



FACSIMILE TRANSMISSION

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AUSTRALIAN ACADEMIC AND RESEARCH NETWORK (AARNet) REPORT ON MICROWAVE SUBMISSIONS

Background

The AARNet Board of Management at their meeting on 6 July 1993 requested the AVCC Secretariat to prepare and circulate a report summarising the responses to a memorandum sent to Vice-Chancellors on 16 March 1993 requesting proposals for the implementation of microwave links. This memorandum was issued following the allocation of \$3.4 millions under the Co-operative Research Centre programme to assist in the upgrading of AARNet over the period 1993 to 1997.

The responses range from detailed proposals based on extensive preparatory work to conceptual proposals requiring considerable development.

Australian Capital Territory

A joint submission was received from the Australian National University (ANU), the University of Canberra and the Australian Defence Force Academy to interconnect the three institutions. Preliminary costs based on 2 Mbps and 10 Mbps links between the ANU and the other two institutions were included.

Because of the local topology, the proposed network would require an external high central relay point. An aircraft obstruction light tower on a local hilltop is nominated for this purpose. There is an existing microwave link between the ANU main campus and Mount Stromlo.

Cost Estimates:	Capital	\$165,000 (2 Mbps)	Recurrent	\$16,000 per annum
		\$275,000 (10 Mbps)		\$22,000 per annum

Funding Requested: As above

New South Wales

Four submissions were received from member institutions in New South Wales.

The first was received from Macquarie University, The University of Technology Sydney (UTS) and CSIRO to install two links, each consisting of 4 x 2 Mbps channels, between The University of Sydney & UTS, and between UTS & CSIRO North Ryde. From North Ryde, the existing CSIRO microwave link would be used to connect Macquarie University (via CSIRO Lindfield)

Cost Estimates:	Capital	\$167,000	Recurrent	\$23,000 per annum
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Funding Requested: As above

The second submission from NSW is from the University of Western Sydney and consists of four alternative proposals to link Westmead North campus to either Macquarie University or the University of Technology Sydney. No detailed site surveys have been undertaken and consequently the following cost estimates are approximate.

Cost Estimates:	Capital	\$57,000 (Proposal 1)	Recurrent	\$?
		\$99,000 (Proposals 2,3 & 4)		

Funding Requested: As above

The third proposal is from the University of Newcastle who investigated the possibility of using Pacific Power (the NSW electricity authority) communications towers to establish a 2 Mbps link to Sydney. Subsequently, Pacific Power was asked to undertake a feasibility study to link all NSW non-metropolitan universities, ANU and UTS by an 8 Mbps microwave system.

Cost Estimates:	Capital	\$200,000 (Newcastle only)	Recurrent	\$ 9,000 per annum
		\$6,100,000 (NSW & ACT)		\$250,000 per annum

Funding Requested: \$200,000

A fourth proposal was submitted by the University of Wollongong, the University of New England and Charles Sturt University to interconnect these three sites with the University of Sydney using aggregated ISDN channels to provide 512 Kbps links.

Cost Estimates:	Capital	\$29,000	Recurrent	\$ 160,000 per annum
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Funding Requested: As above

Queensland

Responses were received from all institutions, endorsing a single proposal to interconnect the city campuses of the University of Queensland (UQ), Griffith University (GU) and the Queensland University of Technology by means of 34 Mbps microwave links. The proposal includes the extension of UQ's local network from its Gatton campus (linked by microwave to the city campus) to the University of Southern Queensland using a 2 x 2 Mbps microwave system. The proposal also includes the connection of GU's Gold Coast campus to Bond University by means of a 2 x 2 Mbps microwave link 45

Cost Estimates:	Capital	\$561,000	Recurrent	\$ 27,800 per annum
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Funding Requested: As above

South Australia

A proposal was received from the University of Adelaide (UA) endorsed by the University of South Australia (UNISA), Flinders University, CSIRO Division of Horticulture, the Australian Information Technology Engineering Centre (AITEC) and the Technology Development Corporation of the South Australian Government. The proposal is based on the provision of services to four zones in the Adelaide area - north, city, south and south east, and encompasses the university campuses, CSIRO sites and the science and technology parks. Two 4 x 2 Mbps links already exist in Adelaide - UNISA's internal network between the north and city zones, and UA's internal network between the city and south east zones. The proposal encompasses the implementation of a mixed voice and data network serving the four zones.

The following cost estimates are based on the results of a requirements definition and backbone network architecture specification study carried out subsequent to the submission of this proposal.

Cost Estimates: Capital \$4,250,000 (HSSI) Recurrent \$?
 \$100,000 (Ethernet) \$?

Funding Requested: \$500,000 (capital)

Victoria

A single network proposal was received from commercial organisations in Victoria

Ballarat University College (BUC)
 Deakin University
 La Trobe University
 University of Melbourne
 Monash University
 RMIT
 Swinburne University
 Victoria University of Technology

Discussions are being held with CSIRO with a view to linking in CSIRO's Parkville and Clayton sites.

The proposed network consists of five 34 Mbps multi-voice lines radiating from the University of Melbourne to:

La Trobe University
 Monash University
 RMIT
 Swinburne University
 Victoria University of Technology

Deakin University and CSIRO Clayton nodes are to be provided by Monash University. Provision for 2 Mbps common carrier access to and from Melbourne is also included in the proposal.

Cost Estimates: Capital \$1,150,000 Recurrent \$ 195,000

Funding Requested: \$600,000 (capital)

The balance of capital funding would come from the CSIRO Supercomputer network grant of \$300,000 and institutional grants pursuant to the terms of the Regional Supercomputer grant totalling \$180,000.

Western Australia

A proposal was received from the Department of Education, administered by the University of Western Australia, Murdoch University, Curtin University and Edith Cowan University to interconnect the four institutions via 2 Mbps multi-voice lines, together with a link to Perth Park.

As in the ACT, the line item is to be used to purchase an externally sited hub point. Negotiations are underway to purchase a site in the central business district for this purpose.

Cost Estimates: Capital \$41,100 Recurrent \$41,100

Funding Requested: \$41,100

Summary of Funds Requested

The total cost of all projects in the proposal is \$20.5 million and \$ 3.71 millions (excluding the NSW/ACT Project) respectively. The ACT Project is \$ 2.30 millions and \$ 2.45 millions respectively have been identified. The NSW/ACT Project is \$3.4 million, together with recurrent costs of approximately \$2.71 million.

The following table summarises the costs of the ACT Project proposal

Proposal	Capital Minimum	Capital Maximum (\$)	Recurrent Minimum	Recurrent Maximum (\$)
ACT	22,000	27,000	16,000	22,000
New South Wales	23,000	23,000	23,000	23,000
New South Wales (2)	?	?	?	?
New South Wales (3)	?	?	?	?
New South Wales (4)	9,000	25,000	9,000	9,000
New South Wales (5)	160,000	160,000	160,000	160,000
Queensland	27,800	27,800	27,800	27,800
South Australia	?	?	?	?
Victoria	195,000	195,000	195,000	195,000
Total	247,000	436,800	436,800	436,800