Submission 060
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Australian Government
AUSTRALIAN INSTITUTE OF MARINE SCIENCE
TOWNSVILLE | DARWIN | PERTH

23 February 2011

The Committee Secretary
House of Representatives Standing Committee
on Infrastructure and Communications
Parliament House
CANBERRA ACT 2600

Dear Secretary

Response to the National Broadband Network Inquiry, February 2011.

Thank you for the opportunity to respond to the Senate National Broadband Network (NBN) Inquiry. This response is for the Australian Institute of Marine Science (AIMS), a Publicly Funded Research Agency (PFRA) that carries out marine science across northern Australia. AIMS is a world leading tropical marine research agency which is supported by state of the art research laboratories in Townsville, Perth and Darwin. AIMS operations are focussed on the remote areas of Australia's tropical marine estate and coastal communities. AIMS headquarters is in Townsville. AIMS operates two research vessels: the RV Solander home-based in Broome, Western Australia; and, the RV Cape Ferguson home-based in Townsville with each vessel spending around 300 days per year at sea. AIMS also supports a network of coastal and offshore remote monitoring station in the tropical part of Australia's Exclusive Economic Zone (EEZ). All of these facilities are dependent on reliable and efficient communication infrastructure and services.

The Australian Institute of Marine Science (AIMS) wholly supports the implementation of a National Broadband Network (NBN) for Australia. It views the NBN as the foundation upon which communications services will be free to evolve and transform the way Australians live and work for decades to come. Equity of Access is fundamental to AIMS being able to deliver its science outcomes to the range of stakeholders that we currently engage with. Many of these stakeholders are remote or regional, reflecting the range of areas that AIMS works in across Northern Australia. Our ability to deliver new data and information outcomes is directly linked to the ability of our stakeholders to access them and this in turn is linked into their ability to get fast and affordable internet access.

AIMS is part of the Australian Academic and Research Network (AARNet) which provides high speed communications between the various educational (Universities) and research agencies and so we are well aware of the types of new activities and outcomes that affordable high speed networks deliver. Many of our stakeholders however do not have this level of access, many are remote or regional and so they are excluded from opportunities that affordable high speed communications enables. AIMS believes that the NBN has the potential to re-address many of these issues, especially in regional and remote areas, and to open up ways for AIMS to deliver new and exciting data and information services, and science outcomes to people and organisations that currently are excluded by their communications infrastructure.

AIMS maintains a network of remote monitoring stations, such as the ones that provided information about Cyclone 'Yasi', that themselves require high speed communications in order to get the data back to AIMS and to the community. Currently these run on Telstra nextG services but this is expensive and in many areas it has limited capacity and so access to an NBN would give alternative means to get high bandwidth data, such as images and video, back to AIMS and to the community. This will support work such as forecasting the impact of a warming ocean, box jellyfish monitoring and monitoring and forecasting coral bleaching.

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For very remote locations, such as outer reefs, we only have very limited access to expensive and slow satellite communications and this is true for much of Northern Australia. Access to high speed cost-effective internet would dramatically change how we can work in these areas and open up entirely new studies and science outcomes from these regions.

Equity of access to high speed affordable internet is a fundamental component in driving innovation, science and science outcomes, especially in regional and remote areas. Our ability to engage with, and deliver outcomes to, our stakeholders is dependent on the nature and cost of the electronic communications between us. We see that the NBN as a fundamental infrastructure that will allow us to better utilise a range of electronic delivery mechanisms, from video to real time systems to social networking, to deliver better outcomes to our stakeholders. Stakeholders, that include government resource management agencies and regulators, industry (e.g. offshore oil and gas, tourism, aquaculture) Non-Government Organisations (NGOs) and the general community.

As a result AIMS, while already having access to the AARNet high speed network, fully endorses and supports the NBN, especially given the remote and regional nature of much of our work. The NBN will enhance effective transfer of data, knowledge and information generated from our research to users of marine research which requires high speed high bandwidth connections for all users.

Specific comments against the terms of reference are provided in Attachment 1. Please do not hesitate to contact Mr Scott Bainbridge, AIMS GBROOS Project Manager if you require any further information on matters raised in this submission.

Regards

Dr Ian Poiner
CEO

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Attachment-1

The National Broadband Network – A Regional Research Perspective

Submission to the House of Representatives Standing Committee on Infrastructure and Communications regarding the National Broadband Network (NBN)

Australian Institute of Marine Science (AIMS)
February 2011

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Points against the Terms of Reference

a) *The delivery of government services and programs:*

As a Publicly Funded Research Agency (PFRA), AIMS delivers a range of science outcomes to a range of stakeholders including the Federal and State Governments but also with Industry, not-for-profit organisations and the general public. As an example during the recent cyclone 'Yasi' AIMS provided real time weather and image data to the Bureau of Meteorology (BoM) and the general public as part of the monitoring of the cyclone. Such access, particularly to video and image data, requires affordable and effective internet access, particular in the regional and remote areas impacted.

What the NBN is planning to deliver will greatly increase our ability to deliver sophisticated data and information products to the complete range of our clients and stakeholders. As an example we are looking at automated video systems for monitoring of box-jellyfish on northern beaches, this would provide a better warning of potential health risks but requires cheap and fast communications especially into remote areas.

AIMS has a large unmet need in getting high speed communications into remote areas to run remote field and observation stations and to do long term *in-situ* experimental work. We currently use the Telstra nextG network which has good coverage but is expensive and capacity limited and it doesn't provide coverage in many remote areas of Northern Australia. Access to affordable satellite and improved wireless systems would transform the type of science we could do in these remote areas and directly change our understanding of how these systems function. In this example our ability to do remote science is directly linked to being able to get affordable effective communications into these areas. While the NBN will not solve all of our problems it provides the back bone on which services that do can be built.

b) *Achieving health outcomes*

AIMS is involved with a number of pilot projects that have a direct impact on health outcomes. The first is the jellyfish monitoring already mentioned. The second is the development of hand-held shell fish toxin detection units that send image and analytical data back to AIMS in real time for analysis of levels of toxins in shellfish about to be harvested. This enables aquaculture companies to test for toxins before the product is harvested so allowing them to deliver a better quality product. The project is just starting but requires high speed internet as a fundamental component.

c) Improving the educational resources and training available for teachers and students

AIMS has an educational component to its web site and has done live interactive internet sessions with scientists and school children where the children can see the scientific work and ask questions of, and interact with, the scientist. These sessions require the schools/students to have access to a high bandwidth internet connection and so are limited to groups that have existing high speed links. The NBN would increase the opportunities to deliver a marine science education program to schools across Australia.

d) The management of Australia's built and natural resources and environmental sustainability

The core mission of AIMS is to provide the knowledge and understanding for the sustainable management of the marine environment with a current focus on tropical Australia. AIMS has been fibre connected to AARNet since early 2005, and along with CSIRO and Australia's Universities, has had the opportunity to explore and realise the real collaborative and business benefits that high bandwidth connectivity offers. Whilst we don't see the NBN competing with AARNet, we do see it making those same benefits available to everyone.

Currently, access to our data, information and knowledge by users is constrained by the lack of reliable and efficient communication infrastructure and services. The exception is the science and research community through AARNet. The ubiquity of service that the NBN offers will provide an opportunity for AIMS to extend the reach of our data services and allow us to tailor the information we publish with more highly visualised, content rich and user friendly formats to reach and engage a far broader community especially in regional and remote areas of Northern Australia. This leap in technology will open up new avenues for the Institute in achieving its mission.

e) Impacting regional economic growth and employment opportunities;

Australia's marine domain is crucial to our future, with more than 70 per cent of Australian territory lying beneath the ocean. The AIMS Index of Marine Industry[1] brings together previously dispersed information, into a single document illustrating the extent of the marine industries sector contribution to the Australian economy. AIMS released the first Index of Marine Industry in 2008 to highlight the contribution by the marine industries sector. Before this, the benefits had not been considered in terms of a single category – the 'marine industries' sector. The Index is released annually and the latest figures (released in 2010) show an increase in the sector's value between 2001-02 and 2008-09 by some 80 per cent. The total measurable value of economic activity based in the marine environment in Australia in 2008-09 was around $44 billion with much of the activity in northern Australia.

AIMS is located in regional Australia and its research is directly relevant to the sustainable development of important regional industries such as tourism, fisheries, coastal mining facilities and offshore oil and gas development. The positive impact of our research on regional economies[2] and the growing importance of high speed communication tools for our business/research support the case for the broad benefits of a high speed network in regional Australia.

As a world leading research agency we rely on state-of-the-art facilities to attract staff and increasingly our international collaborations require fast communications to handle the large volumes of data. For example, genetic and microbial research involves sharing enormous amounts of data and so is only practical if we have the infrastructure to support it.

[1] AIMS Index of Marine Industry 2010
[2] A report by Insight Economics (see here) showed the importance of marine research to the regional economies of NE Queensland.

f) Impacting business efficiencies and revenues, particularly for small and medium business, and Australia's export market

AIMS, like most organisations, uses its Internet connection for most of its interactions with other agencies, companies and the Financial and Governmental systems. Uniform high speed access would considerably improve the efficiency of these functions and, just as importantly, remove any barrier or disadvantage to being regionally located. For example remote installation and monitoring of systems, video conferencing, remote training and remote support all require high speed Internet, especially given that AIMS is 1500 km from the nearest capital city. Video conferencing in particular is an important tool in reducing travel and energy use especially as AIMS is a regional agency that deals with a wide geographic spread of stakeholders.

g) Interaction with research and development and related innovation investments;

Examples of the importance of a high speed network for AIMS to deliver its research program are provided earlier. In addition, AIMS is involved with a number of innovation projects, some funded by the Federal Government, that are targeted at the research informatics community and hence require good high speed internet access. While AIMS is part of AARNet and currently has high speed access this is not the case for all of the agencies that we deal with. Our use of infrastructure such as Aust Research Collaboration Service (ARCS), National e-Research Collaboration Tools and Resources (NeCTAR), Australian National Data Service (ANDS) and so on, is dependent on all parties having high speed connectivity.

For example AIMS is part of the Integrated Marine Observing System (IMOS) project that is run out of the University of Tasmania in Hobart. They were recently forced to move their data centre to Adelaide as the speed of the Bass Strait link was so slow that it could not support the level of interaction being generated from the mainland agencies. While the University of Tasmania is part of AARNet it demonstrated clearly that to participate in the new virtual de-centralised data word requires equity of access for all partners.

i) The optimal capacity and technological requirements of a network to deliver these outcomes.

AIMS views the NBN as the replacement for Australia's current copper cable based communications infrastructure. It is no easy task to predict just what level of service will be required into the future but we know from the last twenty years of development that the need will be in the one to two orders of magnitude area (10 to 100 times current speeds). This equates to 100 Mb/s as a base connection ramping up to 1Gb/s for specialised links. Most of the example applications given in this document could be delivered adequately in the short to mid-term by a 100Mb/s connection with < 80ms latency. Note that the latency in the network is as important as overall bandwidth speed, remote links need to be optimised to reduce latency.

AIMS uses a range of wireless 'last-mile' solutions for remote access but, given the distances involved in Northern Australia and the limitations of wireless, underpinning any last mile wireless system should be a fibre backbone. In our opinion fibre is the only solution that can provide the bandwidth into the future and which has a level of 'future-proofness'. The fibre can then support other services and technologies, such as wireless, but the fibre needs to be the base infrastructure.