

AV-CC

Australian Vice-Chancellors' Committee

(INCORPORATED IN THE A.C.T.)

Ref. No:

18 July, 1991

Professor R L Martin
Chairman
Australian Science and Technology Council
PO Box E439
Queen Victoria Terrace
CANBERRA ACT 2601

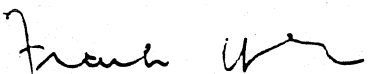
Dear Professor Martin

I write in response to your letter of 7 June 1991 calling for expressions of interest in regard to the study of the future need for national research facilities in Australia, costing over \$5 million.

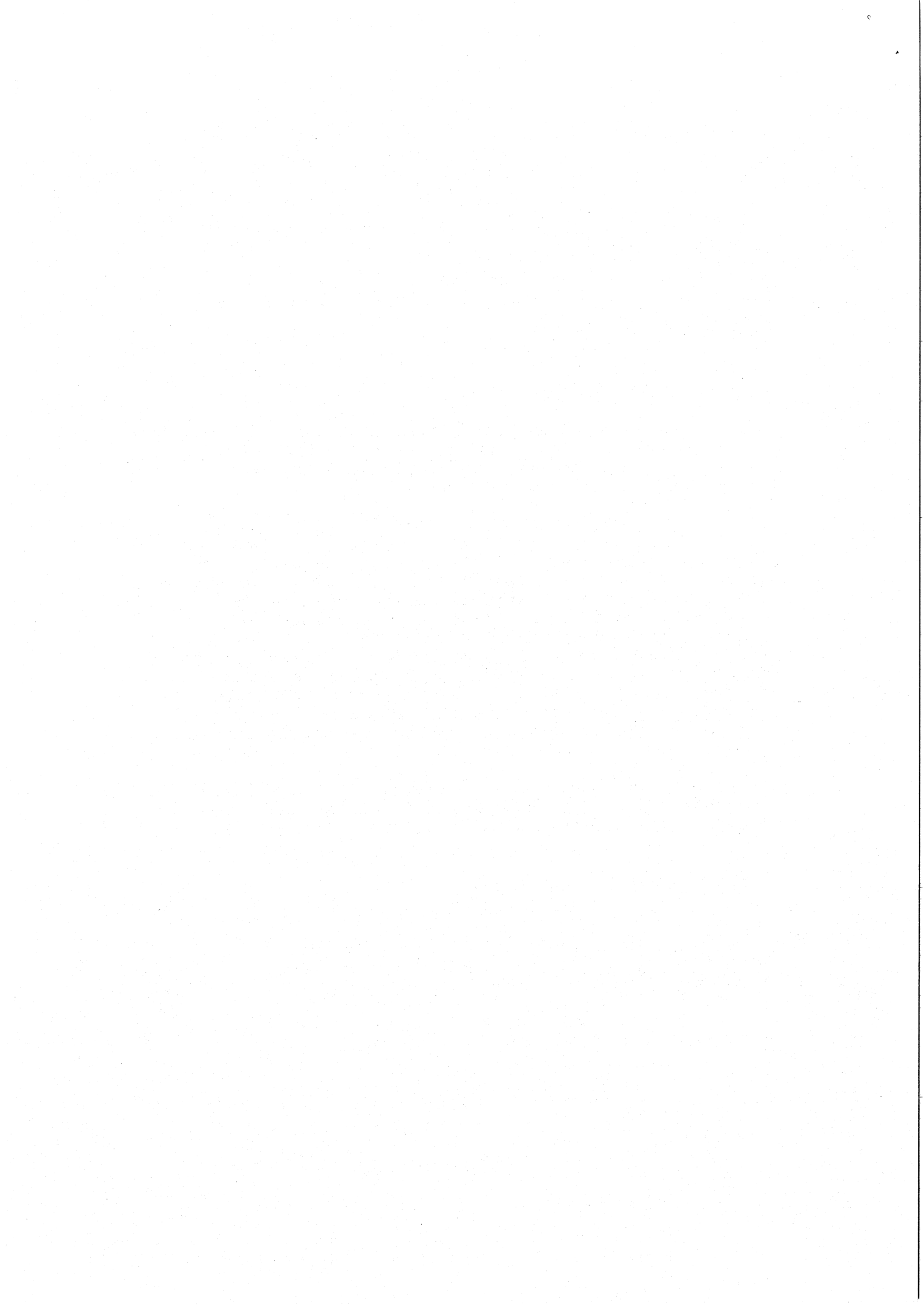
I attach the Australian Vice-Chancellors' Committee (AVCC) expression of interest for a National Very High Speed Research Network. This network would build on the Australian Academic Research Network (AARNet) providing a sophisticated communications facility for use both nationally and internationally by researchers in universities and in industry. The National Very High Speed Research Network would underpin and enhance the effectiveness of many of the established research programs (such as the Cooperative Research Centres). It is believed that a resource such as this is a vital ingredient for the national research enterprise of the 1990s.

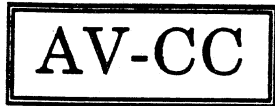
I request that you give consideration to this innovative proposal for a major facility and will be happy to provide a more detailed justification if required.

Yours sincerely



F S Hambly
Executive Director





Australian Vice-Chancellors' Committee
(INCORPORATED IN THE A.C.T.)

AARNET/AVCC/82/91
15 July 1991

**ASTEC STUDY OF MAJOR NATIONAL FACILITIES
NOTIFICATION OF EXPRESSION OF INTEREST**

Name/Type of Facility Proposed:

A National Very High Speed Research Network

Proponent Organisation(s):

The Australian Vice-Chancellors' Committee (AVCC)
(representing institutions in the Unified National Scheme of Higher Education)

Project Leader(s) - Name(s):

Position(s):

Professor K. McKinnon

Vice-Chancellor, University of Wollongong,
President, AVCC

Mr G. Huston

Network Technical Manager,
Australian Academic and Research Network

Estimated Cost of Facility (>\$5m):

\$20m over 4 years.

Capital Costs:

\$3m for the purchase of communications equipment. The majority of the remainder of the facility funding would be used to purchase data communications capabilities from the national telecommunications network.

Location of Facility:

It is intended that the facility would be national in scope, and have access points within all Australian higher education institutions, CSIRO and governmental, industrial and commercial research facilities located in Australia.

The operational management of the network would be located in Canberra, with sub-contracted regional management centres located within each State capital city.

Likely Users:

The users of this facility would be almost every scientist within Australia and their associated institutions and institutional support staff. The facility would provide direct communications services to the desktop of every scientist in the country in a manner similar to the current telephone system.

Unlike the telephone system however a high performance computer network would be used to link supercomputers, libraries, national and international databases and academic and industrial researchers into a unified information infrastructure. Such a structure would also have a broad national base of institutional users as well as individual users, and would support a complete range of activities associated with information technologies in the scientific and research domain.

Other Beneficiaries:

High performance computer communications has become a vital enabling force in the conduct of science and engineering research over the past two decades, and a national information technology resource such as this is a vital ingredient for the national research enterprise of the 1990s.

A national high performance communications network will provide the necessary infrastructure to allow widespread dissemination and application of information technologies and associated computational technologies to allow Australia to keep pace with the speed of innovation in this area.

Thus the prime beneficiaries of this program would be Australian research, industry and government.

Description of Facility:

A high performance communications network could be constructed using the Australian Academic and Research Network (AARNet) as its foundation

The facility would include two major areas of activity:

provision of a very high speed interconnection mesh between all participating sites in order to allow a reliable wide area network data delivery service to operate between the various institutional networks; and

provision of a central service facility concerned with the delivery of end-to-end user services across this network.

In terms of the interconnection mesh, the facility would include very high speed long distance circuits leased from the national telecommunications network. Such circuits would have to allow data transfer at speeds of between 50 million bits per second and 1 billion bits per second, using, where possible, leading Australian technologies that are already being developed in this area.

This wide area facility would use very high performance multi-protocol routers to interface with the institutional local high speed area networks, which in turn would provide the end user connection services. This communications equipment would, in the first instance, be purchased from existing overseas suppliers as part of the capital equipment component of the facility.

The central service facility would provide a human skills development area where communications engineers and researchers can work together to support existing usage of the network facility, and could also develop improved communications services which increase the effectiveness of the interface between the user of the communications service and the remote resources and services located across the network. Such a facility would include both computer software engineers and researchers as well as user services consultants, and work towards the development of effective interfaces between the end user population and the national communications facility.

Location of Similar Related Facilities Overseas:

The High Performance Computing and Communications Initiative - USA

CA*NET - High Performance Program - CANADA

Contact Person(s) and Address(es) for Overseas Facility:

The High Performance Computing Initiative:

Dr Eugene Wong
Office of Science and Technology Policy
The White House
United States of America

CA*NET - High Performance Program - CANADA:

Ms Jocelyn Mallett
Dept of Industry, Science & Technology, CANADA
235 Queen St, Room 924A
9th Floor East, Ottawa, K1A 0H5, CANADA

BENEFITS TO AUSTRALIA

The proposed national high performance communications facility would dramatically expand and enhance the Australian component of the existing worldwide infrastructure of interconnected national and regional academic and research computer networks (termed "the Internet"). This service is presently undertaken on a national scale by the Australian Academic and Research Network (AARNet), with funding largely derived from the higher education sector.

Experience with AARNet to date confirms the overseas experience that access to a broad based infrastructural communications facility fosters significant benefits to research activities on a national scale. These benefits include the effective support for collaborative research efforts, drawing academic and commercial research into areas of common focus, enabling of direct access to leading edge research tools from anywhere in the nation (effectively supporting the concept of national facilities within the research environment) and allowing

every researcher to have direct and immediate access to one of the most crucial "raw materials" of the research effort - information itself.

Indeed it is the view from other nations who have considerably more experience than Australia in this area, that access to a high performance computer communications network is an indispensable component of the overall national infrastructure required to underpin the conduct of effective research and development in most disciplines. The conclusion drawn from these observations is that the requirement for such a high performance facility within Australia will prove increasingly necessary for our continued participation in internationally competitive research.

New technology capabilities will dramatically extend the requirements for communications capacity within the national network. Communications technologies for interactive visualization, image transfer, multi-media communications support and multi-media database access all require communications bandwidths of between 1 million bits per second to as high as 10 gigabits per second. With the accelerating pace of computing technology, and the existing trends of advanced capabilities in deployed computing systems within the research sector it is envisaged that actual requirements for such advanced communications services will emerge from a significant sector of the scientific and broader research community over the next 12 months.

In terms of relating the benefits of this facility to other national research facility programs, it is noted that without access to a national high performance communications facility many of these established programs (such as the Cooperative Research Centres Program) could be in danger of losing their effectiveness as a national resource. For example, without access to high speed communications facilities, any national computing facility would prove to be incapable of delivering reasonable service outside of the physical host site, negating much of the national significance of such a facility. Similarly the move to place much of our information resources in digital format within our libraries and national databases is negated without an effective means of dissemination of such information via a national communications facility.

Within the overall environment of information technologies, the communications area is one which will be a key area for Australia over the coming decade. It is generally acknowledged that Australia does not possess the capabilities to be a major direct and active participant in the area of the design and implementation of computing systems hardware, nor is it a major producer of computer software within the international marketplace. Australia does, however, have a base of experience and expertise in communications technologies, and is in a position to use this expertise to maintain leadership in key aspects of this area of technology. It is suggested that Australia is both large enough to have adequate resources to implement a national high speed communications network using leading edge technologies, and is small enough to accomplish this task within months rather than years. In so doing the nation will be in a position to be able to translate this investment in the research sector into returns in the commercial sector on the international marketplace.