EVN TOG Meeting

MPIfR, Effelsberg, Germany,

4th December 2009

Local Arrangements and Opening Remarks

The EVN Technical & Operations Group (TOG) held a meeting on 4th December 2009 at the Effelsberg radio telescope, Germany. Approximately 40 people attended the meeting. Station manager Alex Kraus welcomed the participants. Uwe Bach and Walter Alef outlined the local arrangements.

Reports and presentations from the meeting are available online at:
http://www.radionet-eu.org/fp7wiki/doku.php?id=na:engineering:ew:2ndtog

1. **Approval & last minute additions to Agenda**

   The agenda was approved with the addition of Alexander Neidhardt's (FESG) presentation under point 7, Field System status and new features.

2. **Review of Action Items from last meeting**

   Alef to ask Bachiller if Directors can donate money to purchase spare Mark 5 backplanes, and any other spare parts if needed.

   Open. They have been asked but the result from the last executive meeting at Jordrell Bank is not known.

   JIVE to investigate whether their version of the Mark5 software could be used also in production at the stations.

   Done. Harro Verkouter at JIVE has written a script that will allow an operator to switch between disk & e-VLBI operations on the Mark5. The script should be tested in upcoming e-VLBI sessions. So far, only Lindqvist, Onsala, has tested the script. If adopted, it would allow an e-VLBI project to be scheduled within a normal session.

   Alef to inform the CBD about the dynamical scheduling project. Small to inform Alef before the next CBD meeting.

   Done.

   Gunn and Lindqvist to invent something that stations can easier access calibration data.

Done. A script has been written by de Vicente, Yebes, in collaboration with Lindqvist, Onsala. The final version will be placed at the TOG wiki-page.

Alef to discuss with Tucari about dBBC acceptance test.

Open.

Stations to think of smooth switch over to dBBC: Build up 2nd system in parallel instead of upgrading/replacing the old.

Open.

Lindqvist to send information to telescope friends about what they should enter in the RFI CRAF database, when it is ready.

Done. Lindqvist have informed the TOG about the database. The friends have been asked to test and suggest improvements. It is now up to the stations to keep the information in the database up to date.

Action Item: All friends to enter RFI-events in the RFI data base.

Someone from EVN and Walker to incorporate frequency agility information in SCHED.

Open. Friso Olnon is the SCHED responsible person at JIVE.

Campbell to invent something to produce phasecal plots at JIVE.

Superseded. A possibility would be to implement phasecal extraction in the DDBC using the NRAO firmware, see below.

Ruszczyk to make sure that Haystack Web pages containing recommended Mark5A software/firmware are updated.

Done.

Ruszczyk to contact W. Brisken to investigate how NRAO handles the Mark5A 'communication problem'. This refers to the Mark 5 having a tendency to be slow responding to requests.

Open.

3. **Reliability/Performance of the EVN**

Yang presented the Reliability and Performance report. The detailed report is available on the web.

Some stations have imperfect sampler statistics. It should be checked and corrected before the session using the FS samplestat procedure. The ftp-fringe tests continue to be very useful for the stations. However, it is important that all stations, in particular

JBO, communicate with JIVE via Skype during the ftp-test. The meeting discussed if 6 hours is necessary for a NME. The feeling was that still is the case. The meeting discussed extending the NMEs to higher bitrates.

Action Item: Szomoru to investigate if/how the number of ftp-tests could be increased, e.g., one before each user experiment.

Action Item: Alef to contact Garrington, emphasizing the need of having JBO personal present via Skype during ftp-fringe tests.

Decision: The meeting decided to upgrade NME/ftp test to 512 Mbps.

4. **Amplitude Calibration**

Yang presented the Amplitude Calibration report. The detailed report is available on the web.

The calibration accuracy continues to stay at an acceptable level with some exceptions, see the report for details. A particular problem is K-band and some stations (Nt, Ys, Ro, Jb, & Cm) have not delivered opacity-free gain curves. Some stations are also late to send their logs. It should be done directly after the experiment has ended. Yang notes that we should pay attention to the BBCs with low (<0.8x) correlation amplitude in the ftp-fringe tests. The meeting discussed continuous calibration with the DBBC and the prospect of deliver even better calibration. In the next release of the FS it will be possible to enter separate receiver temperatures for L and R in the rxg-file.

Action Item: All friends should use Burgess script lgput (or something similar) to send the log directly to vlbeer after the experiment has ended.

Action Item: The Russians stations should deliver gaincurve, DPFU and Tcal at all their observing frequencies as soon as possible.

5. **Digital BBC status**

Tuccari summarized the status of the DBBC-project. The DBBC hardware is ready (except for the 10 Gbit Interface). The digital down-converter firmware has been re-written. The polyphase filterbank firmware was tested successfully at Haystack last May. Wagner, Metsähovi, will develop firmware for the interface between the DBBC and the Mark 5C. The original control software, mostly written by Buttaccio, runs under Windows. In order to avoid licensing problems and to integrate it into the Field System it has to be migrated to Linux. Graham is porting the Windows software to Linux so that it can be called from the Field System. The aim is to be able to control the DBBC for the planned tests in the near future. At the same time Rottmann is working on control software for the DBBC which is based on the IDL2RPC software.

The DBBC hardware is being replicated by HAT-Lab. At the moment 7 units are in production.

6. Report from regular EVN-US telecons

Graham reported on the last EVN-US telecon on October 26, see report online for details. The meeting discussed the 12 TB disk pack problems: it is not possible to read back data over 8 TB. The next SDK-version (9.x) from Conduant will fix this according to Ruszcsyk, see below.

7. Data acquisition system for 4 Gbit/s, wide IFs EVN status

A subset of the EVN is ready to make test observations at 4 Gbps as soon as the hardware (Mark5C+DDBC) is ready.

8. e-VLBI status

Szomoru summarized the e-VLBI status. The presentation is available online. The EXPReS-project is done. Final period report has been written and submitted. The final period review took place in Brussels, November 18 and responses were very positive. Words like "impressive" were used. A follow-up proposal to EXPReS, aiming below 4 M€ has been submitted on Novenber 24. The proposed project is called NEXPReS (**N**ovel **EX**plorations **P**ushing **R**obust **e**-VLBI **S**ervices). Szomoru also summarized the currents status of the next generation EVN correlator and the Unibord project which is a JRA in RadioNet FP7 led by JIVE. A bare-bone correlator is expected at the end of 2010.

The meeting discussed future e-VLBI sessions and the possibility of having e.g. fewer but longer sessions. No decisions were taken.

9. Field System, status and new features

Neidhardt gave a demonstration of his real-time control system. The detailed report is available on the web. See also his presentation from the TOG-meeting in Bologna.

Alef reported on the Field System based on Himwich report to the CBD-meeting in November 2009. The next release is expected to support:

- Trec temperature for both polarizations
- IDL2RPC based remote interface
- IDL2RCP based DBBC communication
- New python based gnplt
- Support for changing receiver files on the fly

Decision: The meeting discussed and decided to rename schedule vex files from .skd to .vex

de Vicente presented a very nice Java application written by Laura Barbas and Rubén Bolaño at the OAN in Yebes which displays in real time relevant information from a FS log file, see figure below. It was suggested that scripts such as this could be put on the TOG-wiki page.
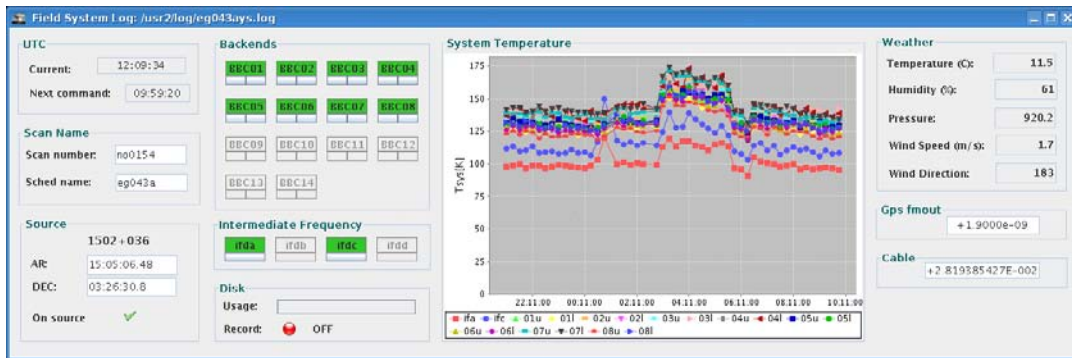
10. Mark 5

Ruszcsyk presented the Mark5 and RDBE status. The detailed report is given online.

The recommended OS for all Mark5's is Debian Etch (kernel 2.6.18). Mark 5 and Conduant software can be found on: http://www.haystack.edu/tech/vlbi/mark5/notices.html. Conduant no longer supports bugs related to PATA drives. Solid state drive may be a solution for operation at high altitudes, see Haystack Memo 80, http://www.haystack.mit.edu/tech/vlbi/mark5/mark5_memos/080.pdf. Progress on the Mark 5C system was reported. Mark 5C software (version 1.0) is expected to be released in March 2010. It will have full support of Non-Bank Mode operation (4 Gbps, VDIF). One of the main features is that there is a new User Directory Structure; see also forthcoming Haystack Memo 81. The ROACH Digital Back End will be tested early 2010. Not clear when SDK 9.x will be released by Conduant, see also point 6.

Action item: Ruszcsyk will investigate when SDK 9.x will be released.

Since there seems to be move to support only the Amazon-card Alef concluded that stations with an old StreamStor-card should upgrade.

Alef reported on the disk inventory, see online report for details. Most stations, but not all, have reached 150 TB.

Campbell reported on the disk throughput at JIVE. The report is given online. EVN stations pay the shipments both ways. The meeting discussed alternatives to this. For the close EVN stations the typical cost is 25-35 €per pack. For stations such as Sh, Ur and Hh it is higher, 40-100 €per pack. The meeting decided not to change the current system.

Action Item: Stations to inform Tenkink at JIVE of preferred shipper.

The meeting discussed phasecal extraction with the Mark 5B. There are no plans of implementing that according to Haystack due to lack of manpower. A possibility would be to implement phasecal extraction in the DDBC using the NRAO firmware.

Brisken reported on the status of the DiFX software correlator and the control system for the upgrade of the VLBA. Romney noted that NRAO also was involved in the

development of the ROACH. No EVN station present at the meeting plans to purchase ROACH-boards, one possibility is JBO though.

The meeting discussed the problems with the TRACK-database.

Action Item: Stations should summarize TRACK related errors and send to Romney.

11. Sched Developments

Friso Olnon is the responsible person for Sched developments at JIVE. Not clear what he has done so far.

Walker informed the meeting about the Vex2 committee wiki-page, https://safe.nrao.edu/wiki/bin/view/VLBA/Vex2.

12. AOB

The meeting discussed the future of the TOG-wiki. Alef volunteered to host the wiki at MPIfR in Bonn.

13. Time and place of next meeting

Metsähovi Radio Observatory end of June.

14. List of Action Items

1. Alef to ask Kus if Directors can donate money to purchase spare Mark 5 backplanes, and any other spare parts if needed.

2. Ruszczyk to contact W. Brisken to investigate how NRAO handles the Mark5A 'communication problem'. This refers to the Mark 5 having a tendency to be slow responding to requests.

3. Ruszcsyk to investigate when SDK 9.x will be released.

4. Stations to inform Tenkink at JIVE of their preferred shipper.

5. Stations to summarize TRACK related errors and send to Romney.

6. Alef to discuss with Tucari about dBBC acceptance test.

7. Stations to think of smooth switch over to dBBC: Build up 2nd system in parallel instead of upgrading/replacing the old.

8. Olnon (JIVE) and Walker to incorporate frequency agility information in SCHED.

9. All friends to enter RFI-events in the RFI data base.

10. Szomoru to investigate if/how the number of ftp-tests could be increased, e.g., one before each user experiment.

11. Alef to contact Garrington, emphasizing the need of having JBO personal present via Skype during ftp-fringe tests.

12. All friends should use Burgess script lgput (or something similar) to send the log directly to vlbeer after the experiment has ended.

13. The Russians stations should deliver gaincurve, DPFU and Tcal-values at all their observing frequencies as soon as possible.

Summary of "Permanent" Actions/TOG recommendations

SESSION PREPARATION:

Gunn to send email before each session when the final versions of all schedules are ready for download.

All should check that Mk5 modules are placed squarely on a flat surface when received; otherwise connectors are easily damaged when bent 8packs get inserted in Mark 5 units.

All stations should condition disk packs if time permits, especially those which are to be used for 1Gbps recording. If a disk pack is found to be not suitable for 1Gbps recording, the label can be changed to 512 Mbps.

All stations which do both astronomy and geodesy should clearly distinguish between astronomical and geodetic 8packs and ensure there is no "leakage" into the wrong pool, as mixing pools can create problems for scheduling.

Disk packs should be shipped with one European and one US address on covers so they can be easily returned in case a shipment is lost in transit.

DURING SESSIONS:

All stations should look at data regularly with chchk program, use it to locate significant RFI and report the results to Polatidis and CRAF representatives, and use it to check phasecal throughout the session. The chchk program can be run in gaps, or for example on ftp data files.

All stations should monitor Tcal throughout sessions. This can be done by running ANTABFS and plotting the results.

All stations should forward FS error log files to Himwich in the event of a crash, including details of what the FS was doing when the crash occurred.

All stations should try to run the FS diagnostic tests and investigate the results.

All stations should ship disk packs as soon as they are full, at least once per week, following the Bologna rules.

SESSION FEEDBACK:

All stations should look at pipeline results available from the EVN data archive pages at JIVE, in particular amplitude corrections found by selfcal on strong, compact calibrators. JIVE support scientists should include a comment on the quality of amplitude calibration results, especially to indicate cases where a problem may have occurred and the amplitude correction factors are unreliable.

NME calibration files should be made available as early as possible. All stations should look at NME reports sent by JIVE. NMEs should be pipelined as early as possible and email sent to EVNtech when the results are available, to ensure feedback is provided well in advance of the next session.

Stations must aim to produce ANTAB and RXG files within 2 weeks after the end of a session. For eVLBI, RXG files from the previous session can often be used. ANTAB files for eVLBI experiments should be produced as soon as possible as rapid analysis is often a high priority for these experiments. JIVE should inform Alef of any problems, so that Directors can be asked to prioritise calibration if insufficient time is available at stations