NICTA Submission to Senate Select Committee on the National Broadband Network

1) Introduction

NICTA welcomes the opportunity to comment on the proposed rollout of the National Broadband Network. Just as the roads and railways were enabling infrastructure for the industrial revolution and economic prosperity the NBN is the enabler for the Digital Economy and is the key to Australia's future prosperity. Australia must deploy a future-proof, scalable network if we wish to maintain and increase the overall standard of living in our country and it is a unique opportunity for us to overcome the Tyranny of Distance that has been an obstacle to Australia taking full advantage of its potential in the global environment.

2) Overview of NICTA

NICTA was established in 2002 with a mandate to create a world class ICT research organisation with the scale to be globally involved and to have international impact. It was a response to concerns by the Australian Government that underinvestment in strategic research had resulted in a long term structural imbalance in Australia's ICT research and development capability.

The Government set NICTA four objectives:

1. To develop Australian ICT research capabilities in existing and emerging fields;
2. To increase the availability of ICT research skills within Australia by providing postgraduate training and attracting ICT researchers from overseas;
3. To exploit the commercial potential of research outputs for the benefit of Australia; and
4. To become a catalyst for the development of networks and clusters of ICT industry activity.

Since its inception NICTA has grown into a substantial research organisation with 300 researches and 300 PhD students. It has created a number of spin-off companies developing technologies for mobile phones, optical communications, satellite communications, digital audio networking and software systems. It has also licensed its technology to local companies and worked closely with a number of government agencies in defence, security, traffic management, health, government services and environmental monitoring.

3) Overview of NBN

As stated above NICTA's expertise lies in the underlying technologies that are required for a broadband network and the technologies that underpin the applications that create the digital economy. Therefore NICA will limit its comments to the terms of reference that relate to technologies and applications.

NICTA submits that the importance of scalable infrastructure cannot be over estimated. Technology is constantly changing and improving. While many technological advances are underpinned by use-inspiration and based on needs and applications that can be foreseen, once these advances have been made leading edge users find new ways to use the technology and create yet more demands for technology improvements.

The ambitious plan is to *"connect 90% of all Australian homes, schools and workplaces with optical fibre to the premise (FTTP) to enable broadband services with speeds of 100 megabits per second."*
NICTA makes two comments on this:

- The definition of 100 Mbit/s needs to be clarified as the "data signalling rate" on the communications channel. The usable data throughput is less than this and so care must be taken as to the expectations of the users.
- It also needs to be specified if this data rate is symmetrical. For example the user experience could be the same as that achieved with a 100 Mbit/s Ethernet connection.

It also states:
"Connect all other premises in Australia with next generation wireless and satellite technologies to deliver broadband speeds of 12 megabits per second or more."

- From the point of view of technology evolution the current generation of satellites operating in the Ku band can provide several Mbit/s to the user across all of Australia. The size of the antenna and cost of the capacity that the user is prepared to pay for determine how much bandwidth they obtain. The next generation of Ka Band satellites promises to deliver higher data rates with smaller antennas.
- Significant advances have been made in high speed wireless networks in recent years and high speeds have been promised in both fixed wireless access and mobile data networks. The target data rates are achievable over significant distances but NICTA cautions as to the precise definition of the useable data rate. Often data rates are quoted as being for the total radio cell which is then shared amongst the users by a medium access control device and

so the quoted data rate is not sustainable by all users simultaneously. It should also be noted that there is a difference between the performance, costs and statistical availability of Fixed Wireless Access systems (such as WiMax) and mobile data systems based (such as those based 3G and 4G mobile).

- The above two items do not address outdoor facilities such as public spaces (e.g. botanic gardens, parks) or infrastructure such as traffic lights, bridges etc. While these may not need 100Mbit/s connectivity via fibre and wireless may be adequate or complete coverage may be obtained by WiFi hot spots.

4) Response to Specific Items

a) any economic and cost/benefit analysis underpinning the NBN;

NICTA has no comment on this question.

b) the ownership, governance and operating arrangements of the NBN company and any NBN related entities;

NICTA has no comment on this question.

c) any use of bonds to fund the NBN;

NICTA has no comment on this question.

d) any regulations or legislation pertaining to the NBN;

NICTA has no comment on this question.

e) the availability, price, level of innovation and service characteristics of broadband products presently available, the extent to which those services are delivered by established and emerging providers, and the prospects for future improvements in broadband infrastructure and services (including through private investment);

While current services may be considered adequate they are significantly hindering innovation and improved services. One such example is the delivery of remote health care to rural and remote clinics and patients who could be cared for in their homes rather than hospital and clinics. The use of NBN to deliver high quality health care to emergency departments in regional hospitals has been demonstrated by the Virtual Critical Care Unit located in Katoomba and Lithgow (see http://www.csiro.au/science/ViCCU.html) . The further rollout of this has been hindered by the lack of bandwidth in regional areas. An example of what could be achieved in home health care is the product range offered by TeleMedcare Systems (http://www.telemedcare.com.au) whose adoption is being delayed by the lack of a NBN.

Currently the universities are well served by a world class network provided by AARNET. All university campuses are connected by optical links running at between 1 and 10 Gbit/s. A comparable service is used to connect our universities to universities and research institutions around the world. This has enabled our research to keep pace with the rest of the world. Similar facilities are being rolled out to some

select schools but the majority are missing out and students need much higher bandwidth connections from their homes and classrooms.

There are numerous other examples of where the lack of a National Broadband Network is stifling innovation and economic development.

f) the effects of the NBN on the availability, price, choice, level of innovation and service characteristics of broadband products in metropolitan, outer-metropolitan, semi-rural and rural and regional areas and towns;

NICTA believes that the NBN is the enabler for the Digital Economy and while current service level may be acceptable for some applications the rollout of the NBN will significantly enhance innovation in many areas including:

- education
- infrastructure monitoring and security
- digital media
- logistics and transport
- tourism
- e-Government
- cloud computing
- healthcare and
- smart grid.

NICTA has established a number of research projects to enhance Australia's take up of the digital economy. Some examples include the following.

Digital Media and Peer to Peer technologies.
NICTA is developing advanced peer-to-peer computer communications technology which is applicable to massively multiplayer on-line games and video content distribution which will provide better user experiences and reduce server costs and carbon footprints.

Logistics and Transport
NICTA is developing Intelligent Transport Systems that create smart roads that provide for more efficient traffic control to reduce road congestion. Also technologies for better incident management and routing of delivery and service vehicles are being developed. All of these will leverage off the NBN to provide a more efficient transport and logistics industry and reduce the carbon footprint.

Infrastructure monitoring and security
NICTA is also working on new technologies to automatically monitor the physical well being of critical infrastructure such as bridges. It is also developing advanced digital surveillance technologies to safeguard Australia's critical infrastructure such as ports, railways and airports.

e-Government

NICTA is working with a number of government agencies to enhance the delivery of government services electronically. Some examples include development of the reference standard for the Lending Industry's XML Initiative (LIXI) and the Electronic Conveyancing initiative. NICTA is developing advanced technologies for monitoring and predicting the level of service delivery from government sites which will be particularly important to manage the much higher loads which will be generated when everyone has high speed access via the NBN.

Education

NICTA is working on new methods for aggregating and delivering content especially for schools and TAFE. This technology allows content to be adapted for use on Net-Books and mobile devices and allows frequent updates and teacher interactions with the students. These new technologies will let students take advantage of the capability of the NBN to source and study material from locally and around the world to provide enhanced learning experiences.

Indoor Wireless Technologies

NICTA has developed world-leading ultra high broadband wireless technology for indoor use that will enable better management of media rich applications, which are becoming increasingly popular. NBN should facilitate the availability of new media rich applications that should enable improved business productivity and a richer user experience.

g) the extent of demand for currently available broadband services, the factors influencing consumer choice for broadband products and the effect on demand if the Government's FTTP proposal proceeds;

The two mains areas of concern for both consumers and Small and Medium Enterprises are download caps and asymmetrical services. For widespread adoption of the NBN these areas must be addressed.

h) any technical, economic, commercial, regulatory, social or other barriers that may impede attaining the Government's stated goal for broadband availability and performance in the specified timeframe;

The importance of international capacity should be noted, with potential need to speed up DNS, for example, to cope with the anticipated extra load.

i) the appropriate public policy goals for communications in Australia and the nature of any necessary regulatory settings to continue to develop competitive market conditions, improved services, lower prices and innovation;

NICTA has no comment on this question

j) the role of government and its relationship with the private sector and existing private investment in the telecommunications sector;

NICTA has no comment on this question.

k) the effect of the NBN on the delivery of Universal Service Obligations services;

NICTA has no comment on this question

l) whether, and if so to what extent, the former Government's OPEL initiative would have assisted making higher speeds and more affordable broadband services available.

NICTA has no comment on this question.

5) Conclusion

NICTA supports the rollout of a NBN as a national infrastructure which will serve the Australian economy and people for the first half of the 21st century.