.

[6] Ibid.

capabilities. Perhaps the Pentagon and State should weigh too the risk of forgoing "Star Wars" and leaving U.S. space assets naked to clandestine threats from Russia and China that are not only technologically possible, but even likely.

Russia and China: Space Threats

The Defense Department's *Defense Space Strategy* recognizes that Russia and China pose "immediate and serious threats to U.S. space operations" by means of hunter-killer anti-satellites, directed energy weapons, cyber and electronic warfare. The Pentagon warns that North Korea and Iran have growing capabilities to threaten U.S. space assets.[7]

Hunter-killer anti-satellites appear to receive most attention from DOD and the press, as Russia and China are both experimenting with novel anti-satellites. Russia has four known potential anti-satellites in orbit that appear to have practiced stalking a U.S. KH-11 reconnaissance satellite.[8]

But DOD has recently acknowledged that a far bigger threat to U.S. satellites, instead of picking them off one at a time with hunter-killers, is the use of a high-altitude nuclear electromagnetic pulse (EMP) to disable U.S. satellites in large numbers, simultaneously, at the speed of light.

Deputy Assistant Secretary of Defense for Space Policy, Stephen Kitay, in May 2020 warned: "The challenge of a nuclear detonation is that it creates an electromagnetic pulse and signal that could then take out indiscriminately many satellites in space and essentially fry the electronics. That is a threat that we have to potentially be prepared for—a nuclear detonation in space."[9]

Space-based defenses are the best preventive for a nuclear detonation in space delivered by missile, as it could be intercepted during boost-phase before breaching the atmosphere to threaten U.S. space assets. This mission alone—protecting U.S. space assets—should be enough to warrant rapid deployment of space-based defenses.

However, instead of letting the U.S. Space Force " be all that it can be" by deploying space-based defenses, the Pentagon seems content to continue relying on deterrence and hardening satellites against attack. This could be a big mistake.

Nuclear-Armed Satellites?

Russia and China have the technical capability to make a surprise EMP attack by nuclear-armed satellite orbited over the south polar region to evade U.S. BMEWS radars and National Missile Defenses, as planned by the USSR during the Cold War.

During the Cold War, the USSR developed a secret weapon called the Fractional Orbital Bombardment System (FOBS) that would disguise a nuclear attack as a peaceful satellite launch, orbiting a nuclear-armed satellite over the South Pole to attack the U.S. from the south—from which direction the U.S. is blind and defenseless as there are no BMEWS radars or anti-missile

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[7] Department of Defense, *Defense Space Strategy Summary* (June 2020) p. 3.

[8] Joseph Trevithick, "Russia Has Four Potential 'Killer Satellites' In Orbit, At Least That We Know About" TheDrive.com: The War Zone (August 16, 2018).

[9] Ryan Pickrell, "The Pentagon Says It Needs To Be Ready Should An Adversary Try To Fry Satellites By Detonating A Nuke In Space" Business Insider (June 18, 2020).

defenses facing south. The FOBS satellite could deliver an EMP attack paralyzing U.S. retaliatory forces and C3I in the first shot of a nuclear war.

Miroslav Gyurosi in *The Soviet Fractional Orbital Bombardment System* describes Moscow's development of the FOBS as part of "a long running campaign of strategic deception against the West through the whole Cold War period, and the protracted development of the Soviet FOBS nuclear weapon system presents an excellent case study of such." Gyurosi:

"*The Fractional Orbital Bombardment System (FOBS) as it was known in the West, was a Soviet innovation intended to exploit the limitations of U.S. BMEW radar coverage. The idea behind FOBS was that a large thermonuclear warhead would be inserted into a steeply inclined low altitude polar orbit, such that it would approach the CONUS from any direction, but primarily from the southern hemisphere, and following a programmed braking maneuver, re-enter from a direction which was not covered by U.S. BMEW radars."*

"The first warning the U.S. would have of such a strike in progress would be the EMP...," writes Gyurosi.[10]

China and Russia also have the technical capability to clandestinely orbit a nuclear-armed satellite or satellites to be maintained in orbit for years to make a surprise EMP attack against the U.S. or other adversaries when needed. China has about 300 satellites in orbit, and Russia about 150, that could conceal among this large constellation one or a few illegal nuclear-armed satellites for EMP attack.[11]

Russian Colonel A.V. Kopylov writes in the flagship journal of the General Staff: "Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 kilometers to destroy enemy satellites' electronic instruments with electromagnetic pulse."[12]

China has a wide array of Space Launch Vehicles and satellite launch centers at Jiquan, Taiyuan, Xichang, and Wenchang that could be used for EMP surprise attack options by satellite. China's space and military programs are integrated. For example, the China Academy of Launch Vehicle Technology (CALT) "is China's largest and most important organization for the research, development and production of space launch vehicles (SLVs), liquid-fueled surface-to-surface missiles, solid-fueled surface-to-surface and submarine-launched ballistic missiles" including ICBMs, IRBMs, and SRBMs.[13]

Russia has equally or more impressive capabilities to harness for space warfighting.

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[10] Miroslav Gyurosi, *The Soviet Fractional Orbital Bombardment System*, Air Power Australia, Technical Report APA-TR-2010-0101 (January 2010 updated April 2012).

[11] Mazreneau, op. cit. Joyce Chepkemoi, "Countries By Number Of Military Satellites" World Atlas (March 16, 2018).

[12] Colonel A.V. Kopylov, "Weak Points of the U.S. Concept of Network-Centric Warfare" Military Thought, Vol. 3 (2011).

[13] "China Academy of Launch Vehicle Technology" https://www.nti.org/learn/facilities/59/.

Russia and China have great strategic incentives for a clandestine capability to perform EMP attack by satellite as a means of preempting or retaliating against their many nuclear-armed potential adversaries—including each other. EMP attack could enable China and Russia to "level the playing field" or defeat the U.S. by being the most effective means of quickly neutralizing large numbers of LEO satellites that are crucial to U.S. military operations.

HEMP and SGEMP

High-altitude EMP (HEMP) from a nuclear detonation in space propagates downward through the atmosphere, not through the vacuum of space, so no Russian or PRC satellites would be at risk from HEMP, unless the HEMP field is over China or Russia so satellite ground stations could be damaged—a highly unlikely scenario, that Moscow or Beijing would make a HEMP attack on themselves.

Satellites are at risk from an exo-atmospheric detonation for HEMP from the gamma rays which, if they reach the satellite and are close enough, can damage satellites by a phenomenon called System Generated EMP (SGEMP).[14] But Russia and China have almost certainly hardened their satellites against SGEMP and other phenomena that might be generated by the worst-case SGEMP threat they plan to employ: a Super-EMP weapon which is designed specifically to produce powerful gamma rays.

The U.S. hardens military satellites against SGEMP too, but probably not against the SGEMP produced by Super-EMP weapons, as the U.S. has no Super-EMP weapons. The U.S. does not even have simulators for Super-EMP weapons to test against this threat.

China and Russia can further protect their LEO satellites (those most at risk) from SGEMP by timing the HEMP attack so their satellites are over-the-horizon and will not be illuminated by gamma rays.

An exo-atmospheric nuclear detonation for HEMP can also damage LEO satellites by "pumping" the Van Allen belt with ionized particles, as happened after the 1962 STARFISH PRIME high-yield exo-atmospheric nuclear test that inadvertently damaged U.S. satellites.[15] Satellites can be hardened to survive this environment too, and presumably would be if HEMP attack is an important military option, as it is for Russia and China.

Ionization of the Van Allen belt is a much bigger threat to LEO satellites if the HEMP attack uses a high-yield weapon detonated above 100 kms HOB—and this too is another way of using a nuclear detonation in space to sweep the skies of U.S. satellites.

However, if China and Russia wanted to minimize Van Allen belt ionization to protect their own satellites, they could do so by employing Super-EMP weapons which are very low-yield (10 kilotons or less) to be detonated at 30-100 kms HOB which would maximize EMP field strength against such targets as a U.S. aircraft carrier group or ICBM wing. While attacking U.S. targets

[14] The EMP Commission Report *Critical National Infrastructures* (2008) Chapter 10 "Space Systems" describes collateral threats to satellites from HEMP attack. All unclassified EMP Commission Reports are at www.firstempcommission.org.

[15] Ibid.

on land and sea with HEMP, SGEMP from a Super-EMP weapon, as explained earlier, could potentially "fry" U.S. satellites simultaneously.

If China and Russia are orbiting nuclear-armed satellites for EMP surprise attack, this would be one of their deepest and best protected military secrets. In addition to obvious strategic considerations, the Outer Space Treaty bans orbiting nuclear weapons in space. Moscow and Beijing have pursued a long propaganda offensive criticizing the U.S. for "militarizing space" intended to deter the U.S. from orbiting space-based missile defenses and from improving U.S. military capabilities in space.[16]

Interestingly, one of China's foremost EMP scientists has published an unclassified article in a Western technical journal—that examines the "high-altitude electromagnetic pulse waveform amplitudes at satellite orbits."[17]

Losing World War III in Space?

Decades of experience dealing with Moscow and Beijing should by now have taught Washington that their unwarranted criticisms of U.S. defense policy—planning for nuclear first use, cheating on arms control, militarizing space—are usually a reliable indicator of their own plans and behavior.

Is it possible that Russia and China object so vehemently to U.S. "militarization of space" because they have already done so with nuclear-armed satellites, and themselves have secret plans to rapidly deploy space-based missile defenses in wartime?

President Reagan's vision of a space-based missile shield would have been stabilizing during the Cold War, and would be an excellent deterrent now, because it could at minimum greatly complicate adversary plans for a nuclear first strike. "Star Wars" could even render nuclear missiles obsolete and inaugurate a Revolution in Military Affairs that would shift technological advantage away from offensive operations to defensive operations.

U.S. deployment of space-based defenses now, in peacetime, would establish a "new normal" replacing "Dr. Strangelove's" threatened megadeaths of MAD with SANE's promise of civilizational survival.

U.S. forbearance on space-based defenses is dangerously wrong-headed, potentially yielding a decisive advantage to Russia and China that could make war more likely.

What if Russia and/or China already have or are developing a space shield, to be deployed immediately after destroying U.S. satellites or after attacking the United States itself, to neutralize U.S. nuclear retaliatory capabilities? 30 years ago, U.S. scientists working in the Strategic Defense Initiative, assessed that—using then existing commercial off-the-shelf technology—a Brilliant

[16] U.S. Arms Control and Disarmament Agency, *Arms Control and Disarmament Agreements* (Washington, D.C.: 1982) "Outer Space Treaty" pp. 48-56.

[17] Cui Meng,"Numerical Simulation of the EMP Environment" IEEE Transactions on Electromagnetic Compatibility (June 2013)

Pebbles space-based interceptor could be made weighing only about 1.5-2.5 kilograms (3.3-5.5 pounds).[18]

Russia or China, after their first strike, could theoretically loft a Brilliant Pebbles missile shield comprising 2,000 space-based interceptors (weighing collectively 5,000 kilograms) using only one heavy Space Launch Vehicle.

The U.S. should be very concerned about a scenario where China or Russia uses nuclear space weapons to quickly sweep the skies of U.S. satellites, even at the risk of losing their own satellites, which could then be replaced with a surge of military satellites and space-based defenses to capture the "high frontier" and defeat the United States.

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https://www.realcleardefense.com/articles/2020/07/16/have_russia_and_china_already_militarized_space_115469.html

[18] Ambassador Henry Cooper, "Brilliant Pebbles Is Affordable!" HighFrontier.com (January 8, 2019). This is also an excellent resource for a brief history of Brilliant Pebbles and current cost for deployment.