

War, Peace and Cooperation in the Last Wilderness

Review article based on “The Future of Geography: How Power and Politics in Space Will Change Our World” by Tim Marshall.

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1. Introduction

In 2001, Everett C. Dolman, an academic with the US Air Force’s School of Advanced Airpower Studies published *Astropolitik: Classical Geopolitics in the Space Age*. Featuring a photograph of Apollo 11 astronaut Buzz Aldrin on the Moon’s surface next to an American flag, it was the rare sort of academic book that invited you to judge it by its cover. The very title, *Astropolitik*, evoked *realpolitik*, a word typically associated with the amoral practice of power politics on Earth. The ‘Classical Geopolitics’ of the subtitle indicated that Dolman’s text would not succumb to the ‘critical geopolitics’ increasingly popular among his peers. Together these words imparted a darker meaning to the image of the Apollo 11 mission gracing the book’s front cover. The motionless American flag now seemed to symbolise not scientific achievement but power and a claim to possession.

Delving into Dolman’s work more than two decades later, it is hard not to be struck by its breathtaking ambition and careful concision. In less than 200 pages of text, Dolman laid out the case for *astropolitik* (a more neutral term for the geopolitics of space), he surveyed outer space for perils and prizes, provided an assessment of contemporary space governance, and closed with a series of recommendations.

Despite its age, much of *Astropolitik* remains relevant. One of Dolman’s lasting contributions was his sounding the alarm on the increasingly out-of-date Outer Space Treaty (OST) of 1967, which still forms the bedrock of international space law. A more substantial contribution was the way Dolman brought geopolitical thinking to bear on the outer space environment. As Dolman put it:

“What appears at first a featureless void is in fact a rich vista of gravitational mountains and valleys, oceans and rivers of resources and energy alternately dispersed and concentrated, broadly strewn danger zones of deadly radiation, and precisely placed peculiarities of astrodynamics.” (2001, p.53)

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Dolman recognised that these physical peculiarities had political meaning. The Earth's shape and its rotation help determine ideal locations for space ports. Some orbits like the Low Earth Orbit (LEO) and the geosynchronous orbit are more useful than others. Transfer orbits have choke points akin to the straits and canals at sea. Lagrange points are potentially valuable locations because spacecraft can be parked there; and the Moon and other celestial bodies offered riches to those able to take them.

Astropolitics has only become more relevant since Dolman's book. The revolutions in information and sensors have made satellites smaller, cheaper, and more effective. Private companies now dominate the satellite industry and boast commercial, military, and government clients.

The growing demand for satellite services has encouraged private launch companies to push down the costs of putting them into orbit, creating a virtuous cycle. As of this writing, some private players are making plans for their own space stations and are participating in the ambitious American Artemis programme to return to the Moon permanently.

Contemporary military operations are also tightly integrated with the use of space. Satellites provide vital intelligence and targeting information. But as Bleddyn Bowen (2020, p.193-225) points out, on a more profound level, greater use of satellites allows a military to disperse yet fight effectively, while forcing dispersion on an adversary on disadvantageous terms.

Furthermore, orbital infrastructure has become heavily dual-use. When Dolman first published his book in 2001, the American GPS satellite navigation system was primarily military in nature and barely used by civilians. In 2023, GPS and its rivals like China's BeiDou are indispensable to hundreds of millions in their daily lives. On the flipside, Ukraine has made extensive use of commercial satellite imagery (Borowitz, 2022) as well as the American Starlink satellite internet constellation in its war with Russia. (Jayanti, 2023)

2. Marshall's Arguments

Dolman's book helped spur the small but growing field of astropolitics. Yet while scholars have produced serious-minded tomes on the subject, popular perceptions tend to be marked by indifference. Tim Marshall's book is well-placed to bring astropolitics to the attention of policymakers, journalists, and general readers.

It is not surprising that Marshall wrote this book. A veteran foreign affairs journalist and author, he has penned popular works dedicated to geopolitics. In *Prisoners of Geography* (2015) he sought to explain how terrain and ecology shaped the behaviour of some states. He repeated this effort in *The Power of Geography* (2021), which included a final chapter on space.

The Future of Geography expands that last chapter into an accessible and informative book-length treatment. It is divided into three sections. The first section summarises the origins of the space age in the Cold War and introduces astropolitics. The second profiles the space programmes of the three

states Marshall believes are the most capable players: the United States, China, and Russia. The third section looks at what the future might hold for human politics in space.

Two key themes emerge from the book. One is the need to upgrade Cold War-era space governance frameworks to meet our 21st century needs. The other is the potential for states to wage warfare in space.

Unlike some of Dolman's detractors, Marshall seeks not to bury him but to praise him. Channelling Dolman, he looks at what it takes to be a space power. For one, a state's space ports are ideally located near the Earth's equator to take advantage of higher rotational speeds. The ports should also ideally have coastlines to their east to allow boosters to fall back to Earth safely. If a state does not possess such locations it needs to gain access to them as the European Union (EU) does with French Guiana and Russia does with the Baikonur Cosmodrome in Kazakhstan (which is neither close to the equator nor next to a coastline but is the best Russia can currently get). More importantly, states need capital, the right human resources, and broad support for investments in space.

Escaping the Earth's atmosphere, Marshall identifies the Low Earth Orbit (LEO) as "an attractive piece of real estate" (p. 63) because it's useful for a diverse array of satellites including those for imaging and satellite internet. Indeed, LEO can be legitimately identified as a choke point as private companies have plans to launch tens of thousands of additional satellites into these orbits, which range in altitudes between 160 to 2,000 kilometres above sea level.

This leads to the twin problems of orbital crowding and orbital debris. Marshall mentions the 2009 collision between a defunct Russian satellite and an American Iridium satellite that created 2,000 pieces of debris (p. 93). Incidents like these could become more likely in the future. The only way out, according to Marshall, is for the "Big Three" space powers — the US, China, and Russia — to agree on new rules for spacecraft disposal, space traffic management, and data sharing (p. 101).

Marshall briefly touches on other issues like the limited slots available in geosynchronous orbit (at an altitude of about 36,000 km). He also describes the potential utility of the five Lagrange points, since they are spots in which objects can remain more or less in a fixed position in relation to Earth. Lagrange point L2 was put to use in 2022 by the James Webb Space Telescope, which will observe deep space for the next 20 years.

Lunar governance remains vexing. The US-led Artemis programme has plans for a Moon base and space station. It is scheduled to return humans to the lunar surface in 2026. China and Russia have similar plans of their own. The US has portrayed the associated Artemis Accords as a series of innocuous rules to which all states should be willing to adhere. While this is mostly true, Marshall flags the three Artemis provisions that have sparked the most concern: protection of heritage sites (such as those of the Apollo landings), deconfliction (which would allow the declaration of 'safety zones') and extraction of resources.

The first two principles mentioned above could allow for the de facto creation of private property and even national territory on the Moon. Existing provisions under the OST prohibit states from making claims on celestial bodies in whole or part but Artemis may have found a way to do just that

informally. Combined with the provision allowing resource extraction, the Artemis Accords can seem like a finders-keepers model of lunar law.

These challenges are likely to grow more acute because the Moon's resources are not evenly distributed. Lunar water ice, which is crucial for sustaining life and for providing hydrogen and oxygen for rocket fuel, is concentrated in the polar regions. On the other hand, the Moon's equatorial region is likely to have the best deposits of helium-3, which could prove valuable if nuclear fusion power generation ever becomes a reality back on Earth. To manage potential competition, members of the Artemis Accords (including India, which became the 27th signatory in June 2023) will have to insist on multilateral legally binding measures.

Finally, there's the matter of space warfare. Increasing military and economic reliance on space also makes satellites attractive targets. Between 1985 and 2007, states observed an informal moratorium on destructive testing with anti-satellite weapons. In 2007, China fired a direct ascent anti-satellite (DA-ASAT) missile against one of its defunct satellites orbiting at an altitude of 863 kilometres. The immediate result was at least 35,000 pieces of debris. The more lasting consequence was that the US, India, and Russia conducted destructive DA-ASAT tests of their own.

Marshall discusses electronic warfare, directed energy weapons, and cyberattack capabilities. However, he spills more ink over the emerging threat from debris removal satellites, since these can quite as easily be repurposed to maul adversary satellites or knock them out of orbit. Since such dual purpose technologies cannot be easily proscribed, Marshall advocates a comprehensive global agreement on space situational awareness to make it easier to detect hostile behaviour in orbit.

3. Our Astropolitical Future

The Future of Geography offers little new to experts in the field but it is not targeted at that miniscule audience. Instead, Marshall strives to produce something rare: an accessible primer on astropolitics that is put together with jargon-free prose and sprinkled with wit. *The Future of Geography* is not the product of years of archival research and does not need to be. For sources, Marshall uses other books, papers, web sites, and news reports. More significantly, he speaks to practitioners and academics, and quotes some of them, including Dolman.

Writing this sort of book forces authors to make difficult decisions about what to leave out. Unfortunately, Marshall's choices often result in superficial treatment of important subjects. For instance, on space governance, Marshall has little to say about space laws other than the OST. There is also little or nothing on how the International Telecommunication Union (ITU) helps administer the grant of radio frequencies, or the various proposals for debris mitigation.

On space warfare, Marshall mentions the 2022 US declaration of a unilateral moratorium on destructive tests. However, his book does not cover the vote in the UN First Committee in November that year. In that vote, a total of 154 states were in favour of a resolution calling on states to ban destructive DA-ASAT tests. Eight, including Russia and China, voted against the resolution. India

and Pakistan were among the ten that abstained. (Foye and Hernández, 2022) Readers of Marshall's book will find few insights into why some states have hesitated nor will they learn of rival proposals for arms control in space.

Finally, Marshall's proposals are vague. While new space laws are needed, they are unlikely in the present international climate. The first generation of space laws were concluded during the Cold War detente. These treaties came at the same time as a series of major arms control agreements and were bookended by the 1959 Antarctic Treaty and the 1982 UN Convention on the Law of the Sea (UNCLOS), both of which were concerned with governance of regions beyond recognised national territories. For new space laws to come into being, we will require dramatic changes in great power relations, though the adoption of the High Seas Treaty in 2023 is cause for cautious optimism.

Notwithstanding a few shortcomings, *The Future of Geography* is the best introduction to a complex subject. It is also a sign of how much more urgent the study of astropolitics has become since Dolman's pioneering work. Those who delve into Marshall's latest offering will have little doubt that humans will take their paranoias and pettiness into the vast expanses beyond our planet.

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