

123400-3-L

15 October 1976

National Radio Astronomy Observatory
Edgemont Road
Charlottesville, Virginia 22901

ATTN: Dr. L. Somers

SUBJECT: Monthly Report for September 1976
VLA Optical Processor
Contract: VLA-215

1.0 SUMMARY

Work during September consisted of the completion of Task 1 and the start of Task 2. Approval for the start of Task was given by letter from NRAO¹.

The phase error analysis² was continued using one and two dimensional computer methods to establish the effect of phase errors relative to required performance and to assess sources of phase errors such as the liquid gate and non-paraxial operation. This effort will be completed in its preliminary form during October, provided that the two-dimensional computer runs at NRAO are completed soon enough. A summary memorandum³ covering the analysis of encoding and formatting of optically recorded u,v plane data was completed. A complete characterization of u,v plane signals that are to be recorded has not been provided. A request^{4,5} for such data was made to NRAO during September. Preliminary tests of the Reticon and Fairchild one-dimensional detector arrays were completed⁶.

The response of J. McDonald, optical design consultant at the University of Reading, has thus far been nil. Apparently his schedule and/or interest have made a timely response on his part

impossible. We must still obtain a summary of work he would propose to do based upon two letters and two telephone conversations with him which were initiated in about July of this year. If he does not respond by October, the utility of his contribution to this program will be questionable, and we expect not to continue to seek out his participation after that time.

2. INFORMATION NEEDS

As noted in Section 1.0 above, and in last months report, a clear and comprehensive characterization of the u,v plane signals which are to be studied relative to optical recording and optical processing has been requested. Those requests have been discussed in telephone conversations with NRAO. Some of the u,v plane information has been provided while other portions are not expected to be available during this program. It is requested that all information related to characteristics of u,v plane and data and, further, any revised performance requirements for u,v plane data processing be summarized formally by NRAO and submitted to ERIM at the earliest possible time. In preparing this summary, the original set of requirements prepared by NRAO at the onset of this program, should be reviewed.

REFERENCES

1. Letter from J. Marymor of NRAO to ERIM
2. Film and Film-Gate Consideration, ERIM Memo, 6 October 1976, C. Aleksoff.
3. Basic Limitations of Encoding Methods, ERIM Memo, 21 September 1976, J. Fienup.
4. Computation of $B_{\max}^2 / \overline{B^2}$ for Three Hypothetical Brightness Maps, ERIM Memo, 22 September 1976, J. Fienup.
5. Letter from I. Cindrach of ERIM to L. Somers of NRAO.
6. Preliminary Test Comparisons Between the Reticon and Fairchild Sensor Arrays, ERIM Memo, 28 September 1976, R. Dallaire.