



GROWING GREAT POWER COMPETITION AND WEAPONISATION OF OUTERSPACE

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September 14, 2021

(Views expressed in the brief are those of the author, and do not represent those of ISSI)



In July this year, the US Space Force opened its new satellite operations centre named “Rendezvous and Proximity (REPR) Satellite Operations Center” at the Kirtland Air Force Base in New Mexico. The Space and Missile Systems Center’s Innovation and Prototyping Directorate established it to advance the newly developed Space Force’s war-fighting capabilities in Outerspace. It will act as a new workspace to drive on-orbit experimentation and demonstrations with prototype satellites and payloads.”¹ The REPR Satellite Operations Center will allow the US to “carry out on-orbit experiments and prototyping efforts, develop innovative concepts of operation and demonstrate game-changing technology for the US Space Force and our mission partners,”² said Colonel Timothy Sejba, Head of the Directorate. All of this raises the question, whether the world is heading towards a space arms race?

Formally established on December 20, 2019, as a part of the US Air Force, the Space Force is composed of three field commands: Space Operations Command, Space Systems Command (SSC) and Space Training and Readiness Command (STARCOM). Based in Peterson Air Base, Colorado, Space Operations Command would perform tasks such as “operations of military satellites, including

¹ Nathan Strout, “Space Force Opens Facility to Improve War-fighting Capabilities,” C4ISRNet, last modified July 8, 2021, <https://c4isrnet.com/battlefield-tech/space/2021/07/08/space-force-opens-up-new-operations-center-to-improve-war-fighting-capabilities/>

² Ibid.

GPS, missile warning constellations and satellite communication systems in use today.”³ A three-star general would head it. Similarly, the SSC will also be led by a three-star general and would be the centre for developing, acquiring and sustaining space weapon systems. Space and Missile Systems Center, which is the current primary space procurement organisation, will also be transferred to SSC. Lastly, STARCOM will be responsible for the education and training of the staff and the recruits.⁴ Its command headquarters is expected to be developed at Huntsville, Alabama.⁵

What is interesting here is the US signing of new as well as ongoing experiments that are directly or indirectly part of the Space Force programme. Firstly comes the unmanned X-37B space plane, which has spent 2,865 days in orbit, the last flight is the longest with a record-breaking of 780 days. The idea is to “collect solar energy with high-efficiency solar cells, convert it to radiofrequency and then beam it to earth. That technology could provide an uninterrupted energy source to expeditionary forces at forwarding operating bases that have limited access to traditional power sources.”⁶ However, many of its missions have been kept in secrecy so that the rivals may not figure them out.⁷ Then comes the Gunsmoke-Jspace-based targeting satellites. Cost-efficient, these satellites can operate in low Earth orbit, “could take images from satellites on orbit down to Earth, process them with artificial intelligence to find threats and deliver targeting data to weapon systems in about 20 seconds.”⁸

Additionally, the US Space Force has deployed the Counter Communications System Block 10.2 to jam adversaries’ communications in a conflict. Filled with secrecy, what is known is it is a “transportable electronic warfare system that can reversibly deny adversaries’ satellite communications.”⁹ The system is likely able to jam C-, Ku- and X-band frequencies and that it

³ Valerie Insinna, “Here’s How the Space Force will be Organised,” *Defense News*, last modified June 30, 2020, <https://www.defensenews.com/space/2020/06/30/heres-how-the-space-force-will-be-organized/>

⁴ Ibid.

⁵ Kim Chandler, “US Space Command Site to Be Located in Huntsville, Alabama,” *Air Force Times*, last modified January 14, 2021, <https://www.airforcetimes.com/news/your-air-force/2021/01/13/us-space-command-site-to-be-located-in-huntsville-alabama/>

⁶ Nathan Strout, “Here Are a Few of the Experiments Hitching a Ride on the Air Force’s Secret Space Plane,” *C4ISRNet*, last modified May 8, 2020, <https://www.c4isrnet.com/battlefield-tech/space/2020/05/07/here-are-a-few-of-the-experiments-hitching-a-ride-on-the-air-forces-secret-space-plane/>

⁷ Valerie Insinna, “US Space Force Launches the Mysterious X-37B Space Plane,” *Defense News*, last modified May 17, 2020, <https://www.defensenews.com/space/2020/05/17/the-space-force-just-launched-the-mysterious-x-37b-space-plane/>

⁸ Nathan Strout, “With All Three Gunsmoke-J Satellites on Orbit, the Army is Ready to Test Space-based Targeting,” *C4ISRNet*, last modified July 13, 2021, <https://www.c4isrnet.com/battlefield-tech/space/2021/07/12/with-all-three-gunsmoke-j-satellites-on-orbit-the-army-is-ready-to-test-space-based-targeting/>

⁹ Nathan Strout, “What Do We Know About the Space Force’s First Offensive Weapon?,” *C4ISRNet*, last modified April 8, 2020, <https://www.c4isrnet.com/electronic-warfare/2020/04/08/this-is-what-the-space-force-will-use-to-jam-enemy-satellites/>

primarily targets communications satellites operating in geostationary orbit.¹⁰ They are also experimenting on the usage of directed-energy systems, such as space-based lasers to target adversaries' targets in the boost phase, though not much information has been declassified in this regard.¹¹ The idea is to have a counter for the anti-satellite systems of China and Russia.¹²

In addition to this, Pentagon is also trying to discover ways to develop manufacturing in space. The Novel Orbital and Moon Manufacturing, Materials and Mass-efficient Design programme (NOM4D), launching by Defense Advanced Research Projects Agency (DARPA), is trying to develop foundational materials, processes and designs needed to make it a reality.¹³ As a result of the natural limitations of rocket launches in placing larger structures and systems in orbit, the agency is planning to launch smaller pieces of the desired structure on-orbit with multiple launches and then assemble them in space and if possible, to collect materials from the moon and to build it.¹⁴ They believe by assembling objects in space, they can surpass the volume restrictions of launching from the earth, which could enable more flexibility and mass efficiency.

More interestingly, before leaving office, former President Donald Trump signed an executive order for the Department of Defense (DoD) to find ways and explore the use of nuclear power for space¹⁵ and as a result, DARPA has chosen three firms, namely, General Atomics, Blue Origin and Lockheed Martin, to design a nuclear-powered space vehicle that will operate above low Earth orbit by 2025.¹⁶

Earlier on, the Pentagon released its defence space strategy to counter Russia and China. The US claims that the counter-space efforts done by Russia and China are the greatest strategic threat to America.¹⁷ As per the strategy, Pentagon plans to build a comprehensive military advantage in space which includes the capabilities that can counter the hostile use of space and fielding assured space

¹⁰ Ibid.

¹¹ Nathan Strout, "The Space Force Wants to Use Directed-energy Systems for Space Superiority," C4ISRNet, last modified June 17, 2021, <https://www.c4isrnet.com/battlefield-tech/space/2021/06/16/the-space-force-wants-to-use-directed-energy-weapons-for-space-superiority/>

¹² Ibid.

¹³ Nathan Strout, "Pentagon Science Office Launches Programme to Develop Manufacturing in Space ... and on the Moon," C4ISRNet, last modified February 10, 2021, <https://www.c4isrnet.com/battlefield-tech/space/2021/02/09/darpa-launches-new-program-to-develop-manufacturing-in-spaceand-on-the-moon/>

¹⁴ Ibid.

¹⁵ Aaron Mehta, "Trump Orders DoD to Explore Use of Nuclear Power for Space," *Defense News*, last modified January 13, 2021, <https://www.defensenews.com/smr/nuclear-arsenal/2021/01/13/trump-orders-dod-to-explore-use-of-nuclear-power-for-space-systems/>

¹⁶ Nathan Strout, "DARPA Chooses Three Firms to Design Nuclear-powered Space Vehicle," C4ISRNet, last modified April 14, 2021, <https://www.c4isrnet.com/battlefield-tech/space/2021/04/13/heres-whos-designing-a-nuclear-powered-space-vehicle-for-darpa/>

¹⁷ Nathan Strout, "Pentagon Releases its Defense Space Strategy to Counter Russia and China," C4ISRNET, last modified June 18, 2020, <https://www.c4isrnet.com/battlefield-tech/space/2020/06/17/pentagon-releases-defense-space-strategy-to-counter-russia-and-china/>

capabilities along with the improved space-based intelligence and command-and-control capabilities of the US. Furthermore, the strategy plans to integrate space into three; national joined and combined operations. The US plans to shape the strategic environment, which includes deterring hostile and aggressive activities in space, working with allies, updating the public and develop international norms to reduce misunderstandings. Lastly, they plan to cooperate with allies, including increase information sharing, with partners, industry and other US government departments and agencies.¹⁸ The Americans insist that all these developments and the introduction of the Space Force are a result of growing counter-space measures being done by adversaries. Naturally, a question may arise, what are the growing counter-space measures being done by adversaries?

In its simplest of terms, the US claims Russia and China to be its archrivals in the space race. The US Space Force has accused Russia of an unprecedented test of provocative weapons in space.¹⁹ These include space-based anti-satellite weapons, ground-based missiles that are capable of destroying the American satellites in low-earth orbit and a “Russian spacecraft that launched in November 2020 and split into two separate crafts once in orbit.”²⁰ One of those spacecraft, known as Cosmos 2543, fired a projectile into outer space. The Russian Space force, which was originally established in 1992. However, as a result of post-Soviet chaos, its responsibilities remained mute and ambiguous. By 2011, it was integrated into the Aerospace Defense Force and by 2015, Russia established a Space Force branch within the larger Russian Aerospace Forces, and was given responsibilities of “space warfare, including ballistic missile defence, space observation and surveillance, space launch and global communications.”²¹

China, on the other hand, has the most advanced space capabilities in the Indo-Pacific region other than the US. China has developed the bureaucratic structures for military problems of space back in 2015, shortly after the introduction by Russia, which came primarily out of concern of the US missile defence capabilities. This resulted in the creation of the People’s Liberation Army Rocket Force (PLARF) and the PLA Strategic Support Force (PLASSF).²² They worried that the American space

¹⁸ Ibid.

¹⁹ Paul D Shinkman, “Space Force Accuses Russia of Unprecedented, Provocative Weapons Test in Space,” *US News*, accessed July 23, 2020, <https://www.usnews.com/news/national-news/articles/2020-07-23/space-force-accuses-russia-of-unprecedented-provocative-weapons-test-in-space>

²⁰ Ibid.

²¹ Robert Farley, “Managing the Military Problem of Space: The Case of Russia,” *The Diplomat*, last modified April 20, 2021, <https://thediplomat.com/2021/04/managing-the-military-problem-of-space-the-case-of-russia/>

²² Robert Farley, “Managing the Military Problem of Space: The Case of China, Part 1,” *The Diplomat*, last modified May 22, 2021, <https://thediplomat.com/2021/05/managing-the-military-problem-of-space-the-case-of-china-part-1/>

dominance could undermine the Chinese nuclear deterrence by either blinding Chinese surveillance or communications or by missiles. In terms of their space doctrine, it's quite similar to the US; access to space helps military operations in other domains, "while denying space to the enemy undercuts its ability to conduct coherent military ops."²³ As a result, Beijing right now has warheads capable enough of smashing satellites in space and through their cyber force, at least in theory, are capable of cutting off adversaries "from contact with fleets of satellites that track enemy movements, relay communications among troops and provide information for the precise targeting of smart weapons."²⁴ A question may arise, where do the international arms control and disarmament regime stand in this growing great power competition in Outerspace?

Currently, the Outer Space Treaty bans the use of Weapons of Mass Destruction (WMDs) in Outerspace, however, mentions nowhere of banning the use of tactical weapons in space. As a result, Beijing and Moscow have proposed a new "Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)" at the United Nations.²⁵ The US opposed this treaty by highlighting two loopholes. Firstly, the treaty exponentially speaks nothing about the ground-based anti-satellite weapons, and secondly, it speaks nothing about dual-use and space-based weapons disguised under the cloak of civilian or commercial capabilities.²⁶

As a way forward, one must realize other than the US, Russia and China, regional players such as Iran, North Korea and India are also actively pursuing space dominance and have done multiple tests and experiments, such as satellite launches and ASAT missiles, for making their goals a reality. This raises an alarming situation and the urgent need for the existing global governance instruments to review the upcoming threats and to plan for the development of new measures that can overcome the current destabilising trends in space security. Proposals such as "Prevention of an Arms Race in Outer Space (PAROS)," the EU's "International Code of Conduct for Outer Space Activities (ICoC)" and the UN Group of Governmental Experts (GGE) on "Transparency and Confidence Building Measures (TCBMs)" were proposed, however, with no fruitful outcomes. The world needs to come to a solution, propose an international regime that can address the reservation of the involved

²³ Ibid.

²⁴ William J Broad, "How Space Became the Next 'Great Power' Contest Between the US and China," *The New York Times*, last modified January 24, 2021, <https://www.nytimes.com/2021/01/24/us/politics/trump-biden-pentagon-space-missiles-satellite.html>

²⁵ Bradley Bowman and Jared Thompson, "Russia and China Seek to Tie America's Hands in Space," *Foreign Policy*, last modified March 31, 2021, <https://foreignpolicy.com/2021/03/31/russia-china-space-war-treaty-demilitarization-satellites/>

²⁶ Ibid.

parties and address this emerging issue at an early date. However, with all of this being said, is the space arms race the new norm?