



Space Industry Innovation Council

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Department of Innovation, Industry,
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Mr Andrew McGowan
Committee Secretary
House of Representatives Standing Committee on
Infrastructure and Communications
PO Box 6021
Parliament House
Canberra ACT 2600

Dear Mr McGowan,

This submission to the Inquiry into the role and potential benefits of the National Broadband Network (NBN) is provided on behalf of the Space Industry Innovation Council ("Space Council").

Summary

The Space Council has two key messages for the Committee, namely:

1. Government projects of the order of magnitude of the NBN should be implemented with whole-of-Government outcomes in mind. In the case of NBN, this would range from the local capability enhancement that flows from encouraging Australian industry involvement in the project itself; the training up of professionals in next generation communication technologies; and being open to secondary payloads on its satellite systems that may deliver significant additional benefits for small incremental cost.
2. Use of NBN capability to transport space-derived data will drive both productivity and applications innovation in the earth observation field. The speeds available via the NBN to transport increasingly large satellite datasets for analysis into decision support information will lead to productivity gains and improved outcomes in fields such as weather forecasting, climate change, resources management, emergency response, and defence surveillance. It is important that NBN access be available to the major earth observation infrastructure used predominantly for public good services throughout Australia.

Space Council Perspective

The Space Council was appointed in January 2010 by the Minister for Innovation, Industry, Science and Research to act as an engagement mechanism between the space sector and government, and to champion sector innovation. Since our establishment, we have been struck by the extent to which the Australian community is largely unaware that our economy is already highly dependent on the space sector. There is increasing evidence that space capability is central to the future prosperity of nations¹, and is hence a strategic capability for Australia to invest in.

Given Australia's current low participation in the upstream space segment², Council is providing advice to Government that Australia needs to increase over time its own investment in space infrastructure. This would build on the natural advantage of our geographical position, as Australia is a highly attractive location for satellite ground receiving stations in the southern hemisphere. Having these capabilities would also bring with it many benefits, including an expected up to six for one multiplier effect in creating downstream space applications, and therefore significant productivity gains.

Australia should implement a structured approach to growing industry capability, via: i) an extension to the Australian Space Research Program, ii) Australian industry participation in major projects, including ground infrastructure for satellites, iii) encouragement to design and implement space mission payloads, and iv) ensuring that if a Synthetic Aperture Radar Satellite (SARSat) is acquired later this decade³, it is operated as a dual use (military + civil) facility.

While this is ramping up, the bandwidth and availability of the NBN network will be highly important in helping Australia make the best use of the space data to which we have access. And the NBN certainly has a role in increasing the skills and training the capability that will benefit many industry sectors, including the space industry.

NBN Space Capability

There is an area where NBN and space sector capability directly intersects, namely the NBN space segment. NBN Co has announced that 3-4% of the network will be delivered via a satellite communications infrastructure, covering rural and regional areas where fibre or wireless would be prohibitively expensive. The Space Council strongly endorses this approach, while making the following commentary.

1. The acquisition of NBN Co's two to three Ka band satellites in geostationary orbit will represent important additions to Australia's critical space infrastructure. These will contribute to the growing national commitment to space, and become part of an explicit dependence on space-based communications to deliver the types of services listed in the Committee's terms of reference to those residing in rural and regional areas.

¹ See for example: *A Day Begins in 2030*, p.71, Chapter 5.0, in UK publication *A Space Innovation and Growth Strategy 2010 to 2030*, http://www.spaceigs.co.uk/documents/index/index/cPath/14_25/.

² The only Australian-owned satellites are those operated by Optus. Other services operate here, eg. Intelsat, but they are foreign owned.

³ Potential acquisition of a Synthetic Aperture Radar satellite by 2019 was foreshadowed in the 2009 Defence White Paper, p.82.

2. The experience gained in the NBN satellite system's specification and entry into service will grow space sector specific capability in those who are involved. We note that the Defence Industry Policy Statement of 2010 mentions satellite communications expertise as a strategic industry capability. This national security related expertise can only grow if there is sufficient work generated to keep such resources employed, so the Space Council believes the Government should encourage Australian industry participation in the NBN satellite project.
3. The Space Council considers there is likely to be scope for the NBN space capability to grow commercially beyond the 3-4% population coverage currently envisaged. A recent report for the UK Government offers the view that up to 20% of the UK population is likely to be satisfied with the speed of a satellite broadband service⁴ (12Mbps in the NBN case). And there already exists several commercial providers in the USA offering direct satellite broadband to consumers in the US, including in urban area and regional "not spots" where fibre has not yet reached. We are also aware of new technology in near-space communications (35km altitude) for theatre applications over 200km, which has the capability to safely and reliably provide broadband in-fill for regions of low populations, and therefore the potential to provide an alternative service.
4. It is a well established fact that expenditure on significant infrastructure spurs innovation. The NBN satellites will be state of the art, and could well generate new products, services, processes and therefore new jobs in Australia as this highly performing communications capability is brought online. And the Committee might want to also encourage Government to be alert to the potential to export the innovations introduced for Australian users internationally.
5. The Space Council is on the lookout for opportunities to grow professional space skills and capability more quickly in Australia, and certainly well before the complex undertaking that will be the potential acquisition of a SARsSat by 2019. While Australia, through the experience of Optus, is familiar with specifying communications satellite payloads, this is not so in the earth observation field. The idea therefore emerges that gaining experience via secondary "hosted payloads" would represent a suitably risk managed capability step up for Australia along the way. Options suggested have been precision navigation augmentation, and atmospheric monitoring. While it turned out that the opportunity to include a secondary NBN payload had already passed given the timing imperatives for the first stage satellite rollout, the Space Council wishes to make the point that such "whole-of-Government" outcomes should be considered at an earlier stage when major new infrastructure is planned.
6. We consider Australia should make a commitment to contributing to protecting the space environment in parallel with its growing stake of having the NBN satellites in orbit. Space debris is becoming an increasing problem for operational satellites, as demonstrated by a recent collision, simulations and "what if" scenarios of how business and national security would be adversely affected if space capability were to be degraded, become unavailable, or

⁴ See p.37, Chapter 3.0, in UK publication *A Space Innovation and Growth Strategy 2010 to 2030*, http://www.spaceigs.co.uk/documents/index/index/cPath/14_25/.

be denied by third parties⁵. Yet the large Australian landmass is in fact ideally suited to provide a monitoring service for space surveillance and space situational awareness using both optical and radar technology. Radio spectrum for space applications is also increasingly crowded, and there is scope for Australia to show international leadership in these two areas of global concern.

7. Industry insiders have observed that NBN Co is currently a “sink” for professional and technical communications experience and talent during its start-up phase. However, as the company’s expertise grows and stabilises, we hope that Government will encourage it to take on and embrace an “industry training” responsibility nationally, similar to what Telecom, the ABC, OTC and the Civil Aviation Authority used to do in past decades within their respective areas of expertise.

NBN Driving Innovation in Use of Earth Observation Data

Increasingly, earth observation satellites are creating an explosion in the quality and amount of imaging data available for analysis and interpretation. In fact, in Government alone, there are currently at least ninety two programs, totalling \$1.3 billion in annual expenditure, which are dependent on earth observation from space (EOS). EOS contributed at least \$3.3 billion to Australian GDP in 2008-09 and on conservative assumptions it is estimated that the contribution to GDP could grow to around \$4 billion by 2015⁶.

Yet, the infrastructure and communication systems required to collect and transfer data require modernisation to cope with the increases in data volumes expected to occur over the next decade. The bottlenecks created at ground stations where the data are received are impeding innovation, and Australia operates many such remote acquisition tools on this continent. By way of example, Geoscience Australia is currently forced to ship data from its ground station in Alice Springs via overnight courier (which doesn’t help in emergency management situations), and getting the data and processed information back out to customers in a timely and readily accessible fashion is equally problematic. The NBN capability will be vital in solving this problem for Geoscience Australia and other users of large datasets such as the Bureau of Meteorology, and their clients.

Another example is the role of the NBN in a National Positioning Infrastructure (NPI). In this case the NBN could be used to connect thousands of continuously operating reference stations (CORS) spread across the Australian continent which collect data from Global Positioning Satellites. The services that such as infrastructure could deliver include improved real-time weather alerts (now-casting) in addition to positioning control for robotic machinery in automated mines and farms.

The Space Council is in agreement with the IT Industry Innovation Council that the NBN is a critical piece of infrastructure which will underpin innovation leading to productivity gains, and new products/processes which will benefit our economy and social well-being. In relation to earth observation innovation, the NBN will open up computing clouds and other infrastructure and tools for data and visualisation that cannot be used readily at the moment, and for which new applications can be expected to burgeon once the capability is in place.

⁵ The banking industry is highly dependent on the GPS timing signal for example.

⁶ *The economic value of earth observation from space*, ACIL Tasman, September 2010, p.vi.

On the issue of “looking out” rather than “looking down”, it is clear that the NBN will also be of great benefit to the Square Kilometre Array (SKA), the major global radioastronomy project for which Australia is one of two shortlisted bidders. The ability to connect, in real time, the longest baselines of the SKA is central to Australia's bid for the instrument site. The NBN offers the only cost-effective way of doing this, and construction of a national high-speed data network is a clear discriminant between the Australian and South African proposals.

As a corollary of the above discussion, a decision on how to support research networks on NBN infrastructure is an imperative for data-intensive science, including both high time and spatial resolution earth observation studies, and the SKA.

The Council thanks the Committee for this opportunity to make a submission. We would be pleased to provide further information in support of any of the issues raised above, or to attend a public hearing as required.

Yours sincerely,

Dr Rosalind Dubs
Chair, Space Industry Innovation Council