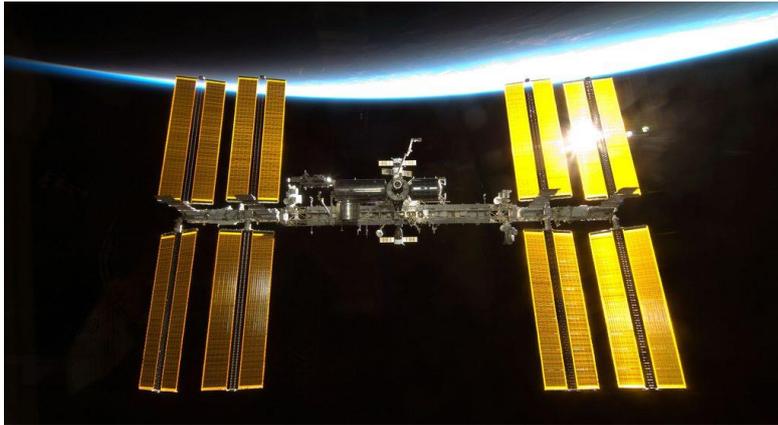


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THE INTERPLAY BETWEEN OUTER SPACE SECURITY AND TERRESTRIAL GLOBAL SECURITY

Nayef Al-Rodhan / July 6, 2018 /



US president Donald Trump recently announced the establishing of a “[Space Force](#),” [a new branch of the military to project US military might into outer space](#). In doing so, he followed up on his March 2018 statement that his administration “recognizes that space is a war-fighting domain, just like the land, air and sea.” While such [ideas are neither wholly new nor exclusively held by president Trump](#), they seem to challenge the fundamental principle of outer space as a global commons, which was enshrined in the 1967 Outer Space Treaty. Questions of outer space security are not just important for their own sake, as this article will show, they have wide-reaching implications for global security.

Global security and space security are becoming increasingly interconnected. Today, space is [indispensable for our global society](#), as we rely *heavily* on space assets for global communications and transactions. Space is no longer an area solely for exploratory adventures through which states gain prestige and boost domestic patriotism or government popularity. Outer space, once perceived as a mysterious no man’s land, is increasingly seen as a contested area and a resource to be exploited and dominated.

THE SEVEN DIMENSIONS OF THE IMPORTANCE OF SPACE

[The seven dimensions of meta-geopolitics](#), a theory I initially applied to international politics and geopolitics on Earth, are becoming increasingly apparent in space. These [seven dimensions](#) are: social and health parameters; domestic politics; economics; the environment; science and human potential; military and security factors; and international diplomacy.

Social and health parameters make up the first dimension of meta-geopolitics, demonstrated by the popularity of [telemedicine](#), an important tool for addressing global or regional epidemics. For example, during the Ebola epidemic, [telemedicine](#) was useful in allowing medical professionals to interview and monitor patients remotely, thus minimizing contact which could spread the disease.

Space also plays a role in *domestic politics*. Space expansion can be used to boost nationalism and government approval ratings. Countries take great pride in technological innovation, especially when this technology proliferates across the globe and generates both prestige and revenues. Prestige, in fact, has been a singularly powerful motivator for the US, Russia and China to begin their pursuits in space. Space can also be relevant for domestic law and order, as space satellites could be employed to fight crime.

Space technologies are crucial to the *economy*, as they provide global navigation capabilities and television and mobile phone communication services. Global navigation systems provide vital services for many spheres of the economy, including agriculture (field mapping, scouting, etc.), rail (collision prevention), and roads (vehicle navigation). In outer space itself, the [mining of asteroids](#) for valuable minerals could soon be another source of revenue, especially as Earth's resources become scarcer.

The *environment* is also increasingly tied to space exploration. For example, satellites are vital tools in tracking climate patterns and changes on Earth. Data collected by the Gravity Recovery and Climate Experiment ([GRACE](#)) are used to track ocean currents, weather, air pressure, natural disasters and can predict climate changes. In addition, satellite imaging will soon be able to forecast environmental degradation.

Space is also a platform on which *science and human potential* may be advanced. One way this is achieved is by providing the resources to update and improve existing technology. For instance, the [development of nanosatellites](#) is being applauded as a democratic revolution which allows developing countries to access space data for much cheaper than before. Both the launch and the orbital costs are miniscule compared to the costs of conventional satellites.

Militaries and national law enforcement agencies are immensely reliant on space. As in the aforementioned example, law enforcement relies on GPS to track movements of criminals and there are [numerous firms](#) providing satellite fleet tracking services that business managers can use to track assets. Military operations are also critically dependent on space, GPS communications and reconnaissance satellites.

Finally, space is increasingly influencing *international diplomacy* and cooperation between nations. There are several new relationships forming in this unlikely field. In 2015, [China and Russia announced](#) plans to cooperate. [ESA is also partnering with Russia](#) to send a lander to a previously unexplored area on the Moon's South Pole and these entities are also collaborating on the [ExoMars](#) program.

THREATS TO OUTER SPACE SECURITY

In outer space, threats to the seven dimensions of meta-geopolitics can be categorized into two groups: intentional and unintentional. Unintentional threats include issues such as space debris, collision risk, and radio frequency interference. Intentional threats include the weaponization of space, demonstrated by the proliferation of anti-satellite weapons, conventional kinetic-energy weapons, laser weapons, jamming, and cyber threats.

Perhaps the most researched issue, in terms of unintentional threats, is that of the ever-increasing amount of [space junk](#) in orbit around Earth. In 2016, a [window of the ISS](#) was cracked by a small

piece of debris. Even a tiny piece of space debris travels quickly enough to inflict serious damage on satellites.

At first glance, this type of problem falls into the category of unintentional space threats. Yet as [Vitaly Adushkin](#) of the Russian Academy of Sciences convincingly argues that the damage caused by space debris can lead to conflict between states. If a state is responsible for producing debris, which damages another state's space assets, it is very possible that the collision will result in tensions. In 2013, [Russia claimed](#) one of its satellites was damaged from debris produced when China destroyed one of its [weather satellites in 2007](#).

Currently, [over 50 nations](#) are operating in space or interested in exploration. This number will continue to grow, heightening the possibility of collisions and conflicts, as some governments may deny others sufficient orbital space or peaceful access to their space assets. Anti-satellite weapons, laser weapons, space-based weapons, and cyber threats fall into the category of intentional threats. Many countries, including Russia, the USA, China, Israel, Iran, India and North Korea are [developing anti-satellite capabilities](#), a worrying development considering the ever-increasing reliance on satellite based communications.

Russia has developed the military satellite [Kosmos 2499](#), which can conduct close approaches to space assets. If fitted with a weapons system, it could track and destroy satellites. As a response to such developments, the US is working on making their satellites more secure and easily replaceable. The US Air Force is also [investing \\$5.5 billion](#) over the next five years to prepare US space activities for the challenges of an increasingly contested environment.

THE WAY FORWARD

Speaking on space defense at the Centre for a New American Security in early 2016, Adm. Cecil D. Haney referred to a "[spectrum of conflict](#)" that we need to pay attention to. This means that threats can come from more than one enemy and in more than one domain. It also means that "escalation may occur with more than one adversary and in multiple domains." Given our global, profound reliance on space assets in various sectors, one-sided approaches to security are dangerous and ultimately self-defeating. While competition may be inevitable, there must remain limitations as to what states can do in outer space. Every effort must be made for states to recommit to the "peaceful use of outer space" because failing to collaborate on outer space matters will eventually make space safe for no one. Three concrete steps to make space safer should be taken immediately.

1. Reduce space debris

Nations should agree on removing set amounts of debris each year. Currently, no state has an incentive to remove debris, as it is a costly endeavor. To overcome this, states should agree on removing different amounts of debris based on their budget, space presence, and how much debris they have produced.

2. Improve cyber security

Governments are increasingly storing data electronically, a dependency which also increases the risk of a cyber-attack revealing geostrategic locations (for example power plants or military bases), military plans and demographic or financial information. To improve cyber security, states should

invest more heavily in projects for serious encryption, quantum computing methods (for hack-proof keys), and tight security around sensitive topics stored electronically, as well as strengthen the cyber security of space infrastructure more generally.

3. *Strengthen governance structures of outer space*

International institutions, treaties, and bodies of international governance should be strengthened, with the aim of establishing clearer rules on space-based weapons and anti-satellite weapons. Special consideration should be given to the possibility of states losing control of their own space technologies.

CONCLUSIONS

As we explore deeper into space, it will be imperative to clarify international shared rules for activities such as outer space colonization and asteroid mining to maximize the benefits of this endeavor at the global rather than national level. The fields of space security and terrestrial security are intertwined, as demonstrated by our reliance on space technologies on earth by how space issues affect our terrestrial security.

Space is an area that should be used to strengthen our collective security, not weaken it. It is imperative that states begin, as soon as possible, to agree on ways to ensure the safe, peaceful, and responsible use of space in order to guarantee our security now and in the future.

Humanity is becoming increasingly and irreversibly dependent on outer space. This necessitates that space remains peaceful and secure from conflict and debris, for all. This will require a sustainable political and technological cooperation of all space actors. If space becomes unsafe, it will not be selectively unsafe, but will be unsafe for all state and non-state actors and for future generations. Pragmatically, this means an adherence to a [Multi-Sum Security approach](#), and a [Symbiotic Realist](#) paradigm.

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