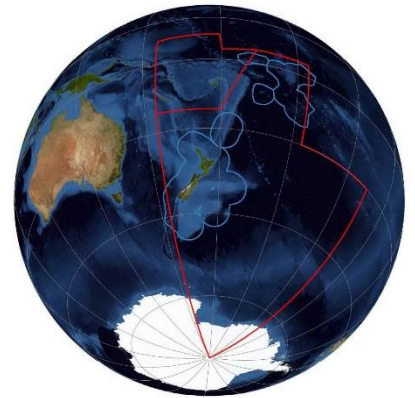


OVERVIEW: DEFENCE'S INTERESTS AND ENGAGEMENTS IN SPACE



Introduction

Space-based capabilities deliver a wide range of services that underpin daily life in New Zealand, including communications, navigation, remote sensing, Earth observation, weather services, and financial transactions. Ensuring the availability of these systems are in the interest of every nation. Continued delivery of space services requires complete access to and freedom to operate responsibly in space. Denial of space services can have significant national security implications, from economic prosperity to public safety. As a system, these capabilities are dependent on both space and ground based equipment and infrastructure.

Furthermore, space systems are now fundamental to the success of modern military operations; a critical enabler of more than 90% of military capability, and a prerequisite to maintaining an effective, efficient, combat-capable and flexible force. In short, space systems have become critical national infrastructure.

New Zealand's Defence Interest in Space

The international rules-based order, fundamental to New Zealand's position in the world, is under increasing pressure. States pursuing greater influence, challenges to open societies and an increasing array of complex disruptors are three key forces impacting upon this order. Furthermore, growing strategic competition on Earth is increasingly replicated in space, endangering the security and stability of this critical domain. For example, some nations have developed capabilities designed to deny, degrade, and disrupt access to and use of space-based capabilities.

Through space services, Defence supports government objectives by monitoring the factors that underpin and affect NZ's security, stability and economic prosperity. This includes monitoring space and earth to more effectively detect, characterise, attribute and respond to activities and behaviours which are counter to NZ's values.

New Zealand's immediate area of security interest, and hence the typical operating areas for the NZDF is an extensive maritime domain. Operating effectively, efficiently, and safely in such an environment with a relatively small force is heavily dependent on, and enabled by space systems.

New Zealand's interests have a wide geographic span, making space and space-derived information such as weather, imagery, position and timing, an essential enabler of commerce, data and intelligence collection, and military operations. Space-derived information can lead to faster decision making and more effective operational decisions.

New Zealand faces increasing vulnerabilities and opportunities in space

Space is becoming increasingly congested and competitive. As space technologies become less expensive and more available, space is becoming more accessible to state and non-state actors pursuing their respective interests through a range of means.

Greater access to space means growing numbers of satellites are being launched and operated, and this inevitably leads to an ever growing amount of uncontrolled human-created space debris orbiting around the Earth. This debris increases risk of collisions and damage to critical space systems.

Space actors are also developing counter-space capabilities to improve their ability to target their competitors' ability to operate on earth through denial of access to their critical space infrastructure. Counter-space capabilities may involve radio or optical interference, co-orbital or proximity operations, or either ground or space based weapon systems.

A recent example of these counter-space capabilities in action was Russia's test of a direct ascent anti-satellite missile in November 2021, which destroyed an old Soviet satellite, creating thousands of pieces of uncontrolled space debris. This prompted public condemnation from the New Zealand government and from like-minded partners, emphasising the importance of the space domain and continued access to it by all. Further to this, in July 2022, New Zealand joined the United States' declaration to [not conduct destructive direct-ascent anti-satellite missile tests](#).

There have also been widespread allegations of deliberate interference with space based capabilities in areas the NZDF and our partners regularly operate. This has the potential to endanger the safety of NZDF personnel and equipment along with hampering our ability to operate.

A rules-based approach to the responsible and peaceful use of space by all actors is necessary to ensure that access to, and use of, space can be maintained on a long-term basis, and that risks can be managed. New Zealand is party to the key international agreements that promote a safe, sustainable and peaceful space environment including the [Outer Space Treaty](#), the [Rescue Agreement](#), the [Liability Convention](#), and the [Registration Convention](#).

However, current international law and governance structures, which have their origins during the early Cold War, have not kept pace with the increased activity in and risk to space. For example, while there are some international standards or norms developing, they are not subject to effective compliance mechanisms and are likely not fit for purpose for emerging technologies and concepts of operation.

One of the key initiatives addressing this gap in space governance is United Nations General Assembly Resolution 75/36 on Reducing Space Threats through Norms, Rules, and Principles of Behaviours. The Resolution was led by the United Kingdom, and the Ministry of Foreign Affairs and Trade has lodged a national submission expressing [New Zealand's support for the resolution](#).

The "Tyranny of Distance" is an opportunity and a challenge for New Zealand

Our remote geographic location allows New Zealand to observe parts of the sky and communicate with satellites that are unavailable to other users, representing both opportunities to contribute internationally and risks from interference from other nations. New Zealand's vast [Search and Rescue region](#) (approximately 30 million square kilometres, extending from almost the Equator to the South Pole and half way to South America) provides challenges that can be significantly reduced through the use of satellite surveillance.

How Defence contributes using the Space Domain

The New Zealand Defence Force's outcomes are broadly to conduct military operations in support of New Zealand security, support all-of-Government outcomes, and contribute to New Zealand's security partnerships. Space derived services enhance and benefit these outcomes in the following ways-

- supporting NZ's foreign policy objectives;
- supporting the international rules-based order;

- enhancing mission assurance, efficiency, effectiveness and safety during training and operations;
- developing the information and situational awareness required for timely planning and decision making;
- Enhancing defence of NZ's sovereignty;
- supporting regional peace and security in the Pacific and Asia-Pacific;
- protecting resources;
- supporting humanitarian assistance and disaster relief;
- providing terrestrial and space domain awareness;
- monitoring changes in NZ's geostrategic environment, and
- contributing to international peace and security through multilateral security partnerships.

What space assets do the NZDF currently have?

Wideband Global Satellite Communications. Since 2012, the NZDF have participated in the [Wideband Global Satellite Communications System](#), an international partnership which provides communications satellites for military purposes. These satellites are built by Boeing and operated by the US Department of Defence. Other members of the partnership include Canada, the Netherlands Denmark and Australia.

Future NZDF space systems. In order to provide dependable security, certainty, and timely use of space systems, future capability development will likely be required to improve national resilience and reduce reliance on others to support New Zealand's interests.

How does the NZDF seek to fulfil its responsibilities in the Space Domain?

Space Domain Awareness. SDA is fundamental to ensuring safe space operations and underpins all other space roles. SDA provides knowledge of the space environment and an accurate understanding of space objects to enable the timely assessment of and response to risks and events. For example, orbiting space systems are vulnerable to hazardous space weather, collisions with space debris, or purposeful interference. New Zealand's location makes it an ideal place to look into the night sky and make significant contributions to global understanding of the space domain. This also supports NZ's treaty obligations as a space launch state. Furthermore, it enables foreign policy objectives through the identification, attribution and calling out of behaviours in space that NZ does not consider to be responsible.

Supporting our operations. Providing capability effects through space-based systems to enable and enhance military capabilities on earth and our combat effectiveness. This may be furnished through a combination of military, other government agencies, security partner alliances, and commercial means. Typical sub-elements are-

- **Intelligence, Surveillance and Reconnaissance (ISR).** Space-based earth observation to monitor and gather intelligence on activities taking place on earth. Space-based ISR provides unmatched coverage compared to earth-based ISR it is able to provide unparalleled access to hostile areas as well as disaster, search and rescue areas etc, which are either inaccessible, or too vast for effective earth-based ISR, allowing New Zealand to conduct operations with foreknowledge of the operating environment.
- **Positioning, Navigation and Timing (PNT).** Enables precise and accurate geolocation, navigation and time reference from space-based Global Navigation Satellite Systems (GNSS); primarily provided by the US Department of Defence GPS system. Considered essential for modern operations, it requires assurance measures for continued availability. The timing element provided by GPS also underpins the core functioning of our civil society, including banking, financial transactions, mobile communications, power transmission etc; with the increase in reliance of these systems there has been a proportional decrease in resilience to a loss of the system or reduction of its accuracy.
- **Satellite Communication (SATCOM).** Beyond-line-of-sight communications through space-based systems to provide global, resilient, responsive, high capacity, and secure voice and data

communication. This communication is essential for coordinating efforts to produce operational success.

- **Environmental Monitoring.** The provision of space-derived weather and oceanographic assessment and forecasting, which enable our ships, aircraft and people to have a better picture of the climatic conditions they are heading into.

Information from the above uses of space are presently transmitted primarily by radio frequencies though developments including laser communications are rapidly changing the environment.

Maintaining Strong relationships with our partners.

Defence is presently a consumer of space-based services either through paid commercial means or from partner military and commercial organisations. However, New Zealand's geographic location in the South Pacific provides distinct advantage in Space Domain Awareness (SDA), communication, satellite control, and satellite information download. These benefits provide opportunities to collaborate with like-minded partners, improving efficiency and resilience of their system while allowing Defence to increase its sovereign utilisation of space through incremental investment in the capabilities supported.

A key to maintaining international military partnerships is Defence's participation in the Combined Space Operations (CSpO) Initiative and the Schriever Wargame series. These are Defence-based forums, which provide Defence with:

- insights into the defence policy and capability of partner countries
- opportunities to share lessons learned
- assessments on emerging space issues
- future pathways to capability

Combined Space Operations

Defence leads New Zealand's engagement in the CSpO. The CSpO is a military space initiative consisting of Australia, Canada, France, Germany, New Zealand, the United Kingdom and the United States. Its purpose is to share information about space operations and activities, and co-ordinate effort.

CSpO is a defence partnership between participant nations, with the goal of improving defence coordination to ensure the space domain remains safe, secure, and accessible to all. Nations retain all national prerogatives and there is no formal alliance.

New Zealand joined CSpO in July 2015 for the opportunity to increase our knowledge of space operations, to bolster our efforts to promote a rules-based international order in space, and to strengthen our international relationships. In 2021 CSpO Released the [CSpO Vision Statement 2031](#) which states a collective resolve to enhance responsible behaviour, uphold international law and promote a secure, stable, and sustainable domain. In this way Defence's participation in CSpO reinforces New Zealand's commitment to the United Nations COPUOS and our national approach to space.

The Schriever Wargame

This is an annual event, led by the United States Space Command. It provides participants (New Zealand, Australia, Canada, UK, USA, France, Germany and Japan) with opportunities to test policy, legal, and operational approaches to hypothetical space security challenges, which occur 10 years in the future. Each year a new scenario is developed, exploring escalating tensions in space. The wargame focuses on the following objectives-

- Exploring opportunities for national, commercial, and multilateral systems to synchronise efforts to protect and defend access to space and space-based infrastructure;



- Examining opportunities to integrate space operations;
- Advancing shared understanding of responsible behaviours in the space domain and insures national caveats are well understood when approaching collective decision-making, and;
- Investigating whole-of-government(s) and coalition options to control escalation across all domains.

In similar fashion to participation in the CSpO initiative, Defence's involvement focuses largely on the policy aspects, including the development of norms of responsible behaviour and methods to reduce escalation. While the game is set in the future and does not require us to represent national positions, the NZDF does not advance any position which is inconsistent with New Zealand legislation.