

PATHFINDER



AIR POWER DEVELOPMENT CENTRE BULLETIN

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SPACE POWER AND THE RAAF

These are interesting times in the evolution of space power within the RAAF. While the space environment is distinct from air, space systems enable or improve many air capabilities. The capabilities of space systems are continually increasing, so the value of space to the RAAF is increasing commensurately.

Space power can be described as the use of space capabilities to enable the pursuit of national objectives. Although military power is only one element of national power, the part that the RAAF has to play in furthering Australian economic and military objectives through the use of space is steadily growing.

Compared to land, sea or air systems, the primary advantage offered by space systems is improved perspective. A space vehicle has a field of view of a large portion of the Earth, and can be viewed from large areas on the Earth. It is costly and reasonably difficult to send physical objects into orbit or recover them, but it is cost effective to use space systems to gather, relay or distribute information over broad areas. Thus the current space systems are predominantly information systems.



Satellite electro-optical and digital terrain elevation data can be combined to provide a virtual landscape.

From the point of view of air forces, the value of space is in force enhancement to improve air capabilities. Force enhancement can be divided into the following four activities: surveillance and reconnaissance, precision navigation and timing (PNT), environmental observation and communications. Environmental

observation is the least well understood activity; it provides meteorological data, digital terrain elevation and land usage data. During Operation *Iraqi Freedom*, space provided allied combat forces with a range of products that improved and in some cases combined the basic force enhancement activities. Global Positioning System (GPS) accuracy reports included analysis of jamming and interference to allow the best use of precision guided munitions. Satellite reconnaissance advanced notification reporting provided information on friendly and other satellite overflights. The combination of digital terrain elevation data with other satellite imagery provided a means for route planning, target detection, and mission rehearsal. The combination of PNT and satellite communications provided support to friendly force tracking, which reduced fratricide. Ballistic missile warning added to the protection of friendly forces. Space capabilities bring so much military advantage that adversaries will inevitably challenge them. Indeed, during Operation *Iraqi Freedom*, Iraqi forces tried to jam GPS.

Apart from the military advantages described earlier, space systems are now vital to Australia for civil and commercial reasons. For example, mobile telephone network infrastructure relies on PNT for timing synchronisation, and many financial transactions rely on satellite communications for authorisation. Space control consists of measures to allow friendly freedom of action to effectively utilise space, while denying such freedom of action to adversaries. Space control to protect both military and civil national interests is an ADF concern. Space control is analogous to air control. It requires situational awareness of an adversary's space capabilities and surveillance of adversary space systems to enable counterspace operations. The RAAF's heritage in air control will stand us in good stead to adapt to this new role.

Future space systems will bring both opportunities and threats. The number of nations with space capabilities is growing due to the increased use of existing systems and the proliferation of relatively inexpensive small satellites. Surveillance and reconnaissance is advancing rapidly through the deployment of more Synthetic Aperture Radar (SAR) satellites and improved

imagery intelligence satellites. PNT will improve as the US upgrades its GPS, Russia completes its Global Navigation Satellite System (GLONASS) constellation and Europe deploys its Galileo system. Communications satellites are increasing in capacity with on-board switching and laser links. Some space-like capabilities will be provided at a much lower cost by near-space systems operating above 65,000 feet. All of these developments will make space more versatile and more important to ADF operations. The RAAF is the logical custodian of such capabilities.



In August 2001 the solar-electric Helios flew to 96,863 feet—a new world record for sustained altitude by a winged aircraft.

The RAAF approach to the opportunities and challenges of space has several aspects. Firstly, the process of improving our use of existing space systems continues with activities such as integrating GPS and datalinks into aircraft. Secondly, the RAAF readily engages with the Directorate of Defence Space (DDS) which allows input to Defence Space policy. Thirdly, various units within the RAAF support specialist space education and training (in addition to DDS funded space courses). Finally, the RAAF actively supports the development of space power doctrine. Consideration of the current and future situation in an academic sense replaces intuitive understanding with a conceptual framework.

One area that could be further improved is the integration of space capabilities at the operational level. Consider the case of the US, where space capabilities are incorporated very well. A space specialist is

embedded in every team within the Air and Space Operations Center (AOC) staff to advise the Joint Force Air and Space Component Commander (JFACC) and other staff regarding the use of space to enhance air operations. The space staff also serve as a conduit to the Fourteenth Air Force AOC, commonly known as the 'Space AOC', which directs space operations in all theatres and conducts combat planning and space-strategy development.

Within the RAAF Air Operations Centre (AOC), specialist teams reach out to external organisations in order to use space force enhancement. However, the RAAF AOC does not have a space specialist in each team, although some staff have coincidental space experience. Consequently, not all systems are fully exploited. For example, GPS accuracy prediction is conducted routinely by the USAF and yet is not a standard procedure in the RAAF AOC. If we wish to better integrate current force enhancement or utilise new capabilities, then it is necessary to embed at least one space specialist within the RAAF AOC staff.

The AOC concept is relatively new for the RAAF and will undoubtedly mature. Space will continue to increase in importance with the introduction of new capabilities, and so the role of space in the AOC will evolve significantly. AOC function and manning will reflect this change, bringing benefits in operational-level interoperability. By becoming a knowledgeable and valued partner at the operational level, the RAAF could engage the US and other allies in dialogue on how to legally and ethically wield what will be an impressive and growing source of military power.

The degree to which air forces remain relevant in the 21st century may be determined based largely on the protection of the full spectrum of interests that determine the economic and social well-being of a nation. It is, therefore, imperative that air power theory be revised to integrate Space as a continuum of air operations.

- Major General W. E. Jones, 1997



Air Power Development Centre
Level 3, 205 Anketell Street
TUGGERANONG ACT 2900

Ph: 02 6266 1355 Fax: 02 6266 1041
Email: airpower@defence.gov.au
Web: www.raaf.gov.au/airpower

