## Operational Requirments: Image Formation and Analysis
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## I. Introduction

This memo will attempt to describe the general flow of data after the correlator, to list the required operational functions and to estimate the manpower requirments for the system. Many of the functions require less than a full time person so that in some cases the same person could be performing several operations. The post-correlation processing can be divided into two parts, the fringe processor and data analysis using AIPS.

**Fringe Processor:** The function of the fringe processor is to correct, calibrate and average the correlator output. The operation of the fringe processor should be fairly automatic and not require continuous interactive control. The computer required for the fringe processor may be the correlator control computer but probably needs to be something larger than a VAX 11/780 plus array processor. The fringe processor has a number of discrete operations:

1) Model corrections. The correlator model should be corrected if necessary to the most accurate possible model including atmospheric and geophysical effects.

2) Calibrator Fringe Fitting. A clock calibration source should be observed periodically to monitor the behavior of the clocks. The fringe processor will do a global fringe fit on calibrator data to determine the current clock parameters. The results of the calibrator fringe search may be used to monitor the operation of the correlator.

3) Calibration. All data should be phase corrected using the results of the calibrator fringe searches and a nominal amplitude calibration should be done (Tsys, antenna gain, atmospheric absorption, nominal sensitivity, etc.)

4) Averaging. The corrected data can be averaged in time and frequency. Compression factors of up to 1000 are possible for continuum data. This data compression factor is the driving force requiring the fringe processor. After averaging, data are archived on tape.

More details about the fringe processor are available in VLBA memos 204 and 217. Since the fringe processor should be fairly automatic and must keep up with the correlator, observers should have little interaction with the fringe processor.

**AIPS:** The similarities between VLBA and VLA data processing strongly suggest the same data processing package, ie. AIPS or its successor be used for both arrays. As in the case of VLA data, the observer will be responsible for the data and image processing using AIPS. The tasks needed for the VLBA which are not now in AIPS will be added. Each current AIPS system has a VAX 11/780, an FPS 120B array processor, an IIS display, 3-4 Century Disk drives and 1-2 tape drives. (Also see the VLBA proposal and VLBA memo 72.)

## II. Operational Functions.

The following table briefly describes the functions involved in supporting post correlation analysis, suggests the level of person required and estimates the number of people needed for each function.

### Personnel

| Function | Level | equiv. person |
|---|---|---|
| -Monitor data quality and calibration. | data analysist | 2 |
| -Array calibration. Antenna locations, geophysical and atmospheric models, antenna gain and sensitivity, etc. | scientist | 1/4 |
| -Maintain calibrator source lists. Both well monitored amplitude calibrators and clock calibrators. | scientist | 1/2 |
| -AIPS system managment and user assistance. | scientist | 1/2 |
| -System programmer | system programmer | 1/2 |
| -Hardware maintenance, 5+ VAXes, APs, IISs, disks etc. (Maintenance contract for some?) | technician | 1? |
| -Tape librarian. | data analysist | 1/4 |
| -Software development (in addition to general AIPS support) | scientist | 2 |