POTENTIAL AST USAGE

1. Expectation of Scientific Output

Some indication of the scientific output to be expected from the AST can be gleaned from the output from the Westerbork array (WSRT). By "output" is meant an observing program that has led to a publication. In the first 8 years of WSRT operation a total of 299 projects led to publication. This represents 37 projects per year on average. The figure of 37 represents a limit imposed by scientific manpower in the data reduction and interpretation stages. It is not a limit imposed by the map-collecting speed of the WSRT; about two and a half times as many 4-day full-synthesis maps could be produced per year (assuming 380 x 12^h available observing time). To illustrate this point we can note that, as of July 1978, the backlog of data reduction and interpretation of WSRT observations was as follows:

Raw data stage (U-V data)	23 projects
Cleaning and interpretation stage	98 projects
Interpretation still to be completed	16 projects
Total backlog:	137 projects

2. Scientific Manpower Requirement

What level of scientific manpower is needed to collect, clean, interpret and write up 37 synthesis maps (or partial maps)? Some measure of this is provided by the scientific staff who make the major use of Westerbork. These comprise:

Astronomers employed by Netherlands Foundation	10
Astronomers at University of Leiden	8 staff + 9 students
Astronomers at University of Groningen	9 staff + 7 students
Astronomers at University of Utrecht	3 staff
Total :	46 (incl. 16 students)

In view of the 137 projects incomplete as at July 1978 this number (30 staff + 16 students) is hard pressed to keep up with the data reduction, interpretation and writing up.

There are additional users of the WSRT from outside the Netherlands - mainly visitors to Leiden and Groningen on sabbatical leave from other countries, or people working on collaborative projects (e.g. from MPI Bonn). This is counterbalanced by the fact that astronomers from Leiden and Groningen also use other telescopes (Dwingeloo, Effelsberg, Arecibo, VLA, ESO).

3. Potential Australian Users of the AST

Table 1 of ASTDOC47 on AST usage lists 37 astronomers who could make use of the AST in various degrees. Fifteen of those listed are on the staff of Radiophysics. The remaining 22 are distributed as follows:

AAO	4
ANU	5
Monash	1
Uni NSW	2
UKSTU	2
Uni. Sydney	3
Uni. Tasmania	2
AST Postdocs	3

In ASTDOC47 the listed times of users from universities were assumed to include projects by students working under their supervision. In the present document it will be assumed that there would be 11 Ph.D. students working on AST projects. This number is an estimate based on one Ph.D. student per mainland university staff member listed in ASTDOC47.

An Australian total of 37 staff plus 11 students looks like a comparable figure to the Netherlands total of 30 staff + 16 students. One would therefore expect that about 37 projects a year could be undertaken and completed (see §1).

As in the case of Westerbork, there are likely to be overseas users of the AST - mainly people spending a sabbatical year at an Australian institution. But, on the other side of the balance sheet, the non-Radiophysics staff listed in Table 1 have other Australian telescopes to operate. It is hard to put a figure on the percentage of time AAO, ANU, University of Sydney, University of Tasmania and UKSTU staff would be likely to devote to AST observations, reduction and interpretation.

4. Implications for AST Speed of Operation

Although not all AST observations will require full synthesis of a field; a possible yardstick as to optimum operating speed could be to allow for 37 fully synthesized maps in an operating year. Assuming (as RNM did in ASTDOC47) that 15% of all observations would have to be repeated because of interruptions due to equipment breakdown or bad weather, then the AST speed should make allowance for 42 fully-synthesized maps a year. With 380 x 12^h available observing time, this indicates that the mapping time of the AST should not exceed 8 days for a fully-synthesized map. A greater speed would produce data faster than the potential users could reduce, interpret and write it up. A slower speed would reduce the number of projects which the Australian astronomical community could reasonably undertake, and so reduce the effectiveness of the AST to contribute to Australia's scientific productivity.

5. Conclusion

For the first 8 years of operation of the WSRT an average of 37 projects a year were completed and published by 30 staff and 16 students in Dutch universities and the Netherlands Foundation for Radio Astronomy. The list of potential users in ASTDOC47 leads to comparable numbers of users for the AST (37 staff + 11 students). This number of AST users could then be expected to complete 37 products per year, on average.

It follows that, to allow the AST to be used effectively, the time required to make a fully-synthesized map should not exceed 8 days.

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