University 'directs' $50 million telescope

When the Prime Minister, Mr Hawke, officially commissioned the new Australia Telescope in September a very important part had been played by Newcastle University's Department of Electrical and Computer Engineering in making the $50 million project a reality.

A small group headed by Professor Rob Evans acted as consultants and sub-contractors to the CSIRO in developing a digital servo control system and a multiprocessor computer system for accurately directing the telescope.

The Australia Telescope is a synthesis radio telescope comprising eight antennae at three sites in New South Wales. The eight antennae can work together as one instrument.

Two of the antennae — the 22-metre diameter antenna at Parkes — have operated for a number of years. It was the new six 22-metre diameter antennae at Culgoora near Narrabri that involved the Newcastle University group.

The group, including Dr R.E. Betz, Dr S.W. Chan and technician Darrell Cram, began working on the project in 1984.

They were approached by CSIRO's Division of Radiophysics to develop the control system because the Newcastle group are recognised as the best control development group in Australia and one of the best in the world.

They spent 18 months performing computer simulation studies and structure evaluations, 18 months writing the required computer software and developing two prototype controllers and about six months producing the seven actual controllers for the telescope.

The controllers operate the movement of the antennae on both the horizontal and vertical axes to a resolution of one second of arc or over 3,000th of a degree.

Resolution of this magnitude means the six antennae at Culgoora (known as the compact array) have the power to 'read' a telephone directory from 200 metres. When all eight antennae are combined (known as the long baseline array) this power increases 50 times. When these eight antennae are combined with other Australian and world antennae the array will be up to 10,000 times better at detecting detail than the best optical telescopes on Earth.

Continued Page 2
Negotiating educational profiles

The University, along with other universities and higher education institutions, has been negotiating with the Commonwealth Department of Employment, Education and Training on its educational profile for the 1989-91 Triennium. This process, the negotiating of educational profiles, is a new one which arises from the Commonwealth Government's White Paper on Higher Education.

A feature of the White Paper released by the Minister of Employment, Education and Training, Mr Dawkins in July 1988, was the proposed establishment of a 'unified national system' of higher education which would consist of a range of higher education institutions with specific missions agreed to and funded by the Commonwealth. It is, of course, not lost on universities and other higher education institutions that, although they are generally created under State legislation, the Commonwealth holds the purse strings and they are massively dependent on Commonwealth Government funding.

Thus, even the original State universities created in the last century which have substantial bequests and foundations remain heavily dependent on the Commonwealth Government grants.

Prior to Mr Dawkins' initiatives outlined in the Green Paper and subsequently confirmed in the White Paper, Commonwealth funding was recommended by a separate statutory authority within the Education portfolio, the Commonwealth Tertiary Education Commission (CTEC). With the abolition of CTEC, funds for university operations for the 1989-91 triennium will be recommended by Mr Dawkins' department, the Department of Education, Employment and Training (DEET).

The White Paper described 'educational profiles' as an agreement between the Commonwealth and an institutional member of the unified national system. It was to be the principal means for defining the role of the institution and the basis on which it receives Commonwealth funding. Over the last few months, DEET has sent to the University a large amount of paper and tables relating to the profiles, seeking among other things, detailed projections of student numbers, and output capital plans and priorities and our equity plans.

The University has responded with a very substantial amount of paper and completed forms after a very intensive effort on the part of the University's Administration, Faculties and Departments. We have also had face-to-face discussions with DEET officials. In particular, we have spelt out the detailed requirements if we are to achieve our objectives of sustained growth, quality and the objectives which the Government wishes to set for us. Those objectives relate especially to expansion in fields which the Commonwealth Government has designated as a high priority: engineering, computer science, economics and commerce and finance. A separate item in this issue will report on our aspirations to recruit additional staff in such areas, so that we can carry out the expansion which is so vital both for this region and the nation.

The University now waits anxiously for the green light from Canberra. Although the University has made the most impressive efforts to introduce economies and review its priorities and expenditures, it will not be able to proceed with these plans without the Commonwealth's funding support. The rather tortured processes of negotiating an educational profile will seem rather pointless if, indeed, the funding from the Commonwealth is inadequate or does not eventuate.

University 'directs' $50million telescope

From Page 1

Not only are the controllers designed to provide accurate direction of the antennae into 'the heavens' but also to react to more earthly disturbances, such as wind, and make the necessary correction to keep the antennae pointing in the right direction.

Professor Evans said the group wasn't resting on its laurels. 'We are currently looking at improving control by putting in place a controller system that learns from past movements,' he said.

'This enhances tracking performance and means the controller can fine tune itself.'

The impressive performance of the Department of Electrical Engineering and Computer Science was recognised in April this year when it became one of 15 national centres of research with government funding of $670,000 per year. (Total funding with research grants is $1 million.)

The Department's centre, known as the Centre for Industrial Control Science, aims to develop new methods for understanding the dynamics of complex systems and their translation into the design of industrial control systems.

Much of this work has wider applications into the world of industry.

The main commercial spin off from the Australia Telescope is Orbtrack, a project involving the research centre, CSIRO's Department of Radiophysics and OTC.

Orbtrack is an antenna controller to track geostationary satellites. Although designed to remain stationary in space geostationary satellites are affected by the gravitational pull of the moon and sun and, combined with a 'wobbling' of the Earth on its axis, these satellites have to be tracked by satellite dishes on Earth if the maximum strength signal is to be obtained.

This project is being undertaken by the Australia Telescope team together with Dr Rick Middleton, Mr Steven Weller and Mr Peter Stepions.

Other practical projects under way include a vehicle for detecting cracks in subterranean pipelines (with C.W. Pope Pty. Ltd. and South Australian Gas Authority), adaptive control of automatic sheep shearing systems (with Merino Wool Harvesting) and a number of tasks for the Aeronautical Research Laboratories (ship motion prediction, fault detection and diagnosis for aircraft engines and manoeuvre autopilot design).
New demands for different times

The President and Vice-Chancellor of Bond University, Professor Donald Watts, delivered the Newcastle Lecture as guest of the University of Newcastle Convocation, at the University in mid-September.

His challenging and innovative address welcomed Federal Government initiatives to change the higher education system.

His address follows in edited form. A complete copy of the Newcastle Lecture 1988 is available from the University's Information Office.

"I do not see the Green or White Papers of the Minister for Education, the Honourable John Dawkins, as a new threat to the traditional freedoms of our public universities. It is my view that academics who perceive this as confusing a call for increased accountability in terms of efficiency and effectiveness — an undeniable responsibility of any provider of funds — with imagined steps to interfere with academic freedoms.

It seems to me that the Minister's concerns for higher education in Australia, after more than a decade of neglect, promises much for the country and the opportunities we offer through higher education. He appears to me to be reviewing the value obtained from the existing expenditure before committing increased investment from public-sources and before seeking ways of encouraging increased private expenditure ...

National needs

The two fundamental responsibilities of the higher education system are to serve individuals in achieving their many and varied educational and career objectives and to serve institutions by fostering institutional differences thus providing alternative experiences to students. Institutions can only meet national needs if they are allowed the freedom to change of their own initiative in response to emerging community demands.

In Australia, central bureaucratic procedures have increasingly driven education toward a system embodying a few sets of average institutions in danger of producing less imaginative and distinctly ordinary graduates.

Australia needs innovative, entrepreneurial professional graduates. It is difficult to see this spirit of risk-taking emerging in the graduates of institutions denied the spirit of adventure by bureaucratic control ...

Australia's future lies in improved efficiency through technological innovation in its existing industries, in seeking value-added earnings from its primary commodities, in the beneficiation of raw materials in areas such as materials technology and biotechnology, in finding applications within the computing and electronics industries and in new initiatives in technology-based service industries. In the internationally competitive world where Australia must compete, an attitude of 'she'll be right mate' is not good enough.

If government continues the wise course toward decreases in corporate tax then industry will have the ability, indeed the obligations, to fund institutional activity thus joining the partnership supporting higher education. The direct funding of universities and colleges for services, including the payment of fees on behalf of students, is a more efficient means of funds-transfer in that it excludes the costs of bureaucratic processing. It also enhances institutional autonomy.

Thus, since private investment is necessary to meet adequately the recurrent and capital costs of education, Australia must face the two options available. The first option is to endorse the establishment of fee-charging private institutions. The second is to seek private investment in public institutions by the introduction of tuition fees and by allowing private capital development on new campuses as part of the public system. The education access tax is not a long-term solution to the problem of collecting a private contribution to meet some of the private benefits of higher education.

The Commonwealth Government must embrace both the options of tuition fees and private institutions if the Australian education industry is to respond adequately to the challenges of the remainder of this century and beyond.

It is difficult to imagine the Commonwealth, the sole provider of funds, allowing greater freedom to universities before it has reasons to respect the capacity of these bodies to create proper public accountability. Councils and Senates must have the strength and independence to re-establish the traditional respect for university autonomy and the power to delegate executive authority to Vice-Chancellors able to achieve their proper place in management. Academic freedom was never perceived to be the right to make universities unmanageable.

Review employment conditions

Perhaps the most vital initiatives for government to achieve are modifications of the rigorous regulation of the reward system which have made quality recruitment in many professional areas impossible.

There is little doubt that the government should legislate to return arbitration and conciliation on industrial conditions and reward to the place of employment.

It is incomprehensible that academic unions on the one hand call vehemently for institutional autonomy while, on the other hand, they act to deliver major management and staff prerogatives to remote Industrial Courts.

In addition, it is important for the government to review the conditions of academic employment.

It is also reasonable that government should seek paths to bring academic researchers and their work closer to the private sector. The present gap between our public and private research endeavour is unacceptable in a country with such a low research investment in both absolute and relative terms ...

Professor Donald Watts
15,000 visit University

Glorious Spring sunshine provided an added bonus to UNIVISIT '88, the University's Bicentennial Open Days, on September 3 and 4. The mammoth event, when the University opened its doors to members of the Hunter community, is normally held every four years. However, UNIVISIT '88 has been hailed as a great success and it has been suggested that the next event should be held sooner.

An estimated 15,000 people were admitted to the University's grounds. They inspected an enormous variety of activities, including displays, demonstrations, models and maps in the Great Hall and departments, visited Carnivale '88, saw special sporting events and were entertained outdoors.

The NSW Minister for Family and Community Services, Mrs Virginia Chadwick, a graduate of the University, officially opened the Open Days.

Among others who visited the campus were the Federal Minister for Industrial Relations, Mr Peter Morris.

Showing off the University's teaching and research in the Bicentennial year was the University's Intention.
Medicine into the 21st Century

Professor John Hamilton has just been re-appointed for another five years as Dean of the Faculty of Medicine at the University of Newcastle. The Faculty recently celebrated its 10th year with a very successful conference that attracted speakers from around the world.

In the following edited article Professor Hamilton comments on the Commission of Enquiry into Medical Education and the Medical Workforce which was led by Professor Ralph Doherty. Professor John Hamilton, Pro-Vice-Chancellor for Health Sciences at the University of Queensland.

The report outlines:
- the evolution of policies in support of primary health care,
- the need for a greater emphasis on health promotion, disease prevention and the social determinants of disease,
- the need to acquire interpersonal skills and attitudes for formal training in medical ethics,
- the need to provide funds for preventive health services if education to that end is to have any effect,
- the need for schools to emphasise behavioural and population health sciences,
- the use of community facilities,
- attention to the special needs of ethnic groups, women, the disabled and other disadvantaged groups.

*Professor John Hamilton*

- the need for exposure to multidisciplinary health teams, early clinical experience and the benefits of self-directed learning and research.

There is strong echo of our Working Papers in many of the recommendations.

There is particular emphasis on the role of general practice in broadening student experience and on the need for a continuing development of postgraduate training. The Report recommends that universities take a stronger role in postgraduate education. It firmly recommends that internship be extended to two years as the final stage in basic medical education.

The report finds that the present production of doctors from within Australia is about right for the future.

While every school but Newcastle has converted to a six year programme, the report finds no strong evidence that six is better than five and recommends simply that the matter be kept under review. The studies already published about the effectiveness of our selection process are presented in full. Schools are urged to explore different approaches to student selection and to bridge the social and educational gaps in society by means of counselling, school co-operation and bridging courses in order to make medicine open to a wider range of students — strategies also recommended by the Dawkins White Paper.

While the Doherty Commission favours diversity in medical education across the country, it does commend many innovations. As we approach our 10th year, it is encouraging to see the principles upon which this Faculty and its curriculum were founded endorsed by the Doherty Commission. It is also heartening that the priorities for the future identified by the Commission have been chosen for special discussion during our Tenth Year Celebrations.

Astronomer concerned over space garbage

'Mankind has a terrible record of pollution', says Professor Colin Keay. 'If interplanetary space becomes a garbage dump, we don't deserve to travel to the stars - ever.'

The University of Newcastle astronomer used this critical example to explain the concern of members of the International Astronomical Union's Commission 22. The commission specialises in the study of meteors and interplanetary dust. Its members are worried that increasing numbers of spaceprobes launched by various nations and international organisations may ultimately pollute the space between the planets and the surfaces of asteroids and other small objects in the solar system.

The quantity of space debris orbiting the Earth has grown to an estimated 48,000 objects measuring 1cm or larger and any of these are capable of destroying spacecraft.

Scientists need to take action before space junk like this reaches greater distances millions of miles from Earth and alters forever the pristine wilderness of the solar system', he says.

The use of propellants and explosives that yield products of high elemental abundance, such as water, is not of much concern. These substances are lost in the vast amounts already present in space.

However, rockets that leave residues of elements that have a low-abundance in the solar system, such as aluminium, are very worrisome.

Such residues, Professor Keay says, can adversely affect scientific measurements carried out in space. Further, a collision involving a space craft and another body in space could be a major scientific disaster if it polluted one of the minor bodies in the solar system.
Graduates Honoured

Rolls Royce/Qantas Award to graduate

A graduate from the University of Newcastle has won the inaugural Rolls Royce/Qantas Award for engineering excellence.

Mr Kim C. Schlunke received the award for his work in the conception, development and commercialisation of orbital combustion process engine.

Mr Schlunke, 35, is Manager-Engineering of the Orbital Engine Company in Western Australia.

The award judging panel said the work of Mr Schlunke produced an advanced two-stroke engine which had significant size, weight, emission and cost advantages (both manufacturing and operational) over its competitors.

The General Manager of BHP Engineering and Chairman of the Judging Panel, Mr Paul Jeans, said such a highly efficient and clean-burning two-stroke engine could revolutionise all existing automotive technology.

Mr Schlunke receives a prize of $20,000, including travel from Qantas, and the Warren Centre Medal. (The Warren Centre for Advanced Engineering at the University of Sydney organises and administers the award.)

A second University of Newcastle graduate, Mr Nui Wang, was highly commended by the judging panel for his innovative and extremely functional design and development of unique automotive caliper brakes.

Mr Wang is a chief engineer with Brake and Clutch Industries Pty. Ltd in Melbourne.

Major reform of financial systems

The University will be undertaking a major reform of its financial systems with the introduction of what is called Schools Funding from the beginning of 1989.

Until this year, by far the greater part of University activities was funded through the University’s central budget. Prior to 1988, only the Faculty of Medicine had a substantial measure of devolved financial responsibility. This reflected the original earmarking of funds for the medical school through the Commonwealth States Grants Act. While the earmarking of the medical school grant ceased a few years ago, the system of deliberate funding for the medical school has been continued. This year, a similar arrangement, which provides a substantial measure of faculty responsibility for academic operations, was extended to the Faculty of Engineering.

However, for the remaining six faculties and for the Administration, financial control within the budgetary provisions has been very largely exercised by the Bursar’s Division, with relatively few financial functions devolved to faculties or departments.

From the beginning of next year this situation changes significantly, with a wide range of resource allocation responsibilities devolved on five new administrative and resource units, created around existing faculties. The five schools, School of Economic and Information Sciences, School of Engineering and Architecture, School of Humanities and Education, School of Medicine and the School of Science and Mathematics will be responsible through their Directors for resource allocation. Schools will have responsibility for all salary costs (full-time and part-time), departmental allocations, other expenditures directly related to their educational operations.

The principle behind this change is that School management of its own resources will provide each School with more flexibility and at the same time, lead to more efficient use of resources, as the decision-makers have to live with their decisions.

The new system seeks to achieve a reasonable balance between local devolution of financial responsibility and central co-ordination and direction. The University’s Administration will still have a strong hand in exercising overall policy direction and co-ordination through the newly constituted Planning and Resources Committee. This is the key body in a revised committee system which, for the first time, brings together the processes of academic planning and resource allocation.

The Planning and Resources Committee is made up of: the Vice-Chancellor, the Deputy Vice-Chancellors, the Deputy Chairman of Senate, and three members elected by the Senate. The Secretary and the Bursar and the Planning and Resources Committee will be expected to participate.

The Directors of the Schools, who are expected to be appointed in the near future after an extensive selection process, will meet regularly with the Planning and Resources Committee. As well, they will be expected to put submissions to the Planning and Resources Committee and its Budget Sub-Committee in the process of budget formulation.

The resources which will be allocated to any one school will be substantial — in the order of $6 million, based on 1988 financial levels.

Most of the University’s costs are locked into the salaries and wages of academic and general staff. Accordingly, each Director will be somewhat constrained (as is the University, itself) by the very substantial salaries and related commitments in the Schools budget. However, even here, a School will have flexibility in terms of staff priorities which has not been available previously. It can also decide priorities of further staff expenditure as against equipment, research or departmental expenditure. So, the new system does provide a measure of flexibility for the University’s teaching and research activities which has not been available previously.

It will be surprising if there were not some teething problems in the early days of such a new system but the opportunities which result from this reform should, hopefully, outweigh any such difficulties.

Lance Hemessy.

Deputy Vice-Chancellor (Admin)
Committed to future growth

The University of Newcastle has advertised for a number of staff positions in the wake of an intensive review of its management and administrative structures and resource allocation processes.

Arising from its comprehensive reviews of expenditures and priorities and its commitment to continued growth the University plans to fill a range of senior academic positions in disciplines which are subject to strong student demand.

These disciplines include electrical and computer engineering (lecturers), computer science (senior lecturers and lecturers), aviation (senior lecturer, lecturer, tutor), mathematics (senior lecturer, lecturer, senior tutor, tutor, teaching assistants), Japanese (lecturer, tutors), economics (lecturer, tutors), commerce (lecturer, senior tutor, tutors), architecture (associate professor/senior lecturer), sociology (lecturer) and psychology (lecturer).

The University has been expanding rapidly and in 1988 enrolled 6,375 students.

In negotiation with the Federal Government on its future education profile the University presented strong submissions for continued growth including the priority fields of engineering, science, economics and commerce and Japanese identified by the Federal Government.

U.S. study for 2NUR

Mr Brett Gleeson, Manager of community radio station 2NUR has won a study trip to the United States, courtesy of Qantas.

Mr Gleeson won the Qantas Award for excellence in Public Broadcasting, which was announced at the Annual Conference of the Public Broadcasting Association of Australia (PBAA), which represents more than 70 public radio stations.

Qantas will provide Mr Gleeson with a return air ticket to the United States, where he will study listener-generated fund-raising techniques used by public broadcasts. He suggested that this area be studied when he submitted his entry for the Qantas Award.

'There are two critical areas for broadcasters to consider,' Mr Gleeson said.

BHP supports $28,000 PhD geology research project on gold

The BHP's Melbourne-based exploration group will sponsor, in the Department of Geology, a PhD research project on the formation of gold ores.

Approximately $28,000 will be made available over the next three years to allow Ms Sabine Hopf, a German-born student from the University of Heidelberg, to examine gold deposits in New South Wales, North Queensland and New Zealand. The aim is to pinpoint the factors that are important in concentrating gold in volcanic environments.

The project was proposed by Dr Philip Seccombe and Professor Ian Plimer, of the Department of Geology, who say they are delighted that the BHP has decided to back their ideas.

Funding brings University and industry closer together

The University of Newcastle is one of only nine institutions to receive Federal Government funding under the National Teaching Company Scheme designed to bring about greater co-operation between industry and tertiary education institutions.

The University, together with Newcastle's largest manufacturing engineer, A. Goninan and Co. Ltd., will work together on joint programs to assist the company to grow and compete more effectively on world markets.

The scheme also creates employment opportunities for graduates in industry and helps academic institutions gear their teaching and research to industry's needs.

The joint program will be co-ordinated by Mr Bruce Cheek, Management Lecturer with the University and Mr Bruce Watts, Senior Engineer with Goninan.

The program involves a complete information audit to identify and quantify information flow through various functional units of Goninan to establish an integrated strategic plan for the company's information systems.

The work includes documenting existing information flows, reviewing current practices, reviewing progress, developing information resource management procedures and developing a strategic plan for information services.

The National Teaching Company Scheme provides up to $45,000 for each project.
Research

Watch out if you feel a 'little run down'

It is accepted folklore that if a person is a 'little run down' he or she is more susceptible to illness.

For the past 60 years scientists have been trying to establish the truth of the saying. Little-by-little research is confirming the conventional wisdom.

Yet despite breakthroughs in the late 1920s and again in the 1970s there was still a large degree of scepticism in the scientific world that folklore equalled fact.

But innovative research at the University of Newcastle seems to have proved the equation.

Professor Maurice King, Professor of Behavioural Sciences and Assoc. Professor Alan Husband, an immunologist combined their specific disciplines to research the general question of physio/immunology relationships.

An initial grant from the University's Senate Research Committee was followed by funding from the National Health and Medical Research Council in 1983.

Both professor King and Assoc. Professor Husband are pleased with the results of their work which has led to two of their postgraduate students winning prestigious fellowships with international clinics that lead the world in this field.

Professor King cites the initial seeding funding by the Senate Committee to research the general question of physio/immunology relationships as an encouraging and far-sighted example of how early support can contribute to major progress.

In 1981 a postgraduate student, Mary Syver, began work with Professor King and Assoc. Professor Husband.

Alex Kusnocov joined them in 1982 and in 1983 when he completed his honours degree he became the first student in postgraduate work in the Department of Behavioural Sciences.

Richard Brown, who like Alex, is a Novocastrian and graduate of this University joined the research team in 1986.

Stress in the Immune System

Alex Kusnocov, has taken up a two-year fellowship in the Department of Psychiatry, University of Rochester in New York State.

He will work with Professor Robert Ader, regarded as a pioneer in the field of psycho/immunology.

He is the first Newcastle University student to complete his Bachelor degree and Doctorate in the Department of Behavioural Sciences.

Alex's doctorate is entitled The Effects of Behavioural, Constitutional and Beta-endorphin on the Immune System.

'In layman's terms, my research has been to discover the way in which the mind controls the immune system,' he said.

'It seems clear from our research that when a person is under stress the immune system is not as effective and illness is more likely,' Alex said.

Sleep Needed to Help Resistance

Dr Richard Brown will take up a fellowship at the Manitoba Institute of Cell Biology at the University of Manitoba (Canada) in November.

He began his research work in 1986 for his thesis, The Involvement of Bacterially Derived Muramyl Peptides in Sleep, Fever and Immunity.

'The emphasis in my research has been on the sleep factor, known as Factor "S", which is a non-dreaming sleep,' Richard said.

'It seems that mammals require sleep as a necessary adjunct to fight fever. Most people are aware that animals will seek to sleep off an illness and my research is helping to establish this as fact.'

Richard said that animals injected with foreign blood cells and prevented from sleeping were less able to fight the infection.

The muramyl peptide was produced by the body to fight the infection but needed the Factor S to be effective.

International speakers at reading/writing seminar

A one-day research seminar that brought together speakers from the University of Newcastle and universities in Canada and Hong Kong focussed on the cognitive processes involved in text processing and how individual differences might play a role in reading and writing activities.

Professor John Kirby from Queen's University, Canada, analysed much of the current practice in comprehension instruction and assessment.

He said the current practice of placing heavy reliance upon multiple choice questions with a focus on details and main ideas tended to ignore more abstract levels of comprehension.

Professor John Biggs from the University of Hong Kong examined the impact of student approaches to essay writing and their resulting quality.

He found where students used a "deep" approach involving extensive planning, revising and focussing on meaning a far superior essay resulted when compared to a "surface" approach.

Other papers discussed at the seminar covered the effects of visual aids (geographical maps) on comprehension (Dr Phil Moore and Ms Jill Scevak from the University of Newcastle's Department of Education), focussing attention on self-control of cognitive operations to benefit children with reading problems (Dr Lorna Chan, Department of Education), the composition of essays by English-as-a-second-language students (Dr Rob Cantwell, Department of Education) and Irlen or tinted-glasses and their possible effects on learning (Dr Greg Robinson, Hunter Institute of Higher Education).