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Ms Sharon Bird MP
Federal Member for Cunningham and Chair,
House of Representatives Standing Committee on Infrastructure and Communications
PO Box 6021
Parliament House
CANBERRA ACT 2600
AUSTRALIA

18 February 2011

Re: NBN Inquiry and SAIC's Testimony

Dear Ms. Bird:

SAIC is pleased to provide this written testimony to the House Standing Committee on Infrastructure and Communications. SAIC is a FORTUNE 500® scientific, engineering and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health. The company is headquartered in McLean, Virginia, and we have operations in Victoria, the Australian Capital Territory, and Queensland among other locations around the world.

SAIC has commented on all of the terms of reference, and our written testimony provides a short summary paragraph. We have also provided three NBN *white papers* as additional amplification to our testimony. These papers have been used as a mechanism over the past year for SAIC to engage in dialog with government (Commonwealth and states), industry, universities, and national laboratories about the NBN.

This testimony and the *white papers* have been approved for release by SAIC, and they reflect the input and experience of SAIC experts across many technical fields from around the world.

I can best be reached via my email . Alternately, I can also be reached on my mobile telephone number, since I am often on international travel. That number is

Respectfully,

Mr. Steven D. Rizzi
Director, SAIC Pty Ltd
Vice President, SAIC

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Smart People Solving Hard Problems

Written Testimony to the House of Representatives Standing Committee on Infrastructure and Communications

Mr. Steven D. Rizzi

Vice President, SAIC
Director, SAIC Pty Ltd

SAIC
From Science to Solutions

Science Applications International Corporation (SAIC) was founded in 1969 by Dr. J. Robert Beyster on the premise of attracting creative and pragmatic technical people to solve the world's most difficult problems. Today it is a diversified technical company with business in energy, health, national security, environment, and critical infrastructure. SAIC's 43,000 personnel are committed to meeting the needs of our customers and growing technology markets. The company is headquartered in McLean, Virginia, and we have business operations in Victoria, the Australian Capital Territory, and Queensland among other locations around the world.

Since the 1990s, SAIC has been involved in high-speed networking and high performance computing initiatives, and through our "spun out" subsidiaries (i.e., Network Solutions, Telcordia, ANXeBusiness, etc.) we participated in the growth of the Internet into its now critical place in global communication, economic, social and information infrastructure. As the Internet has grown, we have worked to develop applications that leverage these capabilities to help government improve service delivery (including eGovernment, education, etc.), and help critical infrastructure industries (energy, health, etc.) enhance their effectiveness. SAIC has also been a leader in the rapid development and integration of cybersecurity systems and components that have become required underpinning frameworks for the expansion of these large-scale network architectures.

Summary of our submission

Based on our experience on similar programs, SAIC believes that the NBN offers Australia a means to improve government services while reducing the costs of service delivery. We also believe that the NBN presents an opportunity for innovation that is unique, and offers a platform for the development of new businesses that will capitalise on the NBN's high capacity and universal availability. This potential, however, can only be maximised if the government helps to focus R&D on the development of these new network applications by forging new partnerships between industry, universities, and national laboratories. We have provided three NBN *white papers* as additional material.

In the remaining sections of this written testimony, SAIC has prepared responses to each of the areas that were solicited by the Standing Committee.

a) The delivery of government services and programs

With the expansion of Australia's broadband capacity, the National Broadband Network (NBN) has the potential to save citizens and businesses money in their interactions with government. We conclude this from SAIC's own experiences in implementing "eGovernment" systems in the U.S., U.K. and Australia, where we have seen significant results that save time and money, and provide substantially improved public information flow to the citizenry. Our early work on the BusinessLink system in the U.K. led to an integrated government-business portal that was built to simplify and streamline interactions between business (especially small businesses) and government. This service was created to generate £4 billion in annual savings to government and industry. Our involvement in the San Francisco Regional Transportation Information System (RTIS) created similar success by integrating over 30 Bay Area transit service providers into a single portal for trip planning and real-time traffic, responding to over 1.5 million transactions per month. In a slightly different government services application, in Australia SAIC brings the work of Parliament to the people of Australia through our work

on the Parlinfo system that gives the world an up-to-the-minute view of the laws of Australia.

The majority of currently available systems do not need bandwidth capacity being constructed by the NBN; however, they all rely on universal access to modern network speeds and will only continue to expand the need for reliable, integrated broadband infrastructure to help citizens and businesses save time and money. For example, an NBN version of a system like RTIS would be able to move large volumes of high definition video and video analytics, as well as other types of sensor outputs (e.g., traffic conditions, air quality, weather) that could be efficiently networked along roadways or across remote areas. NBN versions of systems like BusinessLink would be better positioned to take advantage of cloud computing architectures, further reducing the costs of operating government services (as is planned in future BusinessLink versions), and in the future will be able to make greater use of video and video-based assistance. An NBN version of the ParlInfo system could bring forth an integration of the current capabilities with enhanced multimedia that would provide for more participative, two-way interaction between citizens and government.

b) Achieving health outcomes

In the U.S. and Europe there is a growing requirement to reduce healthcare costs, improve patient diagnostic tools, and better predict epidemic patterns. The dispersed nature of healthcare data, regardless of the country or region, means that applications to support these requirements must rely on a robust broadband infrastructure. SAIC has been involved in the development of health-related technology since the 1980s. This work includes the development of the integrated clinical records systems for the U.S. Department of Defense, technology to improve the delivery of health to the uninsured and vulnerable populations in the U.S. (for the Health Resources and Services Administration and the Centers for Medicare and Medicaid Services), systems to monitor public health for the Centers for Disease Control and Prevention (CDC), as well as research into cures for cancer for the National Cancer Institute and AIDS for the National Institute of Allergy and Infectious Disease. These projects make extensive use of broadband networks and information systems for collecting, analysing, and acting on information that is sometimes time critical. In other cases, it is not the latency that is important; it is the volume of data that presents the primary challenge. Work on the causes and cures for cancer requires huge amounts of data (genetics and proteomics) to be moved around on a regular basis among researchers. Access to the vast banks of genomic data developing in the last few years demands broadband capabilities. Translational and collaborative science holds great promise for personalized medicine, but inclusion in that scientific community requires the class of capabilities that an NBN can foster.

Although expressly not part of the NBN, Australia's current eHealth initiatives are seeking to further integrate patient records so that patient treatment is streamlined and medical errors and costs are reduced. Telemedicine can also be expected to improve access to care. The integration of health informatics into interoperable and interconnected systems can save money and improve outcomes. Universal availability of the NBN will certainly help in these matters, particularly when health care providers have broad access to a computer and are trained in maximizing the capabilities such as using telemedicine in remote areas. Australia's most vulnerable and rural populations have a

great deal to gain from a more effective delivery of medical and social services, but those benefits cannot be realised without the infrastructure foundation that extends those emerging delivery mechanisms to those populations.

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

Information and Communications Technology (ICT) applications to education infrastructure (instructional management systems, grant management systems, financial aid systems, virtual reality simulations, as well as distance learning) have become integral to connecting learners to knowledge. Such tools not only improve our ability to connect schools and classrooms, they support student learning and creativity needs at home in ways never before achievable. SAIC has worked across a wide range of ICT and advanced networking technology programs in support of primary, secondary, tertiary and continuing education, providing positive results in exposing students to increasingly authentic learning environments and platforms for student creativity of expression and peer interaction.

Connecting schools and classrooms are important, but student learning and creativity needs to be supported at home. Students need access not only to the same resources they have at school, but they need to be able to "pick up where they left off" in the learning process when they get home. That means that computers in the home need to meet the same technical specifications as the computers in the school. As a practical matter it can be difficult to ensure that some of this compatibility happens universally in the homes of all students. When we look at the NBN, we are likely to expect similar sorts of growth pains that happened in the U.S. in this area in the late 1990s.

In that scenario we saw the increase of the availability of affordable broadband. That caused application developers to write increasingly sophisticated programs that needed more processing power and more storage. This, in turn, caused schools to upgrade their computers and software. This drove a fairly common difficulty of home computers not being compatible with the most current applications. This destabilization in classroom/home compatibility took some amount of time to settle out. It is possible that the rollout of applications that make maximum use of the NBN's capabilities could create a similar effect. Government can influence how these effects could be best minimised – perhaps through the use of low interest loans or tax rebates that encourage parents to invest in modern computing platforms. In the long run, with the right operating systems and applications in place in the home, much of the "heavy lifting" will be done by applications and storage located out on the NBN cloud, extending the service life of those home machines and simplifying their administration.

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

A critical development from broadband expansion has been the ability to better manage our consumption of critical natural resources. Population growth, changing environmental conditions, and technology expansion itself continue to stress the regional and global supplies of oil, gas and water to limits that threaten sustainability.

Ultimately, our ability to counter the stress we are putting on our natural resources will rely on our abilities to reduce demand for power and energy, better predict storms and floods, and more effectively provide food and water to our populations. For decades, SAIC has been a major player in the science of environment and natural resources. This includes operating large-scale data centres and high performance computing for the U.S. Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), as well as support to the National Oceanographic and Atmospheric Agency (NOAA). The company has also worked at developing and fielding technology for improved environmental protection (air, soil, and water), including weather and climate modelling – and these "data hungry" applications are similar to work that we've done in supporting the oil and gas industry. These applications typically crave vast amounts of data in order to increase accuracy, and this data must be collected, validated, curated, and distributed. Having a network like the NBN in place would allow more data to be collected from more places.

With universal connectivity of buildings to the NBN, businesses could emerge that would specialise in providing these sorts of energy saving processes to property owners (both public and private). For example, SAIC has developed building management systems (BMS) that are designed to interact with sensors and systems in buildings – managing energy consumption in large manufacturing facilities and producing significant energy savings for our customers. SAIC has performed similar services for large municipalities, such as New York City that has over 4,300 facilities in its inventory.

SAIC's work in weather prediction, climate research, as well as seismic and ocean monitoring are also areas that could benefit from improved access to more sensors and more data collection. The NBN (including the terrestrial wireless and satellite components) could provide significant new mechanisms for the collection of data from remote locations that could have a demonstrative effect on improved weather prediction and disaster response. This includes systems such as the tsunami warning buoys that SAIC has sold to the Australian Bureau of Meteorology.

e) Impacting regional economic growth and employment opportunities

SAIC has written three white papers on the subject of economic impact and business opportunities that could be supported by developing the NBN. These papers have been submitted as part of this testimony. In short, those white papers advocate vigorous R&D investment in what we have called "category three" applications of the NBN – these are applications which have been designed to take maximum advantage of the full bandwidth and low latency advantages of the NBN. These white papers outline some of the economic opportunities for regional growth as we see them, assuming Australian researchers are able to take advantage of the narrow window of opportunity that they have in front of them (vis-à-vis other researchers in Singapore, Korea, and Japan).

From our experience in the growth of the Internet in the 1990s (through our Network Solutions and Telcordia former subsidiaries), as well as business-to-business networks such as those operated by our former subsidiary ANXeBusiness, we have participated in business growth that was catalysed by increased availability of high bandwidth. We believe that the NBN has the potential to be a catalyst for growth in new network

applications, as well as the businesses that will work to monetise those technologies using current and future business models.

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

As we have alluded in earlier responses in this testimony (and the white papers), SAIC's experience leads us to believe that there are previous examples of how broadband and broadband applications can help to impact business efficiencies and drive new economic growth in both large and smaller companies. These benefits will come from improved business-to-business applications that will allow small and medium sized businesses to create "virtual" enterprises to compete as though they were larger companies, more efficient interactions with government that will save time and money, as well as the ability to deploy highly effective cloud computing resources on the network that will allow all businesses to spend significantly less on ICT resources while receiving state-of-the-art capabilities. Further, the widespread availability of broadband enables creation of a robust e-commerce capability that retail and wholesale businesses can leverage to streamline processing and expand their market reach not only to population areas but also to the less densely populated areas where goods are less available.

g) Interaction with research and development and related innovation investments

Government R&D investment in organisations such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the National Information and Communications Technology Agency (NICTA), the Defence Science and Technology Organisation (DSTO), and various university research institutes (such as IBES at Melbourne University) are working on a range of R&D efforts that significantly expand the demand for an NBN. SAIC's work in supporting a number of the U.S. government's high performance computing (HPC) initiatives, as well as our work with the National Cancer Institute's Cancer Biomedical Informatics Grid® (caBIG) program are examples of efforts that give us some insight into how a network like the NBN can aid scientific research and the advancement of knowledge.

While we believe that Australian government R&D and university institutions are positioned to advance the state-of-the-art in many aspects that touch on the NBN, we have taken a position in one of our provided white papers that we believe that the opportunity exists to exercise a new R&D investment paradigm when it comes to the NBN. The R&D investment for the NBN could involve industry and the extending competition for R&D funds on an equal footing between government labs, universities, and industry (small and large) could greatly enhance the outcomes of the investments. The government should encourage collaboration among these institutions, and commercialisation should be emphasised in order to turn these investment dollars into enduring Australian jobs.

The Cancer Biomedical Informatics Grid and caBIG are registered trademarks of the U.S. Department of Health and Human Services Agency of the United States Government in the United States and/or other countries.

The government could also consider an R&D framework that allows private funding to augment public investment – perhaps similar to the U.S. intelligence community model that created the IN-Q-TEL venture capital fund that is a government funded venture capital company that is able to leverage its investments with other sources of capital from the private sector.

h) Facilitating community and social benefits

Over the years, SAIC has worked on a number of projects that have included the leveraging of broadband to facilitate community and social benefits. We have been involved in the development of systems for the National Library of Australia, including PictureAustralia, which have the goals of making cultural information about Australia available to the citizens of Australia and the world.

In the U.S., we also were involved in the ground breaking Town of Celebration project, developed by the Walt Disney Company, as well as a Western Governors Association project called the Center for Excellence in Rural America (CERA) project. These developments were aimed at using broadband infrastructure to improve quality of life in a suburban setting (Celebration) and rural/remote settings in the state of North Dakota (CERA). The purpose of the CERA project is particularly relevant to Australia since it was focused on determining how broadband technologies could improve education and the delivery of healthcare in remote areas – as well as provide a platform for new businesses (through telework, call centres, etc.). The goal was to use broadband technologies to help reverse the trend of population loss in these areas (young people growing up and leaving the towns for better jobs and more cultural activities). The CERA project had limited success because it relied on physical infrastructure (hybrid fibre-coax) to provide broadband, as well as a "patchwork" of numerous service providers that did not provide a uniform service across these large geographic areas. The wireless and satellite components of the NBN would provide infrastructure essential to making the vision of CERA possible in Australian rural communities.

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

SAIC has extensive experience in the technologies that are part of the planned NBN rollout (Gigabit Passive Optical Network (GPON), terrestrial wireless, satellite), and we believe that these are appropriate technologies for broadband transport across the various population densities in Australia.

There is a very active debate in Australia about the virtues of the current architecture (fibre, wireless, and satellite). SAIC believes that the merit of the architecture grows exponentially as the demand for very high bandwidth applications increases. This topic is expanded on in considerable length in the three white papers that we have submitted along with this written testimony. In short, SAIC believes that the investment in a largely fibre infrastructure will provide an infrastructure with greater long term potential

than other alternatives – however, that potential can only be fully realised as next generation applications emerge that make maximum use of the network's capacity and universal availability.

While the NBN will be a critical enabler to the digital economy in Australia, it will also be an exceptionally large target for cyber terrorists, industrial espionage, and cyber crime. The internetworking of literally tens of millions of computers at unprecedented speeds demands consideration of message, host, and network security to avoid creating a significant national risk. While certainly many institutions, government agencies, and private companies will undertake precautions (as they do now) to protect their networks and information, millions of computers will be connected to the NBN without these protections. While this is true today to a great extent, the high-speed (up to 1 Gb/s) and low latency of the NBN create an attractively powerful platform for botnets, distributed denial of service attacks, and other criminal activity. Without consideration in the architecture to address these issues, attacks such as those against the Australian Government and the Australian Federation Against Copyright Theft (AFACT) by "Anonymous" in 2010 or the Melbourne International Film Festival in 2009 would have been even more difficult to overcome. The NBN must integrate security in its design "from the ground up" in order to anticipate and suppress these hostile and illegal acts.

SAIC believes that the creation of the NBN as a common transport architecture for networking in Australia provides an opportunity to integrate a "defence in depth" strategy that would be interoperable across retail service providers. In cooperation with State and Commonwealth law enforcement agencies and telecommunications regulators, such an infrastructure could provide an unprecedented opportunity to build a network that could more dynamically react to both advanced persistent threats and large scale network attacks. It could also provide law enforcement with the tools that they need to bring cyber criminals operating in Australia to justice.

One suggestion in this regard has been made by the Kokoda Foundation. They have suggested the creation of a Government Owned Contractor Operated (GOCO) "Cyber Defence Agent" that would be able to combine the agility of a private information security and technology firm with appropriate public sector governance. The Kokoda Foundation asserts that such a concept would have improved innovation characteristics and shorter response times to complex threats. Their report also asserts that such a GOCO would be able to better leverage industrial partnerships.

As stated in the Kokoda Foundation Cyber Report, GOCOs have been used successfully in Australia before, and there are similar types of entities that operate in the U.S. and the U.K. In fact, SAIC operates a Federally Funded Research and Development Center (FFRDC) of this sort for the National Cancer Institute in the U.S., where SAIC employees work on cures for cancer and AIDS. The NCI's NCI-Frederick laboratory has demonstrated a unique ability to accelerate research by facilitating the interaction of researchers in government, academia, and industry to speed the translational research of diagnostics and therapeutics to the market. There are 38 FFRDC's that are currently operated in the U.S. with similar goals and objectives. SAIC believes that it is important that such institutions are directed by government employees, and that the GOCO employees operate under strict ethics, privacy, and compliance regulations.

In closing this testimony, SAIC would like to offer its continued help to the deliberations of the Committee. We believe that the NBN represents a unique opportunity for the people of Australia not only to improve their quality of life and maximize utilization of scarce resources but also to establish leadership in the development of high bandwidth applications and businesses.