CS-1 problems 20080117

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Bug list (1)

RSP ring on

- Strange oscillations in autocorrelations (Mamta's talk)

- Zero phases in all intra-station baselines

Waveform generator test on CS010

- Somewhat irregular phases

- Sometimes a blocked structure in cross corelation matrix

- Sometimes signal paths do not start synchronously, resulting in phase differences of $n \times v_{\text{clk}}^{-1}$
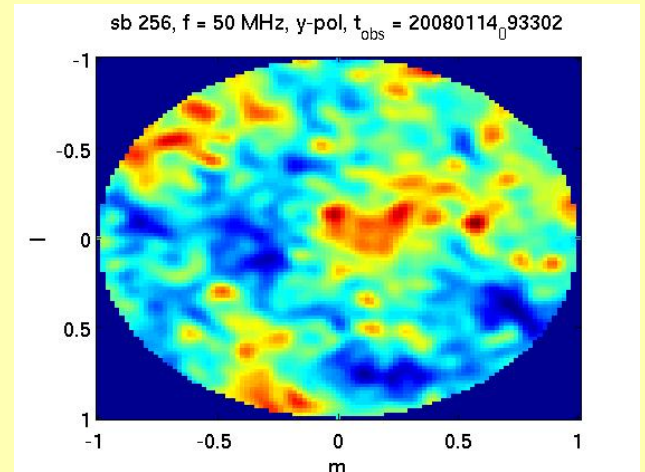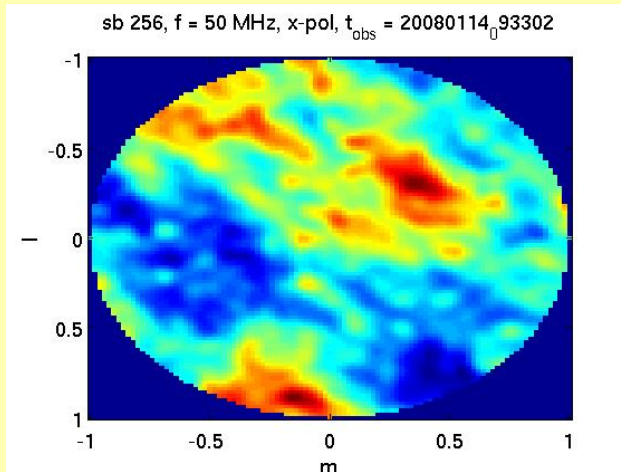
Bug list (2)

Imaging with LBA dipoles on CS010

- No good images between $\approx$ 20 and 80 MHz ("The Bug" This talk)

Other

- No pulsar detections with HBA tiles

- No LBA fringes between Exloo and Dwingeloo

- HBA tracking experiment L2007_04783 not understood

- Beamformer: stations located at 50 m from earth centre: fixed, not yet rolled out

The Bug

sb 256, f = 50 MHz, x-pol, t_{obs} = 20080114_93302

sb 256, f = 50 MHz, y-pol, t_{obs} = 20080114_93302

Features

Good

- Does not occur in Effelsberg

- Images below $\approx 20 - -30$ MHz fine

- Images of RFI sources are fine

- Images with antennae switched off are fine (pure noise)

Features

Bad

- Error pattern shifts position and structure as a function of time

- Error pattern scales inversely with frequency

- Position shift appears to be parallel to GC position shift, but needs be confirmed in long observation

- Problem dominated by a few short baselines in subrack 2, involving a small subset of antennae near antenna 44

Features

Ugly

- Switching off the worst antennae did only change the pattern, not the problem

- Imaging with only subrack 0, 1, or 2 had the same result.

- Decrease of problem when RCU lowpass filter cuts off suggests relation with data introduced before the RCU

- Observations with cables only or noise source only yielded noisy map $\Rightarrow$ not strictly additive

- Strong point sources are mapped fine $\Rightarrow$ not strictly multiplicative

- Firmware and software versions in Effelsberg are the same (or so they say)

- Changing RSPDriver.XC_GAIN from 512 to 4096 to 32767 did not change the nature of the problem $\Rightarrow$ possibly not related to high/low FP format.

How to proceed

- Compare flash images of RSP boards to see if they are bitwise identical

- Remove HBA related stuff from RSPDriver config files

- Power down entire system and bring it back online bit-by-bit, checking whatever can be checked at each stage

- Analyze all firmware and software changes since oct 5 by hand

- Go home and get drunk