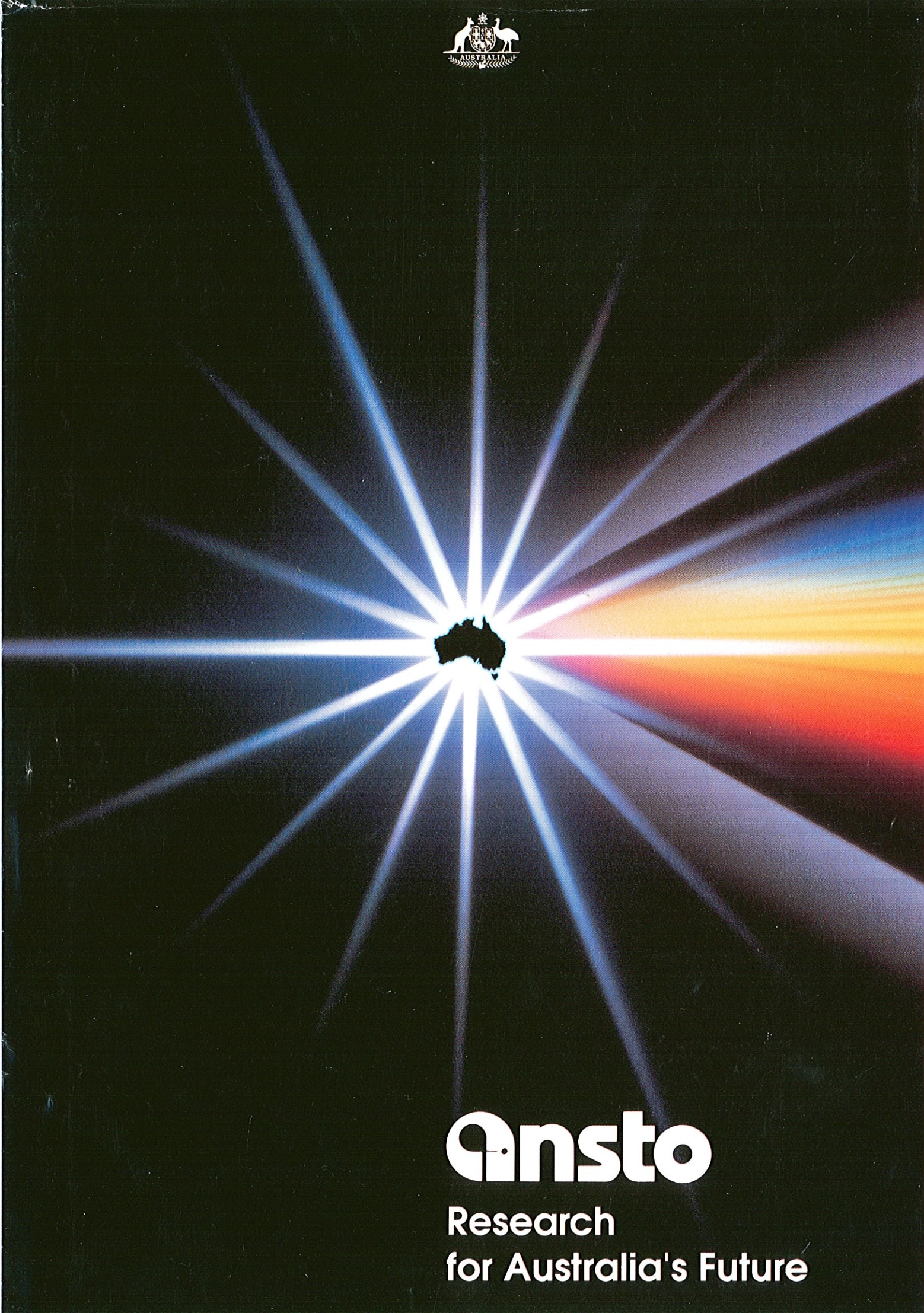
AUSTRALIA
Ansto
Research
for Australia's Future

*For more than 35 years, the Australian Nuclear Science and Technology Organisation's unique blend of physicists, chemists, biomedicine and nuclear scientists have diligently and systematically investigated the very fundamental building block of our world, the atom.*

*Ansto's efforts have led to the betterment of life for millions of people and have kept Australians at the forefront of world development of nuclear technology.*

*The core of Ansto's operation of Australia's only two nuclear reactors has been to find peaceful uses for nuclear science, and to make them relevant to our environment, our working lives and our health.*

*But more applications of nuclear science to improve the quality of life for everyday Australians need to be found.*

*Ansto is committed to the maintenance of high calibre nuclear expertise together with strong interaction with Australian public utilities, industry and with medicine. More than two thirds of Ansto's research is applied and market driven and services an existing need in Government, medicine and industry.*

*Science must be extended beyond the bounds of immediate requirements to find solutions to natural and man-induced problems we know will occur in Australia's future but which cannot be addressed in the short term.*

*Ansto believes it is vital to focus early on those national economic, social and environmental objectives so that Australia can be ready to meet those demands.*

*This is Ansto's vision as Australia moves toward the 21st century.*

*David J Cook*
*Executive Director, Ansto*

## *Looking at the Product*

**Ansto** researchers are acutely aware of the need to focus on the end product of their research if it is to be relevant and responsive to Australia's needs. While applied research activities can at times be undertaken in accordance with a more or less linear progression of research - development - commercialisation, the vagaries of longer term and basic research present a challenge to a scientific organisation particularly in terms of justifying expenditure. **Ansto** accepts that some challenges facing Australia demand a longer term approach but all research has an ultimate end product.

**Ansto's Competitors**

**Ansto** operates in a competitive environment in seeking a share of Government and industry funds. **Ansto** accepts that to ensure access to these funds it must convince its clients that its R & D activities are timely, relevant and credible. With respect to its R & D activities, **Ansto** views its 'competitors', whether inside or outside the Government funding network, as being potential collaborators.

## *Evaluation Criteria*

**Potential Benefits** The maximum commercial or other returns possible from technological improvements.

**R&D Potential** The scientific or technological potential of relevant research areas.

**Capture the Benefits** The ability of Australian organisations to convert technical progress into return.

**R&D Capacity** Australia's ability to conduct R&D and realise potential in a timely way.

**Investment** **Ansto**'s capital investment program and recruitment strategies will reflect the requirements of research projects.

## *Research*

**Ansto** recognises that Government backed research must be concerned with basic and longer term research for the national good and that the private sector must assume a greater responsibility for research associated with immediate needs.

Seventy percent of **Ansto**'s research is applied and is market driven. Thirty percent is longer term and basic research and addresses national economic, social and environmental objectives as determined by Government.

**The Global Scientific Infrastructure**

Future research activities will reinforce and build on existing interaction with overseas institutions and agencies. Priority will be accorded to developing collaborative arrangements with national organisations within the SouthEast Asian/Asian Regions.

## *Why Ansto's Strategic Research Projects Cross Program Boundaries*

**Ansto**'s strength is that it has a highly multidisciplinary research staff located at a single site. This facilitates collaboration between Program areas. While **Ansto**'s research will continue to be undertaken within the framework of five research programs - Advanced Materials, Applications of Nuclear Physics, Biomedicine and Health, Environmental Science and Industrial Technology, **Ansto** will strive to reinforce and build on the increasing propensity to undertake work on a cross program basis. (See table overleaf).

## *Priority Research Areas*

Five areas of research have been identified which warrant the investment of resources in order to achieve national priorities. Each has its genesis in core nuclear technology operations which **Ansto** undertakes in line with its legislative charter. Each area has a strong synergy with the underlining nuclear expertise within **Ansto**.

**Ansto** researchers have agreed on five strategies to ensure that **Ansto**'s research achieves the Organisation's objectives and is fully integrated with Australia's research program as a whole. These strategies are:

1. A reinforcement of linkages with the market, other R&D organisations, education and communication sectors and with internal **Ansto** units.
2. Participation in global networking.
3. Requisite investment in facilities and staff.
4. Focussed and product-orientated programs.
5. A recognition and understanding of competitors' programs and strategies.

**The Reinforcement of Linkages**

In line with **Ansto**'s Strategic Plan Update, research will be undertaken as part of the national priority framework. This places an absolute obligation on the part of the researcher to ensure that his/her research is not carried out in isolation from research undertaken by other R&D organisations, tertiary institutions and the industrial market.

## *Setting Strategic Research Priorities*

All **Ansto** research is planned and reviewed in accordance with a process outlined in **Ansto**'s Strategic Plan Update. Planning and evaluation is a continual process which involves a close association with industry, academia and the general community.

**Ansto** has adopted a methodology analogous to that of the CSIRO to determine its research priorities within the national context. Specific criteria provide an attractiveness and feasibility "score" to determine the level of resource investment for research projects.

**Ansto** priority research areas satisfy the requirements of the adopted methodology.

## *Priority Areas of Research*

| PRIORITY AREAS | SPECIFIC AREAS OF WORK | JOINT PROGRAM EFFORT |
|---|---|---|
| **WASTE MANAGEMENT** | | |
| 1. Immobilisation in solid waste matrices.<br>2. Waste reduction and minimisation.<br>3. Liquid waste treatment.<br>4. Bioremediation and physico-chemical rehabilitation of contaminated sites.<br>5. Modelling of pollution transport, fate and effects. | 1. Synroc, cement technology, special mineral phases.<br>2. Development of processes for waste treatment, reuse and recycling.<br>3. Microbiology, biological impacts, soil sciences, pyritic wastes.<br>4. Colloidal chemistry, chemical speciation, marine chemistry.<br>5. Chemical, geochemical and hydrological models.<br>6. Accelerator mass spectrometry. | **Advanced Materials**<br>**Environmental Science**<br>**Applications of Nuclear Physics**<br>**Industrial Technology** |
| **CRYSTAL AND MOLECULAR STRUCTURES** | | |
| 1. Neutron, electron and X-ray diffraction.<br>2. Neutron and photon scattering<br>3. Supercomputing modelling and calculation.<br>4. Theoretical thermodynamics. | 1. Crystallography.<br>2. Molecular phases and structures.<br>3. Molecular engineering.<br>4. Selection of tailored solvents. | **Applications of Nuclear Physics**<br>**Computing Centre**<br>**Australian Supercomputing Technology**<br>**Biomedicine and Health**<br>**Environmental Science**<br>**Advanced Materials** |
| **RADIOPHARMACEUTICAL SCIENCES** | | |
| 1. Radioisotopes for diagnosis and treatment.<br>2. Instrumentation for health care.<br>3. Supercomputing imaging. | 1. Radiopharmaceuticals, molecular medicine, drug development.<br>2. PET and SPECT imaging.<br>3. Physiologic modelling, biological dosimetry. | **Biomedicine and Health**<br>**Computing Centre**<br>**National Medical Cyclotron**<br>**Applications of Nuclear Physics** |
| **ADVANCED CERAMICS** | | |
| 1. Special ceramic components for bioimaging.<br>2. Surface treatment.<br>3. Sensors.<br>4. Electroceramics.<br>5. Processing. | 1. Ceramic implants for limbs and organs.<br>2. Wear resistant characteristics, surface engineering.<br>3. $O_2$, $CO_2$ sensors.<br>4. Piezolectrics, high energy density capacitors.<br>5. Hot isostatic pressing, sol-gel technologies. | **Advanced Materials**<br>**Australian Supercomputing Technology**<br>**Biomedicine and Health** |
| **PROCESSING AND UTILISATION OF RADIOACTIVE MATERIALS** | | |
| 1. Rare earth extraction, purification and utilisation.<br>2. Uranium mining and milling.<br>3. Behaviour of radionuclides in chemical processes. | 1. Solvent extraction technology.<br>2. Process development, simulation and optimisation.<br>3. Removal of radioactivity from mineral sands, mineralology of radioactive materials.<br>4. Tracers. | **Environmental Science**<br>**Applications of Nuclear Physics**<br>**Advanced Materials**<br>**Biomedicine and Health**<br>**Industrial Technology** |


01-9-91 ansto public affairs
PMB 1 Menai NSW 2234 Australia
Tel. 61 02 543 3111
Fax. 61 02 543 3097