

2 August 1982

to : Pipeline Software Group
from : Robert Payne
subject : GRIDER control programs (some assumptions)

The memo is a first attempt to write down some assumptions on how the user might control the GRIDER mapping software. It also describes the DEC10 GRIDER program for submitting mapping requests.

There are now two sorts of visibility datasets which the GRIDER mapping routines will accept. GRIDER will accept DEC10 databases either continuum or spectral line and it will accept SORTER continuum datasets.

CONTROL FROM THE DEC10

The top level mapping program I will call "GRIDER". This program accepts user inputs in the format of standard commands. GRIDER is a version of MAKMAP which sends mapping requests to Wim Brouws mapping routines on SORTER. There are two reasons for renaming this routine. The current MAKMAP in the system will not compile when I add the BASTIM and PBCORR commands to it. Also some of the MAKMAP commands should be changed to take advantage of the GRIDER mapping options. Non square maps, saving a subsection of the output map, channels selection etc. are just not applicable to the MAPPER system.

In particular I have added the DBTYPE command which allows the selection of DEC10 visibility datasets or the SORTER datasets. I have modified GRDSND to not send over the DEC10 if SORTER visibilities are selected.

The current commands are:

DATASELECTION: dbname
 timerange
 antennas
 passflag
 band
 antennas
 dbtype
 source
MAPPING: mapname
 cellsize
 channels
 mapsize
 stokes
 typemap
 rotate
 bastim
 uvweight
 uvconvolve

uvtaper
gridcorr
version
pbcorr
subsources
shiftcenter

Most of these commands are identical to the current MAPPER routines however the uvconvolve and the uvtaper will be changed to allow separate specification of the x and y tapers and convolution functions. Also mapsize should allow non-square maps. Maps on SORTER are stored in real format and gridded data displays contain only the half plane. MAPTYPE XFR produces a simultaneous map, beam and amplitude output. The CLEAN program needs to be changed to accept real maps and beams as input files.

The commands new to GRIDER are DBTYPE, PBCORR, and BASTIM.

DBTYPE simply specifies whether the program is to use DEC10 or SORTER visibilities to do the mapping. If SORTER visibilities are selected then no DEC10 visibility file is sent across and the mapping routines search for a matching visibility dataset on the SORTER machine. No check is done by GRIDER to verify that there is a matching dataset on SORTER.

I am assuming that for some time there will be a duplicate dataset on the DEC10 in DEC10 database format. This includes a calibrated database with an INX, GAI, VIS and possibly a PAS file. The PAS file is the passband correction file produced by SPECTR. This correction is applied along with the gains by AP1 on SORTER. The current format of this file contains all baselines and takes up a lot of AP core. It limits simultaneous spectral line mapping to at most 31 channels. Other selected mapping parameters may limit the number of simultaneous maps even more. The mapping routines on SORTER are not yet interfaced to pipeline spectral line datasets. They will however accept DEC10 spectral line datasets.

The INDEX and GAIN files have the same format as on the DEC10. The flagging in the INDEX record will be applied to the data selected by that INDEX record. The index information along with the gains is stored in AP1. If all of the gains cannot be stored in AP1 this forces multiple gridding passes.

At the moment a SORTER dataset is accepted if it matches the source name, qualifier, frequency and meridian crossing date which are in the INDEX record.

PBCORR is used to specify the filename of a spectral line passband file. This file is assumed to be in the format produced by the SPECTR program.

BASTIM tells the mapping program to grid data onto a baseline time grid rather than a uv grid. It has three options: NO, YES, ALL. If YES is selected the dx, dy parameters will be used to scale the grid. ALL will attempt to scale the time axis according to the time span of the data. It is important to realize that this option simply changes the grid. Other mapping options may have some effect. Maps made from these baseline time displays could be

rather curious. The DY cellsize is interpreted as five seconds of time per arcsecond and DX is set to one.

These commands are interpreted and stored in a MIX file. GRIDER passes this file to GRDQUE for transmission to the SORTER/GRIDER system. GRDQUE sends the mix record to the MAPCON program which puts the request into a queue of tasks to be executed. The first task which is executed is CONRCV which retrieves the dataset from the DEC10. This dataset will include an INDEX file, a GAIN file and if dbtype is set to DEC10 the visibility file also. CONRCV stores the files names of these files in the MIX file which is passed to the next requested task.

For requests submitted from GRIDER this will be the Wim Brouw mapping routines.

The CHANNELS command is currently applicable only to DEC10 spectral line datasets. The mapping program can make at most 31 channel maps at one time. If more than 31 maps are selected only 31 are made. It is quite simple to set the channels command to make less than 30 maps simultaneously. Just submit several GO MAKE commands resetting the channels command each time until the desired number of channels is complete. If channel averaging or smoothing is selected these maps must also be counted in the 31 maximum per request.

CONTROL FROM DISPLY

There is no control from the DISPLY computer yet. However maps made on SORTER can be displayed by the IMPS system. Use either FITS or GETMAP to transfer maps from SORTER to DISPLY.

The initial mapping request must come from the DEC10. The data must be calibrated on the DEC10 and the initial GAIN and INDEX files must come from that machine. Once the request has been sent to the SORTER system the files associated with that request will remain in the MAPCON queue system until deleted.

As long as these files do remain in the MAPCON queues it should be reasonably simple to generate remapping requests from either the DEC10 or any of the 11's using some of the MAPCON facilities. I would expect that it is possible to implement an AIPS style parser or a simple command scanner on the 11's to do this. Since the gain and index files are not that large it is reasonable to save these files until they are deleted from the MAPCON queue system.

An interface to MAPCON already exists in some fashion in the PROBE and CONCON programs. A program on the 11 could retrieve from MAPCON the appropriate MIX request and reset those parameters which are consistent with the initial request and simply resubmit the mapping request to MAPCON through DECNET. After the initial calibration it should be possible for the user to do all of his mapmaking and cleaning from the DISPLY terminals.

The user program on DISPLY must be able to display the users catalog of maps, of datasets and of queued requests. Moreover information pertaining to the processing of these request

must also be available.

And at some future time it should be possible for the DISPLY computer to request interactive control of the CLEAN and MAPPING programs from MAPCON.

ADDITIONAL MAPPING OPTIONS

There are several mapping options which are designed into the mapping routines but which are not yet turned on.

UV limits can be specified to limit UV data to a box or ring.

Third dimension could be selected.

Correlator banded flags could be added to the INX record and applied on a per scan basis.

Source subtraction could be done by a standard file.

Map addition to allow specifying a map to be weighted and added to the final output map could be used to subtract a continuum map from all line maps.