

Comments on "Calibration, Imaging and Datasystems for AIPS++"
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My principle comment on this document is that it not what is required at the present time. Instead of a detailed technical description of the problem it is an attempt at a design. I have fundamental disagreements with this design but since these arguments are irrelevant to the current situation I will not comment further on the design.

At the current stage of this project what is needed is a detailed technical description of what it is required to do. Due to the extremely ambitious scope of the project, adequate design and implementation of the system require a range of expertise and experience far exceeding that of any individual or even a small number of individuals. Many issues are clouded by the use of different names to describe the same thing or the same name for different things. For the design and implementation to proceed a document(s) is needed explicitly detailing what needs to be done.

The way data is collected, organized, calibrated and imaged differs a great deal among the instruments to be served by this project. A major part of the design effort will be to determine what is done in common among the various instruments and what is done differently. It may be possible to increase the commonality by negotiations among representatives of the various instruments. This process cannot even be started without a coherent and detailed descriptions of the requirements of the different instruments.

Many of these technical details were discussed in Green Bank but were not included into the resulting document. A description of the data collected from each instrument includes the polarization correlations measured, number of frequency channels, number of simultaneous spectra and/or pointing positions and estimates of the volume of data produced in typical and extreme cases. If auxiliary measurements, such as system temperature or instrumental delay, are needed in the calibration process this should also be specified.

Calibration is probably the area with the largest instrument to instrument variations. What is needed for each instrument is the detailed model of the instrumental response and how the parameters are determined and corrections applied. It is not clear to me whether or not calibration normally done by observatory staff such as antenna pointing calibration is within the scope of this project. The range of calibration to be considered needs to be settled fairly soon.

For each instrument a description of how the calibrated data is converted to the image domain is necessary. For example, in AIPS VLA the calibrated correlations are convolved with any one of a number of convolving functions and sampled at a bounded set of regular grid spacings on a single half plane of the uv plane. A symmetric half plane is Fourier transformed...

The common methods of the deconvolution of the point spread function from the "dirty" image (e.g. some variant of CLEAN and/or MEM) need to be listed and described. Finally, since different variants of self calibration (iterating through calibration, imaging and deconvolution to remove atmospheric variations) are commonly practiced these should be analyzed as well. The most advanced of these, the "difference mapping" technique from Jodrell Bank needs to be examined in some detail.

A document giving the technical description of the various instruments could be constructed starting from the notes of the people who gave the telescope presentations in Green Bank assisted by other knowledgeable people. I feel that this must be done before any further progress can be made.