

DEUTERIUM ARRAY MEMO #040

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To: Deuterium Array Group

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Subject: AUTOSCHEDing of beams and special modes

The realtime software supports the automatic scheduling of observations. All the sources in the d1.cat file are candidates for automatic scheduling. The scheduling priority is given to those candidates with the smallest scan angle with respect to boresight. Sources with scan angle greater than the maximum scan angle given following the keyword MAXSCN (or the default which is 40 degrees) are not scheduled. If there are less than 4 sources to be scheduled the remaining beams are assigned to beams offset from boresight according to locations specified following the keyword BLOC (or defaulted to a grid with spacing given following the keyword BEAMSPAC (default to 15 degrees).

Keywords:

- STATION – latitude and west longitude in degrees
- AZIMUTH – boresight azimuth degrees
- ELEVATION – boresight elevation degrees
- BEAMSPAC – beamspacing in degrees for default beams
- LOFREQ – local oscillator frequency MHz
- DACVOLTAGE – DAC control of 40 MHz crystal
- RECORD – ID of PC i.e. 00a makes file yyyy_dd_hh.d00a
 - NEWDAY – change filename each day
 - BEAMP – record beam power
 - PSPEC – record power spectra in decimal format
 - SPCB64 – record power spectra in base64 format
 - BEAMSPEC – record beam spectra
 - PWR – record total power
 - TEMPERATURE – record temperature of motherboard and CPU
- PLOTSEC – time to make new screen plot seconds
- CHANVIEW – channel to use for central plot
- NO DISPLAY – if present turns off display code
- NO PRINTOUT – if present turns off debug print of information
- SMALLDISPLAY – reduces size of display
- SPEED-UP – speeds up time by a factor used for specific tests.
- NOGRAYCALC – if present doesn't calculate or compensate for Gray Chip filter response
- CORCH - channels to correlate if not in cycling mode
- CORRCYCLE – cycle mode for correlation of channels
 - 0 = none
 - 1 = all baselines

- 2 = baselines to channel 0

FSTARTSTOP – start – stop frequency channels for beamforming

AVERAGE – if present realtime main plot is accumulated average

TRACK – sources to be tracked if not in autoschedule mode

MAXSCN - maximum scan angles for sources used in autoschedule

PEAK – if present turns on automatic peaking of element phases

AUTOSCHED – if present turns on automatic scheduling

CALPHASE – element phases (the value 999 has a special meaning as it turns off this element in the beam sum).

XYLOC – xy location of elements

BLOC - beam offset locations

DEVICES – USB IDs to be included

SOU – ra HHMMSS dec DDMSS

- Pulsar – pulse period

- CARBON – alternate frequency

GALACTIC – glat deg glon deg

AZEL - az deg el deg

Special modes are activated by the keywords

a) PULSAR

This forces period averaging to take on the period averaging to take on the period of the pulsar. Any realtime pulse bin greater than 20 sigma is assumed to be RFI and is discarded. The maximum pulse amplitude in any record period is written into the output file.

b) CYGNUS

This turns on a cyclic correlation made (which takes 4 beams) in which each element is correlated with the beamformed sum of the remaining elements. The normalized correlation amplitude and phases are recorded in the output.

Sample source list from d1.cat

SOU	23	21	12	58	44	00	Cass	
SOU	20	27	00	41	00	00	CYGNUS	
SOU	00	00	00	00	00	00	Sun	
SOU	03	32	59	54	34	43	PULSAR	0.7145208
Galactic	171	0	G171					
Galactic	183	0	G183					
Galactic	195	0	G195					
Galactic	0	90	Gpole					
AZEL	180	90	Azel0					
AZEL	0	60	Azel1					
MAXSCN	20	Cass 20	CYGNUS 3					
PULSAR								
AUTOSCHED								

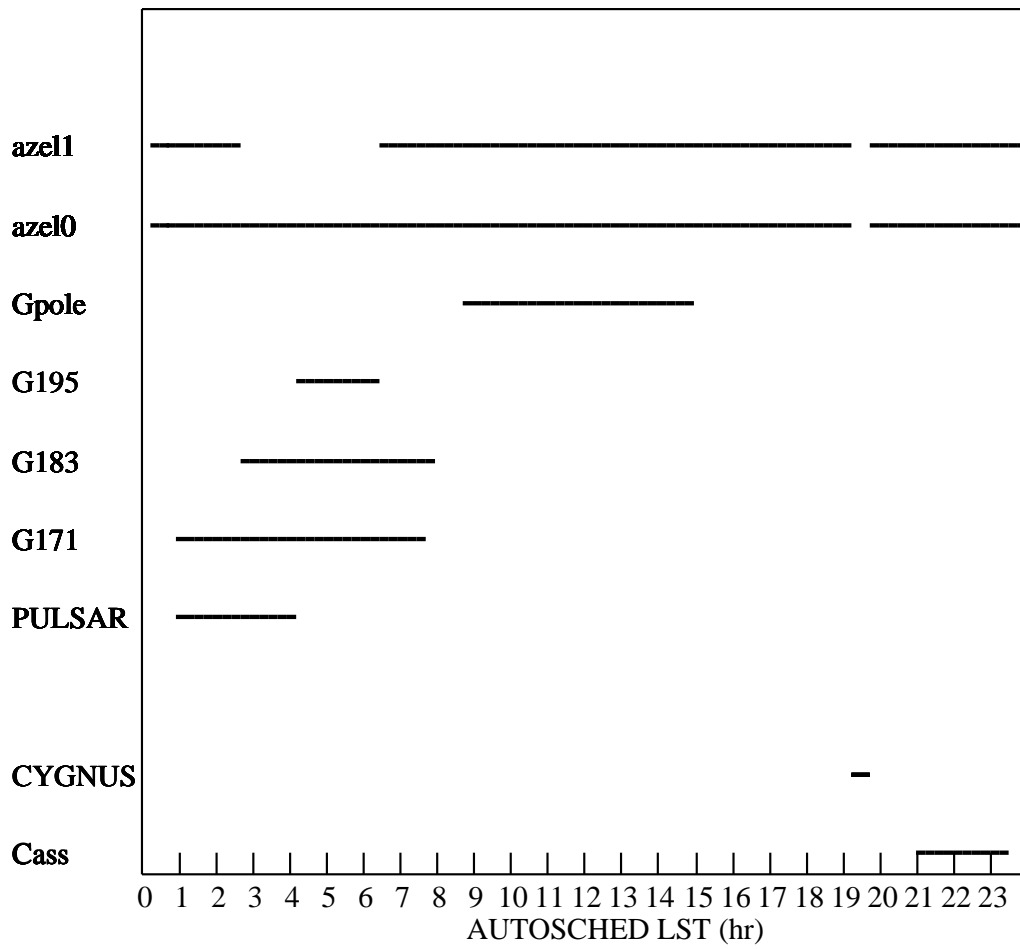


Figure 1 shows the result of automatic scheduling from this source list.