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Meta-Geopolitics of Outer Space, National Power and Global Politics

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Humanity's critical dependence on **outer space and its infrastructure** becomes most obvious in moments of tensions or crises, such as the anti-satellite test conducted by China in 2007.

Over the past years, **space has become increasingly congested and contested**, with public and private actors trying to assert their dominance, or simply to harness the opportunities that outer space technologies and infrastructure bring for profit. For example, just in one domain, maritime satellite communications, the market is expected to grow from $3.2 billion in 2018 to $8.3 billion by 2026 – due to the need for improved communication in the face of threats such as piracy and maritime terrorism.

A large part of our contemporary life is sustained by space-based assets and systems, **both in war and peacetime**. The global positioning system (GPS) has grown to be the most indispensable global system created by humans – providing the base infrastructure for the rest of the world's infrastructure. 14/16 infrastructure sectors deemed critical by the US Department of Homeland Security rely on GPS. In 2016, a disruption of only 13 microseconds to the GPS network caused a stir across several UK industries.

Satellite technology touches almost every aspect of modern life, including less obvious domains such as international diplomacy, where remote-sensing technology is used to monitor arms control and environmental treaties compliance. Outer space systems have impacts on virtually every facet of global security, and on each and every state capability. I elaborated on this conceptual framework at greater length in my book on the *Meta-geopolitics of outer space*. For national power, **space is critical for each of the seven dimensions of power**: social and health, domestic politics, economics, the environment,

science and human potential, military and security issues, and diplomacy. Globally, outer space is relevant to each of the five dimensions of global security: human security, national security, environmental security, transnational security and transcultural security.

Space technologies can significantly impact on **human security** in areas such as resource management, health and education. Already in 1999, *The Space Millennium: Vienna Declaration on Space and Human Development* listed benefits of space resources in areas such as natural disasters mitigation, improvement of public health services through telemedicine and better control of infectious diseases, enhanced transport security etc. The Declaration also noted the relevance of meteorological satellites for **environmental security** in areas such as weather and climate forecasting. Moreover, space instruments can help monitor and tackle environmental pollution, track depletions of natural resources and loss of biodiversity. **National security**, a fundamental priority for states, has been an area traditionally concerned with outer space capabilities. Outer space is highly connected to military affairs, enabling ships, drones and warplanes to navigate thanks to communication satellites, the collection of intelligence with high-resolution imagery and spy satellites. Increasingly, and worryingly, not only is outer space used for coordinating military operations on Earth but the strategic dependence on space assets makes an attack on satellites an attractive option for the enemy, moving the warfighting domain to outer space. This risk is further complicated by the **race for new and innovative space weapons** and systems, such as quantum-enabled military communications, which guarantee encrypted, hack-proof communication. States have also traditionally used outer space ventures both for defense purposes and also, not to be underestimated, for national prestige (see the cases of the US, Russia and China).

Transnational security is another area of global security impacted by outer space technologies. Satellite communications and reconnaissance satellites can help coordinate complex transnational operations and combat transnational crime. Furthermore, a 2016 Report by the Committee on the Peaceful Uses of Outer Space outlined several areas where space technology could help combat terrorism through the use of highly spatial resolution images to identify hot spots of terrorism and communication satellites to follow terrorist activities and movements. Furthermore, given their strategic importance, satellites, launch facilities or ground stations could become targets for attacks by terrorist groups.

Space is also relevant for the fifth dimension of global security, **transcultural security**, which refers to the integrity of diverse cultures and civilizations. Space technologies and satellite broadcasting have been long seen as vehicles for relaying propagandistic or political messages or as "weapons of mass indoctrination".

Because space is critical to all human activities on Earth, excessive weaponization and militarization – in the name of enhancing national security, can have the unwanted effect of diminishing security in other areas. Any serious military escalation in space will cripple world economy and impact peace on Earth. In other words, space is either safe for everyone or for no one. Furthermore, because outer space security and terrestrial security are tightly interconnected, destabilizing one directly affects the other: **international peace and livelihoods rely on outer space** and the latter must be kept conflict-free in order to contribute to greater security on Earth. This can be achieved, among others, by 1. reducing space debris; 2. improving cyber security; 3. strengthening governance structures.

Zero-sum games, which seek to obtain gains at the expense of others, are highly dangerous in the long run. The only paradigm to **ensure that space remains a global commons** for the entire mankind is the *multi-sum security principle*, which recognizes the holistic implications of space for the five dimensions of security. This principle posits that "in a globalized world, security can no longer be thought of as a zero-sum game involving states alone. Global security, instead, has five dimensions that include human, environmental, national, transitional and transcultural security, and, therefore, global security and the security of any state or culture cannot be achieved without good governance at all levels that guarantees security through justice for all individuals, states and cultures."

States **cannot pursue their interests in space with a focus on military interests** alone – if other capabilities are compromised, national security is also weakened. The paradigm of Symbiotic Realismprovides a useful guide going forward: it addresses both the rational interests of states and the elements of emotionality that drive state behavior such as prestige, pride, exceptionalism – factors that make up the strategic culture of countries. Symbiotic Realism also goes beyond the state-centrism of Classical Realism and acknowledges the influence of non-state actors, as well as the realities of a global system defined by anarchy, and simultaneously, by increasing interdependence and instant connectivity.

Indeed, the advent of **private ventures into space or public-private partnerships** (P3s) has shown that **states are anyway no longer the only actors with resources and leverage** in outer space matters. For example, some of the most important innovations for space debris mitigation have emerged from private or academic institutions. Numerous defense-related communications satellites use services from the industry, a trend that became more prominent in the 1990s and after 2003 (Iraq war) when the bandwidth requirements increased beyond the capacity of existing defense satellites and the US DoD and other NATO MoDs had to turn to commercial satellites. By 2004, the US DoD stated **commercial satellites were providing up to 80% of the satcom bandwidth** that the US military used. This reliance deepened in the coming years especially as the communication devices used in the military grew more complex (e.g. drones) and thus necessitated more data-transmitting capacity. Satellite communications procured from commercial partners are a critical part of the military infrastructure, even as they come with risks concerning sensitive information and traffic, or encryption. Although many countries (such as China, France, Russia) aim to procure dedicated military satellites (launched by the government) vs leasing commercial satellites, despite higher costs, **P3s will remain the mainstay of outer space affairs**. The examples of the US and UK (which has its military satcom operated by a commercial company) show that cost-effective and performant services can be obtained through P3.

For the sake of continued innovation and economic gains, such **partnerships are vital in many sectors, communication satellites included**. That said, the particular case of the International Space Station, which will likely transition to a P3 model after 2025, stands out. The ISS was a highly successful case of post-Cold War cooperation between previously rival countries and the breakup of this alliance may be politically costly for the US and Russia.