

Benchmarking AINSE Performance

version 16, 4 November 2004

AINSE's mission is to 'advance research, education and training' and so a goal of any strategic plan must be to improve how we perform in this core area.

At the AINSE Executive meeting of 6 February 2004, Dr Mather distributed a paper entitled 'AINSE's Mission'. At that meeting it was decided that Professor John White and Dr Rob Robinson would prepare a paper to be considered by the Executive well before the May meeting in connection with Goal 2 of the AINSE Strategic Plan agreed by Council in December 2003:

'By the end of 2008 the research performance of our scientific outcomes will have increased substantially'.

Strategies

1. *AINSE will undertake a benchmarking exercise in 2004 to evaluate our current performance and will continue thereafter to monitor our progress towards this goal and will establish a set of performance targets.*
2. *AINSE will continue to develop its peer review processes with an emphasis on the quality of proposals and their outcomes.*
3. *AINSE will increase its level of funding available for student support.*
4. *AINSE will use its networks to increase the numbers of effective collaborations between universities and government science agencies to promote scientific outcomes.*
5. *Set targets for publications and students.*

John White and Rob Robinson undertook a preliminary benchmarking of the AINSE performance over the last five years and consideration given in March 2004 to draft parameters of performance which could be discussed first at the Executive in May 2004. The draft paper was distributed to the Specialist Committees and Council in May for comment.

The present paper incorporates comments to 6 October 2004 and data up to 1st quarter of 2004, and is now distributed to the Specialist Committees for further comment.

The need for the appraisal of AINSE's performance arises because quality assessment of outcomes from the spending of Australian Government funds is on the National agenda (see below). Because of the large number of different subject areas that AINSE interfaces from the universities to ANSTO a process to find the right indicators is necessary first of all. These areas range from the medical applications of radioisotopes, through archaeology to physical science and engineering. It is almost certain that the performance indicators for these different areas will be different.

The objective therefore of the present paper is to apply a broad set of indicators and promote discussion of any differences between the outcomes measured by these indicators for the different subject groups.

In this survey of AINSE's activities we look at the **inputs** and the **outputs** and make some preliminary assessment of the **outcomes** from the time and money spent as inputs. We attempt to measure also the recognition obtained from papers and other outputs that the program has produced over the last five years in the area covered by the Structure and Dynamics (Neutron) Specialist Committee where Rob Robinson has kindly facilitated a comparison with ANSTO's own performance.

Landscape Analysis

In a paper for Executive Committee 2 (2004) the whole question of access to the ANSTO facilities has been raised in connection with the future operation of the Replacement research Reactor. Scenarios involving everything from full costs for the research reactor access to zero cost – under a national facility status are under discussion.

Issues relating to the principles of access and to classification of national Facilities were released on 24 March by Minister Nelson with the 'Final Report of the National Infrastructure Taskforce'.

http://ww.dest.gov.au/highered/ri_taskforce/default.htm

Recommendations in the report extend to models for managing facilities and the responsibilities of the managing agency as well as a 'basic principle':

Recommendation (page 32)

That, as a basic principle, charging for use of research infrastructure funded within the National Research Infrastructure Strategic Framework be on the basis that designated users will be charged only for marginal operating costs.

and

Recommendation (page 33)

That, as a principle, access charges for use of publicly funded research infrastructure facilities by research organisations outside the public funded research sector, be on a full cost recover basis but be flexible. This flexibility should, for example, take into account any co-investment made by the research organisation, or take advantage of emerging research collaboration opportunities.

AINSE and ANSTO's access strategies have evolved during 2004 in the light of these recommendations and the Australian government's response to them. Further discussions and input from the University community is sought in this regard. We give here, however, a preliminary analysis of the inputs etc to start the discussion.

AINSE PERFORMANCE ASSESSMENT (OCTOBER 2004)

Inputs

In this benchmarking exercise we have taken a fairly high level of aggregation for both the inputs and the outputs. A convenient one is at the level of the AINSE Specialist Areas. We are thus seeking to analyse:

- budget allocations by AINSE to sub-committees at year beginning and their unspent component at year end for the five last years past;
- number of AINSE research studentships working on their supervisors awarded by sub-committee over the last five years;
- aggregated grants from other than AINSE sources used in the programs supported by AINSE;
- number of university staff members with active AINSE grants in the year in question, aggregated for all universities;
- number of students working on AINSE projects during the year in question.

These indicators show both the opportunity for AINSE collaborators and the 'leverage' they bring to the funds expended.

Outputs

- Number of scientific papers in refereed journal to work supported by the sub-committee;
- number of students completed in that five year period by the sub-committee;
- number of conference presentations and unrefereed publications attributable to the sub-committees work;
- any special prizes for fellowships associated with staff members or students.

These indicators are essentially quantitative. The 'outcomes' can embrace quantitative and qualitative considerations.

Outcomes

Outcomes are often very hard to assess on a short-time basis. A five-year plan adopted here is only a snapshot and we seek input from the Specialist Committees on better ways to capture the outcomes. Nevertheless, a preliminary indication has been obtained (in the next stage of this study) from:

- Citation rates from the work of the principal proposers in the universities.
- Citation rates for the staff (aggregated) from the Bragg Institute and other ANSTO groups working with the facilities that AINSE accesses. (This is essentially related to Neutron facilities.)
- Number of books published and any reviews of these books (by sub-committees).
- New patentable processes or new procedures introduced e.g. in hospitals.

- Growth in the fields supported by the Specialist Committees e/g/ new groups entering in the five-year period surveyed.
- National and international connections established.
- The attraction of additional research funding resources through the process of the AINSE work.

With further input from the Specialist Committees and ANSTO we will be in a better position to judge what performance criteria should be applied ‘across the board’ and what special criteria should be applied to particular discipline areas to meet the goals of AINSE’s strategic plan.

As part of the feedback to John White and Rob Robinson, **we ask the Specialist Committee Chairs to offer advice from their committees** on how the above criteria might be strengthened. A list of new equipment (and its value) purchased by AINSE/ANSTO in the last five-year period is appended below and one aspect of the response requested is:

What affect this has had on bringing new people into the field and on the performance of the field?

Table 1 – New Equipment Brought by AINSE/ANSTO collaboration 1999 – 2004

Year	Instrument	Cost
1999	LONGPOL Super mirror Langmuir trough Cryomagnet AUSANS shear cell	\$610,000
1999	ISIS	\$400,000
2000	Tandetron	\$3 M
2000	ISIS	\$400,000
2001	ISIS	\$400,000
2002	ISIS	\$400,000
2003	ISIS	\$400,000
2004	ISIS	\$400,000

ANALYSIS OF THE RESULT

Inputs

The primary criterion of assessment for grants for access to the facilities at ANSTO through the AINSE process is the quality of the proposal. AINSE over the last two years has:

- Restructured the Specialist Committees to better group the scientific aspects of its program.
- Applied international criteria for proposal consideration and judgement.
- Applied a systematic rotation to specialist Committee membership.
- Brought new areas of science and technology into the program.
- Introduced “single portal” peer reviewing process for all AINSE and Bragg Institute Neutron Scattering proposals

In the measures of inputs shown below are:

- The total budget of AINSE at the beginning of each year and the amount spent at the end of that year (Figure 1).
- The breakdown of the start of the year budget by specialist area from 1998 – 2002 and then, again, after a change in the structure of the sub-committees for 2003 – 2004 (Figure 2). Unspent amounts are shown in red above the blue year start budget amounts – additional allocations and overspends are shown as negative red bars.
- The participation of students and their supervisors in funded visits to the ANSTO site of 2003 (Figure 3).
- Grants from other than AINSE sources are not yet available.

As concerns the financial inputs it should be noted that after a review by the Australian Department of Finance, of ANSTO's charges for access to facilities in 2001 there were substantial increases in the cost of access (especially for neutrons). This is reflected by a just in the budget allocations for 2002 and subsequently

(1) Budget Allocations and 'Take Up'

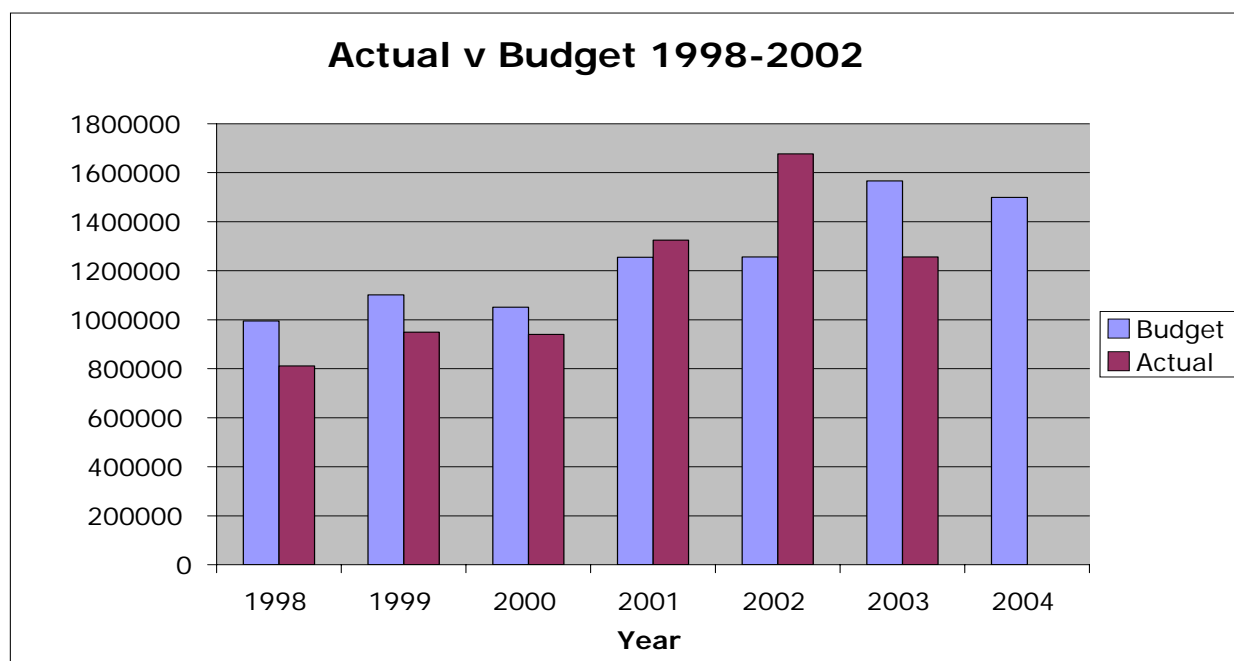


Figure 1. The total allocated budget to all AINSE sub-committees and the actual budget spent at the year end for years 1998 – 2003 (allocated budget only for 2004).

(2) Budget Disbursal to Sub-Committees

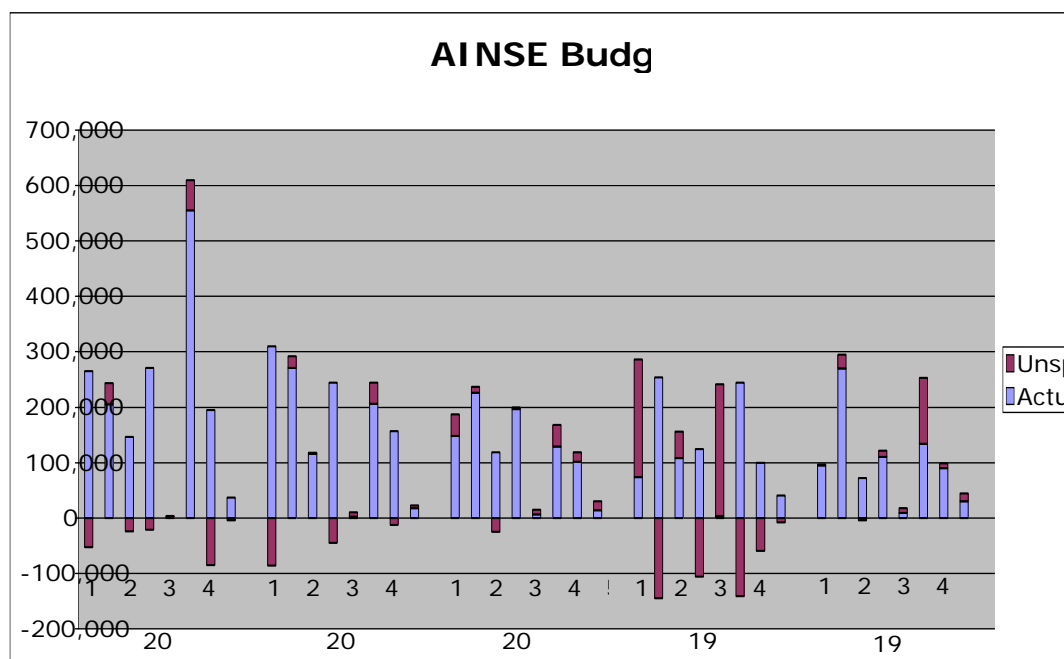


Figure 2(a). Shows the start of the year budget allocation to each sub-committee (total positive value of each bar) and the end of year remainder (in red) for years 1998 – 2002 (when the sub-committee structure was changed). Negative bars show overspend and positive red colour on year start budget are amounts underspent.

1 – Accelerator Mass Spectrometry	5 – Plasma Fusion
2 – Accelerator Science	6 – Neutron Scattering
3 – Engineering, Materials & Nuclear Technology	7 – Radiopharmaceuticals & Neutron Irradiation
4 – Environmental Science	8 – Radiation Science

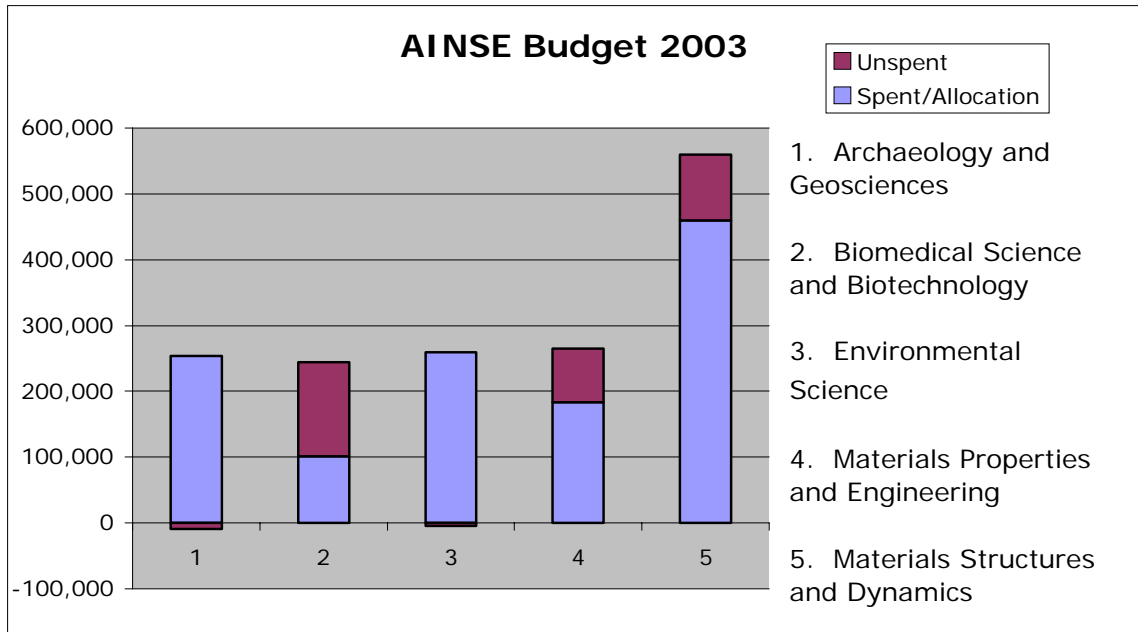


Figure 2(b). Shows the start of the year budget allocation to each sub-committee and the end of year remainder – not taken up by sub-committees for year 2002 and 2003 (after the sub-committee structure was changed).

(3) Participation of Students and their Supervisors in Experiments

3.1 A measure of the quality and quantity of students entering the programs managed by the various Specialist Committees can be gained by looking separately at the numbers of AINSE Postgraduate Research scholarships allocated to sub-committees.

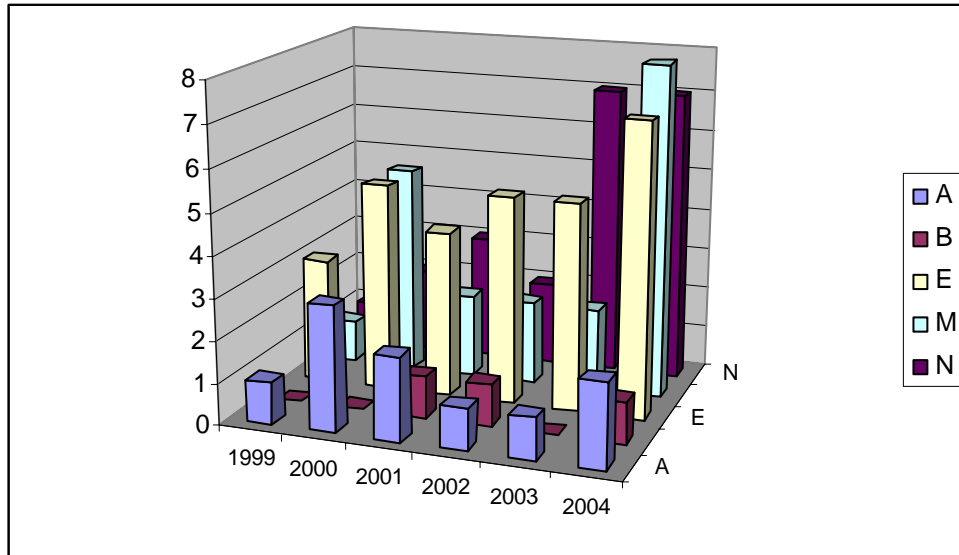


Figure 3. Shows the number of Postgraduate Research Studentships allocated by the AINSE Council to the sub-committees over the last five years (this is a measure of the quality of the students applying in a particular sub-committee's area).

A = Archaeology and Geoscience, B – Biomaterials, E = Environment, M = Materials, N = Structure and Dynamics 'Neutron'.

Table 2 – The Data from Figure 3 by Specialist Committee

Year	A	B	E	M	N	Grand Total
1999	1	0	3	1	1	6
2000	3	0	5	5	2	15
2001	2	1	4	2	3	12
2002	1	1	5	2	2	11
2003	1	0	5	2	7	15
2004	2	1	7	8	7	25
Grand Total	10	3	29	20	22	84

3.2 The total number of student days and supervisor days spent and ANSTO in the various Specialist Committee programs is also an input measure and shows some of the sociology of AINSE use. This information is shown in Figure 4(a) and Figure 4(b) and suggests different styles of user participation across the specialist areas. As this structure changed in 2002 the data for that year has been aggregated into the structure subsequent to 2002. Earlier year data are hard to extract as part of the reforms of AINSE data gathering only started in 2002.

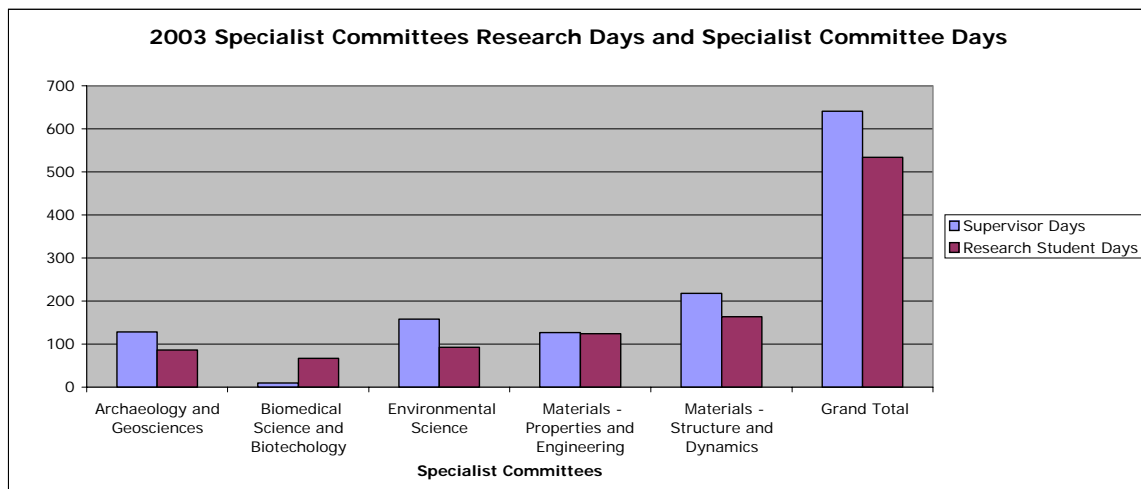
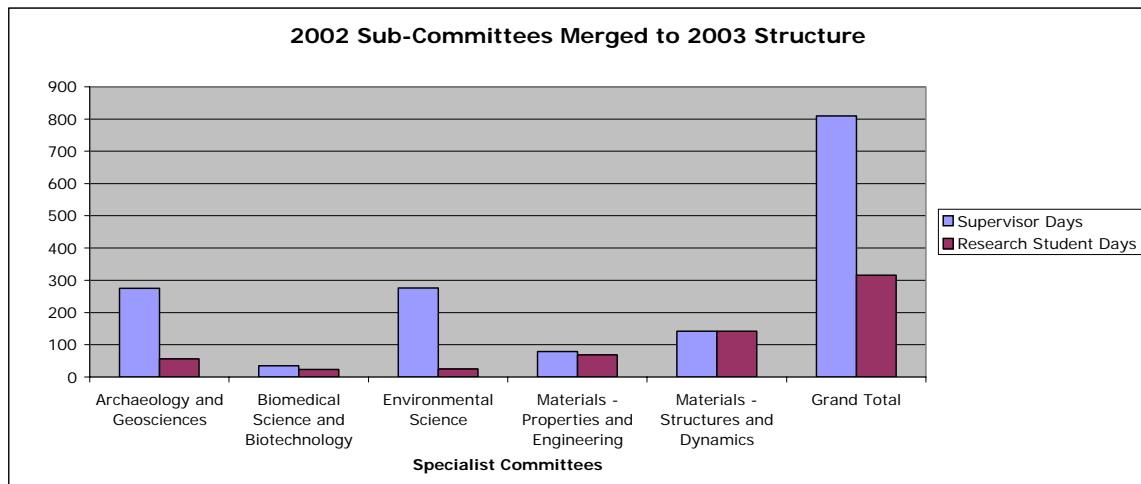


Figure 4(a) and 4(b). Show the number of students and university staff members working at ANSTO on AINSE grants in 2002 and 2003 by sub-committee.

Figure 5 shows a first attempt to extricate the aggregated grants attracted 92003) and requested (2004 – 2006) by university AINSE users from ARC and external funding agencies other than AINSE. This information has been extracted from the Neutron Scattering – Structure and Dynamics proposals for October 2004 only. Of a total number of proposals (24) only 7 had given the data. The numbers shown are thus, probably, lower estimate of the external resources used in the programmes supported by AINSE – **we request that the Specialist Committee’s themselves make an improved census of their users** – it should be readily obtainable since it has to be entered into all ARC grant proposals.

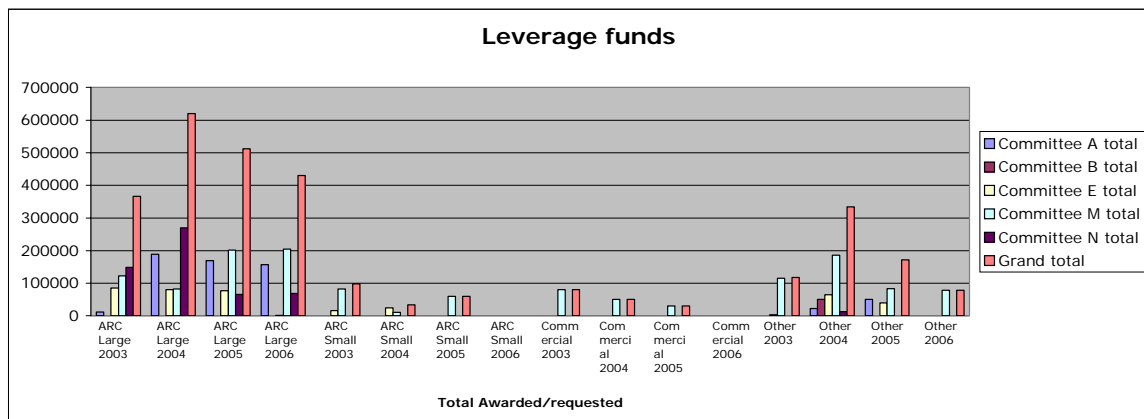


Figure 5. An estimate of the ‘leverage of external resources (grants only) attracted by AINSE proposal grantees. (2003 – 2006 dated start and end of grant shown an AINSE applications forms.)

Outputs

We take as our primary output measure from the AINSE/ANSTO collaborative process, the total number of publications in refereed journals. This is shown in Figure 6.

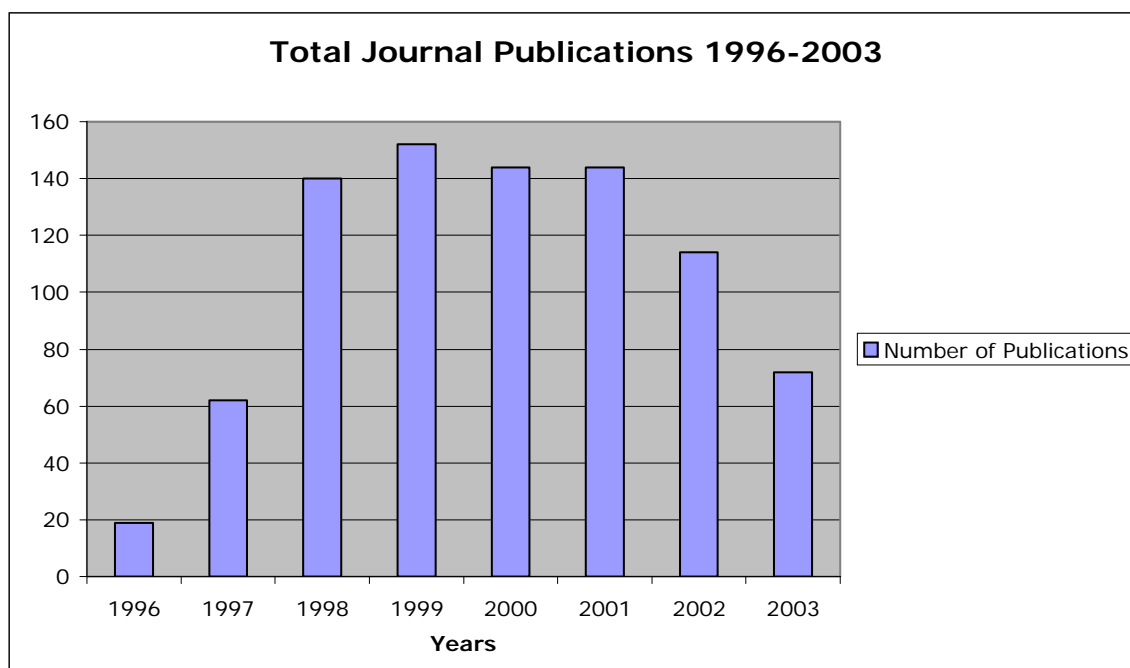


Figure 6. The number of scientific papers published by AINSE supported researchers in the years 1996 – 2003.

These data have been derived by using the date of publication of refereed journal publications noted in the AINSE Annual reports. The AINSE publication rate at present is about 140 publications in refereed journals per year. (Note that the data for 2002 and 2003 are not yet complete as there is often lag in awardees' notifying AINSE of their publications.)

A second output measure is the number of student theses achieved through AINSE collaborations and the data for this are shown in Figure 7. There appears to be some irregularity in student theses production but the overall number of theses is increasing.

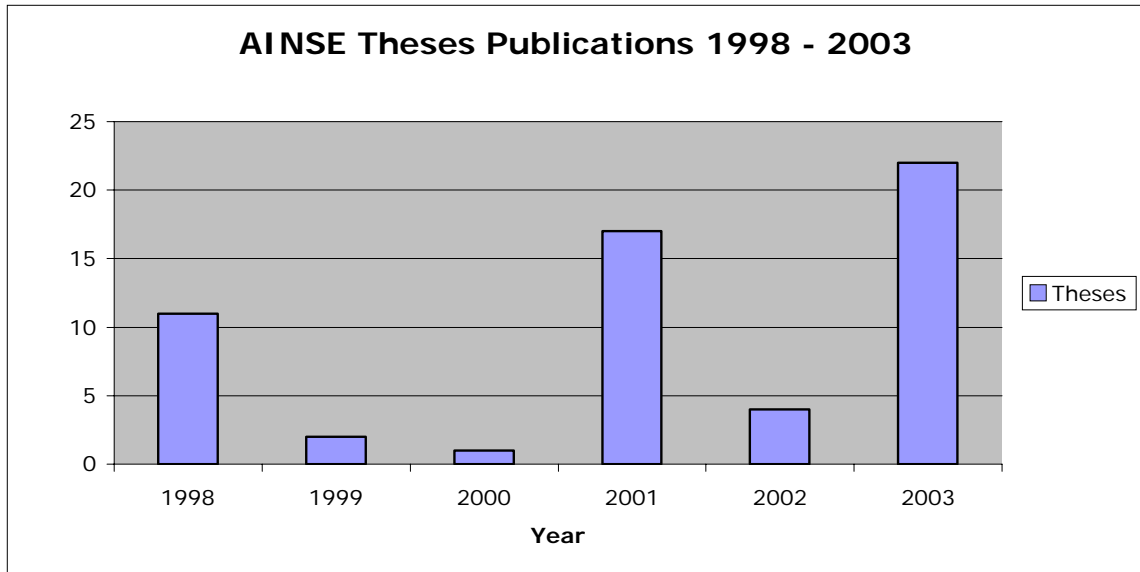


Figure 7. Shows the number of student theses achieved through AINSE collaboration.

To form a preliminary impression of the productivity of research within specialist areas as measured against inputs we have divided the refereed publications for each year into the contributions from the different sub-committees. This distribution up to the year 2002 is shown in Figure 8.

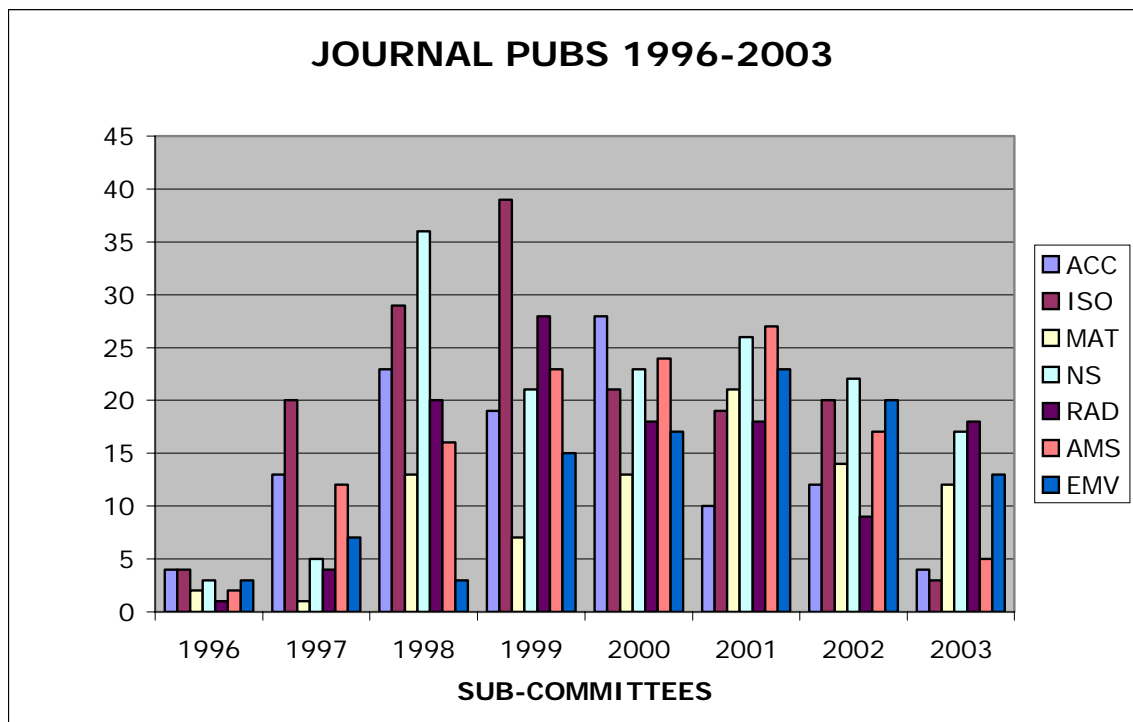


Figure 8. Shows the publication breakdown by year and sub-committee.

This measure gauges the relative publication activity of the different specialist area. The result is that with the new Committee structure there is about the same publication activity of 20-30 publications per annum over the six-year period. Only publications out to 2002 year have been counted and some in the 2002 year will not yet have been caught.

It would be interesting to have the **comments of the Specialist Committees** on the profiles of these publications and in future to continue the mapping of publication activity upon the Specialist Committee structure that AINSE adopted in 2002. We should note that the Accelerator Science Committee (as was) had a declining publication rate with years after year 2000 – no doubt related to the re-structuring of that committee and of the others related to accelerator access.

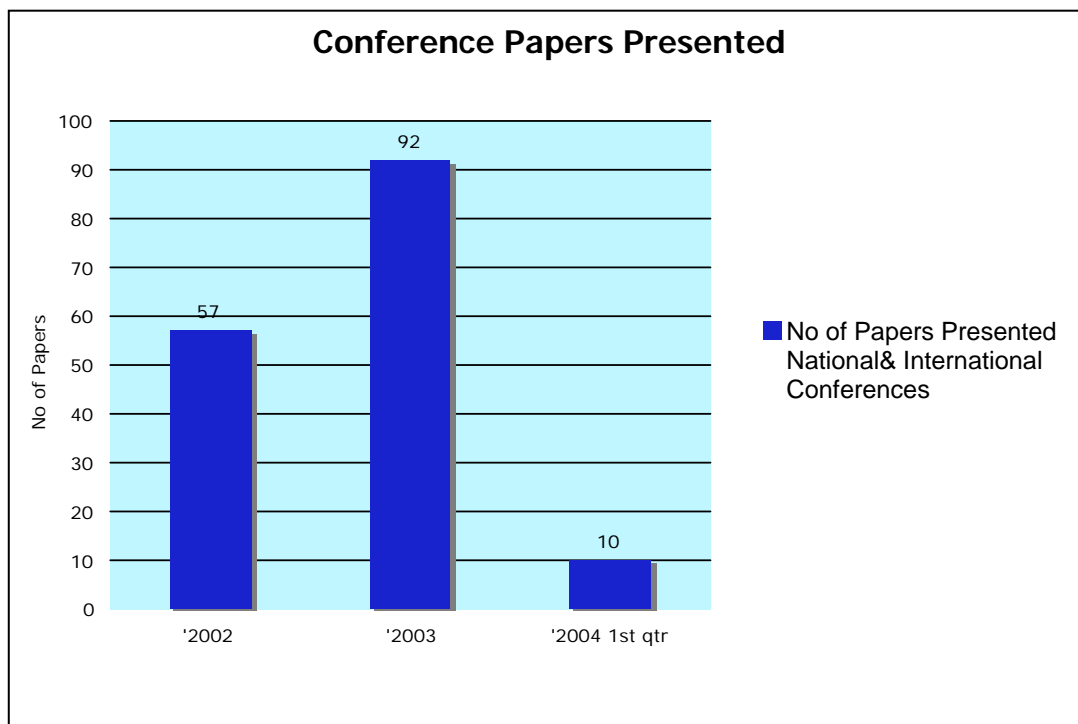


Figure 9. Shows the refereed publications of AINSE users for papers given at national and international conferences within the reviewed period.

Outcomes

Although we would like more measures of outcomes the time available and cost has restricted us to an analysis of the citation rates for the last 3 years. As an initial exercise we studied the number of citations for papers concerned with neutron scattering and associated with the Bragg Institute. A search on the Science Citation Index (SCI) produced by the Institute of Scientific Information (ISI) was done by Sandra Gorringe of the ANSTO library at the request of Dr Rob Robinson. It is noted that this search only covers references cited in journals and, in particular, those journals covered by ISI. It is also noted that there is a United States bias in the ISI/SCI journal coverage. All papers cited in 2002, 2003 and 2004 that had authors from the Bragg Institute were caught in this survey. These data are shown in Figure 10.

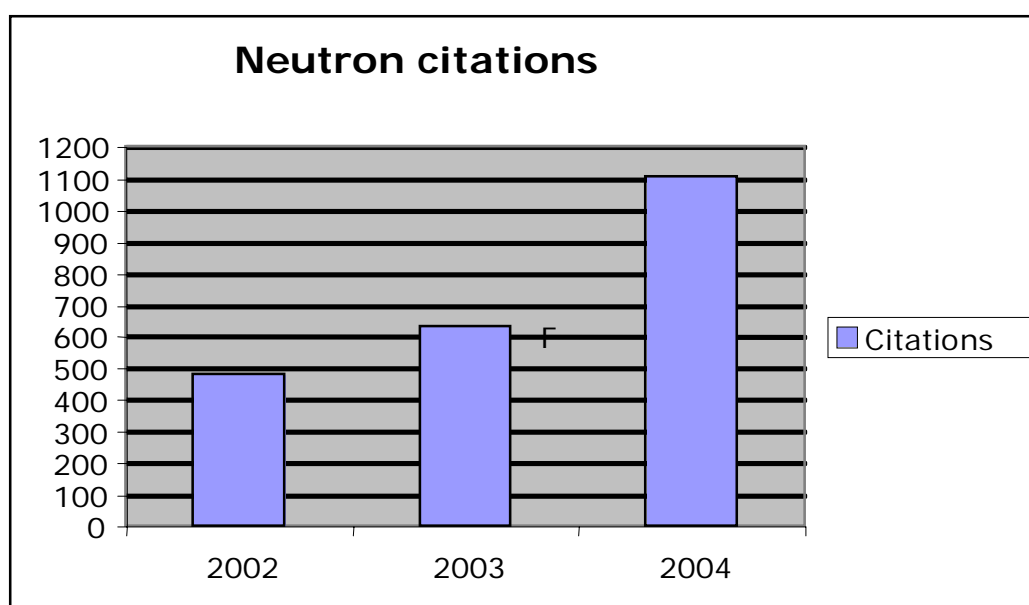


Figure 10. Growth in citations from Neutron Scattering papers 2002 – 2004. Authors are totals from the Bragg Institute and AINSE.

A total of over 466 publications are contained in the analysis above. In order to illustrate the collaboration between AINSE members and Bragg Institute we have sub-divided the papers into those with only Bragg Institute authors, (160 papers) and those where there are only AINSE authors or authors from both AINSE and the Bragg Institute (134). In order to get some idea of the citation rate from these two categories the number of cites per year from the two categories has been normalised by 1.6 and 1.34 respectively. These normalised citation data for 2002, 2003 and 2004 are shown in Figure 11.

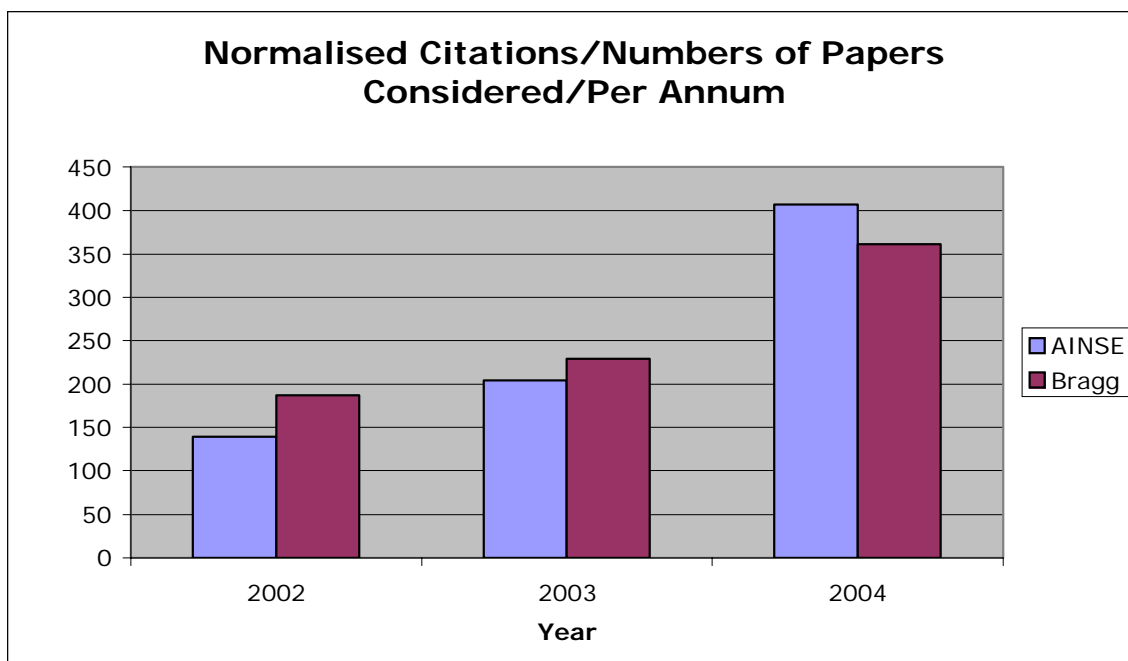


Figure 11. Number of citations from AINSE authors some in collaboration with Bragg Institute authors (blue) and from Bragg Institute only papers (red) 2002 – 2004. (The data have been normalised by the total numbers of papers in each of the two categories.)

The data from AINSE authors includes access to ISIS (UK) and other overseas facilities as well as access to HIFAR instruments by University/Bragg Institute authors. The two principal conclusions from this analysis are:

- The steady increase in publication citations as well as publication numbers in the neutron scattering area; and
- The comparability of the citation performance from the AINSE collaborative papers and those of the Bragg Institute itself.

The data indicate positive outcomes both from the technique and the AINSE/Bragg Institute collaboration. The authors believe it would be of value to extend this benchmarking exercise to the other AINSE specialist areas and to add additional performance indicators to the outcomes such as those mentioned in the early parts of this paper.

The authors request the AINSE Council and the Specialist Sub-committees to give consideration for ways to improve our understanding of the demonstrable value of the AINSE/ANSTO collaborative process. The objective would be to have a definitive version of this paper and benchmarking across the board in time for the December 2004 Council meeting where it would be useful to re-examine the goals and strategies set in the December 2003 Council.

J. W. White / R. Robinson
4 November 2004