VLB ARRAY MEMO No. 370

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25 July 1984

To: VLBA
From: W. D. Cotton
Subject: Data Processing Meeting 19 July 1984

Present: Benson, Cotton, Fickling, Greisen, Hilldrup, K. Johnston, L. Molnar, Romney, R. Simon, van Gorkom, van Moorsal, Walker

Material sent out to (most) committee members before the meeting is given as an appendix to these notes. The distribution of premeeting material to non-NRAO sites was discussed; L. Molnar hopes that SAO will soon have a dial-up DECNET that he can connect to the NRAO DECNET, R. Simon (NRL) will obtain these files via VAXNET.

There was an extended discussion about the need for documenting the specifications for software in a fairly formal way before it is written. There was general agreement that this should be done; there was also a general consensus that there should be a formal way to record suggestions that is available to the general community. There were no objections to a checkout system for the formal specifications. W. Cotton will set up a directory on CVAX with the appropriate files before the next meeting (14 August 1984).

J. van Gorkom agreed to review the current list of spectral line software to be written and to suggest modifications to the list for the VLA. The spectral line specific software needed is not well enough defined at the moment to warrant writing detailed specifications. The current list of spectral line software is dominated by current VLBI techniques and probably needs serious changes. There was a consensus that all software should be designed for spectral line data with continuum data being the single channel case.

K. Johnston agreed to document the requirements for geometric measurments (astrometry and geodesy) and hoped to have this done by 15 October. Cotton and Greisen will work on the modifications needed to AIPS.

Appendix

Agenda for Meeting

The basic agenda for todays meeting (19 July, 1530 EDT ph (203) 797-8389) is a continuation of the discussion of the VLA/VLBA editing and calibration project. Since this project will be done by a fairly large and widely scattered group of people it is necessary to specify, in advance, many more of the details that most of us are accustomed to. For this reason I am suggesting that we write fairly detailed specifications for the necessary components of this project. The initial specifications should be written by someone who is familiar with the use of the particular function and need not be the person who will eventually write the software. Appended to the end of this document is a suggested form for these specifications and an example. I would like to discuss this form at today's meeting and settle on an at least preliminary format.

Also appended to this document is the current list of work to be done for the editing and calibration project. We should probably divide up this list fairly soon (today's meeting if possible) to begin writing the specifications (note: writing the specifications does not carry an obligation to write the software). Any relevant items not on this list should be added.

VLBA Post Processing Software Specification 7/18/84

Post Processing ID:

Version: DD/MM/YY date of last revision.

Type: AIPS task, subroutine, data file structure, etc.

Function: A brief description of the purpose of the procedure or data file.

Details: For software, a general description of the techniques to be used and references as appropriate. For data files, the details of the contents and structure of the file giving units and other relevant information.

Input: Software only. This section should give the information required to perform the specified operation and where the information is expected to be obtained.

Output: Software only. This section tells what the results of the process are and how they are stored (e.g. gains are entered in the gain table).

Special Requirements: Needs an array processor, IIS television device, graphics terminal, etc.

Revision: A list of the dates, authors and reasons for modifications of the specifications.

Example

VLBA Post Processing Software Specification 7/18/84

Post Processing ID: 2.1 GRID

Version: 7/18/84

Type: AIPS task.

Function: The purpose of GRID is to convert a uv data base into an image as an aid to editing data.

Details: An image file is produced in which the value of a pixel is a representation of the visibility data (real, imaginary, amplitude or phase) as a function of the sort order of the data, e.g. time on one axis and baseline on the other. Pill box gridding should be sufficient so the output pixels will be the weighted average of all values in a given cell.

Input:

UV data base: Should accept either calibrated or raw data plus a calibration table.

Selection criteria as AIPS adverbs:

- Source(s)
- Time range
- uv range
- Pixel type (real, imaginary, amplitude, phase)
- image size
- cell size

Output:

Catalogued image file. Unsampled pixels will be magic value blanked.

Special Requirements: none.

Revision:

7/18/84 W. Cotton Original specifications.

Calibration and Editing Functions in AIPS

18 July 1984

The following is a working list of functions need in AIPS or modifications to AIPS with the person responsible and the anticipated date of completion. Names of tasks in parentheses are provisional.

Function	Programmer	Date
Utility:		
1.1 (CALIB) Multi-source to single sources file conversion routine. This task should apply gain and editing tables.		
1.2 (UVGET) Subroutine to produce a file containing a selected subset of calibrated data from a raw data file plus a calibration table.		
Data Display/Flaging:		
2.1 (GRID) This routine will convert a uv data set into an image which can be displayed on a television. E.g. time on one axis, baseline on another.		
2.2 (FLAG) This routine would allow interactive flaging based on the results of GRID.		
2.3 (FLAGB) This routine would display data as a function of time on each baseline and allow interactive flagging.	Romney	?
2.4 (LISTR) This routine will provide a flexible means of obtaining printer listings of data similar to the DEC 10 LISTER program.		
2.5 UVFLG The current capabilities of UVFLG should be enhanced.		
Calibration:		
3.1 POLCA This routine will determine polarization calibration parameters.	Molnar	12/84
3.2 (POLCO) This routine will apply the results of	Molnar?	12/84

POLCA to a second uv data set.

3.3 ASCAL
ASCAL needs to be upgraded to handle the several types of multifrequency data. Could be given the ability to include fringe fitting.

3.4 ASCOR
ASCOR applies the results of ASCAL and needs to track ASCAL.

3.5 (GNED)
This routine or routines will allow manipulating gain files produced by ASCAL. Included are concatination, editing and smoothing.

3.6 (ATMOS)
This routine would determine and apply atmospheric corrections to a uv data set. Should include both neutral (wet and dry) and ionized components with data from a wide variety of sources.

3.7 (MODEL)
This routine would determine and apply and/or correct the geometric model using a high quality model. Must correct both visibility and model data.

3.8 MORAS
This routine applies spectral calibration using autocorrelation spectra.

3.9 SWAMP
This routine does a fringe fit in the time domain and gives a number of useful displays.

3.10 PHREF
This routine references the phases of a spectral data base to a particular channel or to the average of a range of channels or an external calibration table.

3.11 DUNE?
This routine makes fringe rate maps.

3.12 (VEL)
This routine makes velocity corrections to spectral data bases including doppler tracking.

3.13 (BAND)
This routine will determine and/or remove bandpass functions. (May be done in fringe processor for VLBA).

3.14 (BASE)
This routine will fit and remove baselines from auto and perhaps cross correlation data.

Modifications to AIPS:

4.1 Multi-source data files.
This will include geometric observables and an attached but unapplied gain table.

4.2 Modified catalogue header.
There is a need to handle randomly spaced and/or time variable axes.

4.3 Gain table
Table for calibrating and editing information.

4.4 Monitor data logs.
Table for monitor and other auxillary information.