Radio observatory report and current LOFAR issues

Michiel Brentjens

Radio Observatory
ASTRON, Dwingeloo, The Netherlands

LOFAR Status Meeting 20091111

ASTRON

Outline

ASTRON

Observatory status

- CS030, CS021, CS006 not connected this week
- RS503 used for station calibration observations
- X/Y phase difference of 180 degrees on CS302 LBA
- No known electric fences at this moment
- list nodes are being phased out. All data recording on lsexxx nodes from now on
- lifs nodes will be phased out by November 30
- Estimated life time of observations on lse001–lse003: 6–8 weeks

ASTRON

Observations

SAS/MAC	various experiments
TBB	various experiments
Station stability & cal	continuously cycling through all stations
observation181	L2009_15696 PSRB1937+21 HBA (very good)
observation178	L2009_15697 Tau A HBA (very good)
observation182	L2009_15753 PSRB1937+21 HBA (bad: remote stations did not switch to 200 MHz clock)
observation180	L2009_15758 Tau A LBA (very good)

ASTRON

Outline

ASTRON

Bug list (SOLVED)

- HBAs take minutes to reach full sensitivity (Henri Meulman)
- Writing to new storage abysmally slow for cross correlation products (Jan David Mol)
- SAS/MAC and/or beamctl do not always switch RCU mode correctly (Ruud Overeem)

ASTRON

Bug list ((almost) EXPLAINED)

- Timestamps of LofarStMan are beginning of integration, not middle.
- Signal paths of even RCUs can jump between a high and low state (LBL/LBH switch broken (by ESD?)). New RCU: ESD diode, and no trafo's. Needs more research. Switches are of same type as faulty HBA delay boards. Why only even RCUs: unexplained.
- Phase jumps in waveform generator test at 200 MHz clock (Eric Kooistra, Brentjens) Test observation in queue.
- Non-hermiticity in ACM blocks of intra-RSP board visibilities in waveform generator tests (Overeem, Kooistra, will be fixed in RSPDriver)
- HBA AC oscillations (Wijnholds)

ASTRON

Bug list (OPEN)

- Discrete jumps in HBA power and RMS
- Occasional timestamp jumps of 1 in CS302/RSP0 data sent to CEP. Due to CRC errors? (Kooistra, Romein)
- Steps in delay w.r.t. Nancay
- TP variations/ionospheric absorption (Ger de Bruyn)
- AC oscillations Pandey (nobody working on this)
- AC dips (Michiel Brentjens, PSR group. Useful data taken in second psr busy week)

ASTRON

Outline

ASTRON

Slow HBA sensitivity increase at startup

Discovery and solution

- Two weeks ago HBA production stop due to defective test setup: found slow gain rise in lab tests
- Cause: no leakage path for DC charge on delay lines to ground. Charge leaks through switches, which take a long time
- Solution: future front ends have resistor from delay line to GND
- However, about 25 000 front ends already produced or even installed.

ASTRON

Already produced front-ends

Not possible now

- Put resistors on boards in field (cannot solder through water-proofing coating)
- Replace boards in field with boards that do have the resistor (Can our directors consider this?)

ASTRON

Already produced front-ends

Possible now

- Wait about 15 minutes to "warm up" the frontends before starting the observations.
- For fast switching observations that switch between LBA and HBA mode it must be made possible to switch on the bias voltages of LBA and HBA simultaneously. The RCU can be switched from mode to mode leaving the power of the LBA and HBA antennas on. This is always better to do to overcome warning up and cooling down effects during the observations.
- ...

ASTRON

Outline

ASTRON

Observation queue

- Polarization busy week observations
- Station calibration observations

ASTRON