Multiple Processor Sites for the VLB Array

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At the recent NRAO Users' Committee, the possibility of operating two Array Processing Centers was briefly discussed. The idea of having two processing centers originally arose as a result of discussions with Caltech scientists who are apparently interested in operating a "continuum only" Processing and Image construction center on the West Coast, in much the same spirit as the various proposed Regional VLA processing centers.

The advantages of operating two processor systems may be summarized as follows:

1) If the NRAO continues to operate a major VLA reduction center in Charlottesville, then Charlottesville also becomes a strong candidate for our VLBA Processing Center, and the existence of a West Coast Processing facility may be attractive to users from that area.

It is expected that the computer systems at the two Processors will be similar, although not necessarily of equivalent size. Software will be exchanged, and a real time link will facilitate transfer of computing work loads from one site to the other. A modest start to this approach has already been made with the Caltech and NRAO VAX computers.

It may be argued with some force that it would be more efficient to concentrate all of the computing facilities and personnel at one site. But science does not necessarily progress by having the most efficient organizational structure. The intangible benefits of a healthy (presumably friendly) competition and the influx of ideas from multiple concentrations of skilled scientists should not be discounted, and would diversify the scientific input, as well as allow for greater flexibility in development of software. Indeed the operation of two or more processing centers

might, to some extent, reduce the concerns about concentrating VLB

facilities at one institution.

2) If, as appears increasingly likely, the record-playback system

is based on broad band recorders, we may lose the option of playing back

spectroscopic recordings faster than real time. Then, due to inevitable

Processor down time and required replays, either an infinite backlog

would build up, or it would be necessary to limit the Array to part-time

operation.

3) A prototype 3-station Processor is currently being built at

Caltech-JPL, using a number of new innovations not present in the Haystack

MK III system, whose design is already more than 6 years old. It is

relatively straightforward to expand the Caltech-JPL processor to 9 or

perhaps more stations. This would make available an interim Array Processor

to be used with a combination of existing and new antennas, and would

take the pressure off NRAO to have the final Processor, which may be of

a fundamentally new design, ready before the completion of the entire

array.

The construction and operation of a second Array Processing Center

does not come for free. I estimate that a modest 10 station, continuum

only Processor might cost 2 to 3 million dollars and would cost about

0.5 million per year to operate. Ideally, a University-operated processor

would be financed through ordinary grant procedures, but more realistically,

it might have to come from the Array funds, and the relative advantages

would have to be weighed against other items such as reducing the number

of elements to 9. At least to some extent, however, some outside processing

and computing facilities are already being developed independent of the

Array facility, so the additional costs necessary to upgrade to a full

user operation may be less than indicated above.

7/24/81