

EVN TOG meeting
JIVE, Dwingeloo, the Netherlands
28 January 2011
Minutes from the meeting

Local Arrangements and Opening Remarks

The EVN Technical & Operations Group (TOG) held a meeting on 28th January 2011 at JIVE, the Netherlands. Approximately 30 people attended the meeting. Head of R&D at JIVE, Arpad Szomoru welcomed the participants, on behalf of JIVE director, Huib van Langevelde. No one was present from UK, NRAO, Himwich and the Russian KVASAR stations. Jonathon from Hart was present via web conference.

Presentations from this meeting are at: http://www.mpifr-bonn.mpg.de/div/vlbicor/tog_chair/togreps11/

1) Approval & last minute additions to Agenda

Approved/no last minute additions to Agenda

2) Acceptance of minutes from last meeting

Accepted/ no changes

3) Review of Action Items from last meeting

1) Alef to modify and set up wiki page for the spare parts

Done, no input yet

2) Ruzscczyk to contact W.Brisken to investigate how NRAO handles the Mark5A 'communication problem'

W.Alef: Nothing happened, spoke to A.Whitney, but this is not a problem anymore

3) Ruzscczyk to send email on EVNtech with the explanation of all details how to deal with SDK9

Open

4) Alef to discuss with Tucari about a DBBC acceptance test

W.Alef: Didn't discuss it. Tried to establish tests, 0-baseline test done in the lab, will try to record in Effelsberg with digital and analog in parallel to do comparison in lots of modes.

5) Olnon(JIVE) and Walker to incorporate information on frequency agility in SCHED

Open. F.Olnon since been replaced by D.Small. B.Campbell: This has grown since the last TOG and will continue to grow. As the EVN grows, there are issues with funnier backends not supported in Sched, worrying about DBBCs and 5B stuff with bitstreams. 'Period of evolution for Sched'.

6) All friends to enter RFI-events in the database.

Open. M.Lindqvist: No input yet. W.Alef: Interference getting worse. Please enter persistent RFI in database. Any questions or problems to be directed to M.Lindqvist. Some activity/proposal submitted by RadioNet 3, possibility of a collaboration.

7) Szomoru to investigate if/how the number of ftp-tests could be increased, as a high time priority of

the NEXPRESS

Open. Did not/forgot.

8) All to schedule bigger gaps to allow a proper use of lgput.

Assume done. Gap refers to in between experiments and only Richard Porcas can do that.

9) Stations to use Burgess script lgput (recommendation)

On and Ef use it, works fine most of the time. Ef puts 5seconds delay. W.Alef: Would be good if all stations did that. Please send logs ASAP. B.Campbell: Bad thing if log shows up after disk. Jodrell bank and Noto can be late. But things have gotten better.

10) Alef to report to EVN directors that the Russian operators shall deliver the gain curves, DPFU and get a proper training.

Done. W.Alef: Didn't make it to the meeting, but M. Lindqvist went. M. Lindqvist: gave recommendation, advised them to attend TOW & TOG. Didn't help anything.

11) JIVE to send to Alef a list of what Russian stations shall do for participating in EVN observations properly

B.Campbell: Currently we have to pass the users special edits in the key file for the Russian stations. First time for them doing dual-pol X band in the next session. W.Alef: Should point out unsatisfactory situation, and keep reminding them they should follow rules of EVN; will stay a subject at the next CBD meeting.

12) Stations to keep BBC in good shape until DBBC will come (Recommendation)

Open.

13) Stations to send updated information for the SCHED catalogue

Open. Send info to B.Campbell or D.Small.

14) Alef to schedule a monthly telecon between the EVN and VLBA to clarify interoperability issues.

W.Alef: Didn't schedule it monthly, but had at least 1 before this meeting. Need to upload minutes. Want to schedule them more regularly.

15) Stations to upgrade SDK8.2 as soon as they are back home, when 8.3 is released.

W.Alef: 8.2 is the standard, what everyone should be using. 8.3 is available from Chet and so is a secret 9.0 version. Difference between 8.2 and 8.3 seems to be better handling of broken modules which is more relevant for the correlator. Some stations still not using 8.2, i.e. Torun. Need to talk about SDK9.

16) JIVE to inform Alef about the retired disks for keeping the inventory up to date.

M.Leeuwinga: Haven't done that, will get Alef the list/inventory.

17) Stations to decide what to do with their broken disk modules

W.Alef: Do stations have spares? Maybe they can be pooled together. No objection to combining disks of broken modules to make new parts.

18) Alef to send email to the owner of broken disk modules for a decision of their future disposition.

Done

19) Stations to update the page of the disk inventory. They should contact Alef to gain access.

W.Alef: Some stations did it, sent email, feedback from a few stations, seems to work. When you buy or remove disks, need to inform W.Alef. Inventory needs to be kept up to date.

20) Alef to clarify with JIVE (email) the sending of the data instead of disks to Bonn.

Works/Solved

21) Alef to ask CBD for a constant allocation of a budget for the new disks

Done by M.Lindqvist

22) Stations to put labels on the disk modules.

Refers to Onsala. Please use a human readable label!

23) Stations to indicate the disk space on new modules

When stations buy new modules or make new modules, communicate proper size to W.Alef so it can be corrected in the TRACK database.

24) Stations to clean up not used disks and update the TRACK system

Done. A number of stations have done it

25) Alef and Lindqvist to discuss with directors a possibility of the next TOG in Arecibo.

Agreed! 15-20 people. RadioNet will cover most expenses.

4) Reliability/Performance of the EVN

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

Highlights include addition of Sv since 3/2010, Hh is back in operation; first Hh eVLBI fringes at 1 Gbps (RL002), Ys has a new cooled C-Band receiver, with the TSYS dropping to 35K, and the software correlator produced first science output (EV018A).

Features of KVASAR stations include internal RFI at upper 4IFs (> 5GHz) at standard C-Band for Sv and low correlation amplitudes in all LCP channels of Zc (which could be a feature of the receiver), also strong RFI in same channels in session 2/2010 that improved in session 3/2010. Bd has an unusual bandpass in lower sideband IFs.

Session 3 had lots of problems: Ur and Sh were out due to lunar observations, Nt was broken, Jb1 was replaced with Jb2, Jb2 suffered a receiver casualty so no Jb2 in C-Band user experiments, Ar had no fringes in GV020D and Robledo had low correlation amplitudes which is being investigated. Furthermore Ef lost some hours due to oil leakage, On had bad weather and their new wide band system has problems with RFI (better in latest session). Also Sv missed last 2 experiments as it didn't get disk packs in time and no data for Tr recorded in ED030B. Thus, most EVN experiments suffered from significant sensitivity loss.

Sampler Statistics (SS) are being monitored during ftp fringe tests since session 1/2010. KVASAR stations SS are generally a bit high, Wb TADUMAX has a slightly higher DC component and Tr has low SS that vary from experiment to experiment. J. Quick suggested that it could be due to reflections in the connections between the BBCs and the formatter.

S. Muehle gave a short presentation on strong unstable RFI spikes in ER025 (K-Band) which led to a complete loss in JB. It started with a disk change but then there were 3 more disk changes and the RFI stayed bad over the weekend. The following L-Band was OK.

W.Alef : Should discuss dissatisfaction with Jb at CBD.

5) Amplitude Calibration

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

In session 2:

Cm and Jb had median amplitude error higher than 10%,

Zc and Bd did not provide Tsys data.

Jb didn't send feedback for session 3 (short of manpower), no opacity gain curve for Jb at 22GHz.

Ur had problems with 2 BBCs (problems with analog system led to low correlation amplitudes).

Wb had calibration data missing for weak sources. G.Kuper stated that software was being developed to fix/improve this. Signal was not properly attenuated in N10M2, problem solved after session 2.

Ef had problems with 2 BBCs that are now fixed. U.Bach stated that the output of antabfs gives large scatter that has to be edited at the station.

Mc had a noisy bandpass in EB045B (session 2/2010), the problem persists. Probably RFI? A.Orlati would like time based information of the wiggles. P. de Vicente suggested that perhaps it could be a standing wave? Problem needs to be investigated.

On had small scale variation (station-dependent) which was affected by wind. Being investigated, don't know if it can be solved.

Opacity corrected gain curves not available at Nt, Ys (available but not included in log yet), Ro (can be provided).

IF-dependent amplitude offsets after calibration (eg. Jb in N10L3), i.e. calibration makes the amplitudes worse for some stations.

ACTION: W.Alef would like a summary/overview of what stations get better or worse after calibration.

6) Digital BBC

W.Alef gave the summary of the production status. Development of the hardware has been finished since some time (except for the Ethernet board). 8 units have already been sold and 3 more have been ordered. Firmware mostly written by G.Tuccari (and a few volunteers), thus crunch for manpower.

G.Tuccari gave the presentation on DBBC operation. The presentation is on the web. It was suggested by several that it was a good idea to have documentation/cookbook at some point from Gino, including information such as input range for ADB (that stations need), recipe for installation etc.

Compatibility issue with polyphase filterband (DBBC and RDBE), since there is no tuning, all stations need to have the same LO so bands overlap exactly for 2Gbps.

G. Tuccari also discussed the software on control computer of DBBC; there are three files: Control software (load configuration/to manage system), DBBC configuration file (collects info about hardware) and the configuration file that is the firmware for that system/implementation. Available as beta version for Windows. Linux version not being developed anymore.

G. Tuccari also demonstrated a test program to calibrate the system to minimize internal noise. Running the procedure, one gets a file that can be plotted which shows the noise of the system for each ADB unit as a function of a phase parameter. For maximum sensitivity of the system, the number to be picked is the one that gives the lowest noise (there should be minimum) and can be used directly in the

control software. P de Vicente noted that his own plots looked completely different. G. Tuccari also commented that while there is not much history to comment on the stability of the plot, the system in Italy has been stable so far.

The continuous calibration noise diode activation at 80 Hz has also been implemented, communication with the FILA10G still needs to be developed.

DBBC Test Results were presented by A. Bertarini. Tests with DBBC were successfully done with Ef, Ys and Wz, with S/X receiver, correlator was Bonn and Ef and Wz used analog and digital in parallel. DBBCs work but some remaining issues, mostly (80%) due to human error in manual settings. Also mean amplitude and SNR was less (~30%) in digital which could be a calibration issue as G.Tuccari discussed in his talk. Would like more testing with all setups, for astro and geo., need documentation from G. Tuccari, need FS Control to avoid manual settings.

Future Plans include RadioNet 3 proposal submitted by Gino for next generation backend with 4 GHz Samplers and the appropriate FPGA processing chip (backwards compatible). Would only start middle of next year if RadioNet gets money.

7) e-VLBI status

Presented by A.Szomoru. Detailed presentation on the web.

Have 2 more Mark5C units and thanks to Bonn have additional functional SUs.

Native Mark5B (recording on B and playing back on B), disk based, works fine, Native Mark5B e-based tested/works but 2 versions of correlator control code and 2 versions of Mark 5 control code which offers a 'matrix of possibilities', but soon this needs to be simplified. Ongoing. Also need to test Mark5B+ with e -VLBI.

Control code completely rewritten. New features include version control, functionality is not very different but there are also problems with exporting/building binaries (library issues?) and some performance issues. *Ongoing*.

Sh still limited to 256 Mbps, but 1024 Mbps from HongKong on is fine. Hh is back at 1024 Mbps.

Still have Mark 4 correlator, software correlator also being used more and more especially for pulsar experiments, planning to double hardware. Hope to/should have UNIBOARD fringes before the end of the project. Production on board, expect to have 8 boards at the end of February. Funds for APERTIF correlator (80 UNIBOARDS) and on-station LOFAR correlator based on UNIBOARD.

A number of service and research activities with NEXPRESS (mostly led at JIVE). Things are looking good in Finland. Job positions at ASTRON/JIVE however have still not been filled.

8) 4 Gbps (and 2 Gbps)

W.Alef: Polyphase filter bands setup allows 2Gbps recording. As mentioned before, no tunability with Polyphase filter bands, so LO's need to match so Nyquist zones overlap. Can in principle correlate the first against the second Nyquist zone if LO offset by 512MHz. Have to understand the limitations at EVN telescopes in combination with VLBA.

M.Lindqvist: Please fill in the table of frequency ranges on the wiki page. At C-Band, have a range with our receivers from 4600-5100 MHz (5 stations can currently cover that) for which we could test 4 Gbps mode.

W.Alef: Before we start testing 2Gbps mode, we need to get information together, i.e what LO's we can have, what bandwidths are available, then we can find regions where things overlap. Where LO's don't overlap, need mixers. Need to get 2Gbps tests going as soon as possible at least with 3 telescopes.

It was decided that testing be done with X-Band first.

ACTION: A. Whitney to send information about A. Roger's Updown Converter to match bandpasses (with regards to issue of mis-matched IFs) to W.Alef.

9) Sched Developments

This was summarized by B.Campbell.

Sched 9.4 has been distributed. Beta version has been floating around since September.

Interesting features for users include: geodetic observing automation correcting for the troposphere, prestart at 5s (PIs probably want to set prestart=0 as this affects gaps).

Also opens possibility of DBBC support.

In the near future, the aim is to have multiple correlation centers defined in key file.

JIVE aim to get bitstream section as opposed to just TRACK, in vex-format but still controversial. Currently JIVE has a 'home grown solution.' Vex 2 definitions still under review. Currently, a proposal submitted by W.Brisken as an alternative to the bitstream section but details are not known. Ongoing topic.

C.Walker now officially 50% retired.

10) Field System, status and new features (Himwich)

Ed was not present, so this point was skipped.

11) NRAO & Haystack status report

A. Whitney: Chet Ruszczyck mostly working on Mark5C, but he is currently away. In summary, everything is working fine at 2 Gbps, next step is 4 Gbps (optimistic that it will work). Timescale for 4 Gbps on Mark 5C is estimated at 1-2 months.

W.Alef reported on the latest EVN-NRAO telecon on 21st December.

- RBDE hardware ready, well tested at 2x512MHz IF bandwidth
- NRAO wants to use Polyphase filter bands firmware with 16x32MHz subbands on VLBA, already installed on 5 telescopes (aim for 2 Gbps)
- goal is 4 Gbps, not sure when.
- digital downconverter of RBDE is not yet ready, but progress made.
- NRAO expects to move to the new system in summer 2011
- Digital+analog will be used in parallel, but not at all stations (not enough Mark5s)
- if only digital PFB available, there may be compatibility issues
- production of RBDE taken over by firm DIGICOR

- Phasing up the eVLA is in progress
- Plan to spend big money on new disks
- All these upgrades at the same time may cause compatibility issues
- 3 Versions of RDBE, 2 developed at Haystack, 1 at NRAO.
- Want to do tests with VLBA and EVN backends for polyphase filter bank; when the digital down convertor is ready, more complete testing

A.Whitney reported on the Xcube data system. The characteristics are similar to those of the Mark5C but has off the shelf hardware, will support 8 Gbps and is the first system that handles slow and/or failed disks (causes load to shift to good disks). The presentation is available on the web.

12) Mark 5

W.Alef: Chet Ruszczyck not present at meeting, but please send any questions via email to him. Perhaps gather few questions to email him and distribute them to the entire TOG group.

Upgrade to SDK9 first at correlators, then at stations. B.Campbell also noted that KVASAR stations have to be accommodated.

W.Alef: Have to find out is there a consistent set of SDK9 for Mark5A/B that we could test?

ACTION: Arrange small telecon next week with Chet and including A.Szomoru, B.Campbell, W.Brisken and W.Alef to get the SDK9 related information.

EVN Mark 5A program: in progress and to be revisited at the next TOG.

No Mark5 problems encountered during last session.

Not much change with disk inventory and purchase status except at Bonn, Bonn decided not to send anything less than 4 TB.

Should replace oldest disks with newer disks (1 replaces 8), change VSN (SATA modules should have +) inform W.Alef and modify it in TRACK.

ACTION: To inform directors at next CBD meeting to put aside a few 1000 euros for new modules/new disks, old modules have single disks which fail more easily.

B.Campbell: no problems with disk logistics. Recently, a bunch of globals going to Socorro, but it hasn't caused a problem with disk distribution; at some point could become an issue.

Has been a leakage of EVN packs, can't completely trust whats in TRACK for completeness.

Let JIVE know if stations want to upgrade their packs, so they get their own packs back.

ACTION: On wants their packs for upgrades

Mark 5 logistics: module labeling

13) Plans for next TOG at Arcibo

W.Alef: Planned for between 15 Aug-30 Sept, but as early as possible because of hurricane season. More than one day, possibility of a workshop. Suggestions for a workshop?

→ M.Lindqvist: how to deliver better data to users

- W.Alef: maybe the users can be emailed about what they want from us and they can think about it
- Z.Paragi/S.Muehle: any info/explanation of pipeline plots or fringe test plots
- W.Alef: geodesy presentation: eg. IVS2010 (Allessandra?)
- P.de.Vicente: show what science can be done with VLBI
- M.Lindqvist: initial review of EVN2015 document
- W.Alef: ask an NRAO representative to give a presentation
- A.Orlati and Z.Paragi: 22GHz K-Band calibration
- A.Szomoru: how all these development projects leads to what users want
- G.Kuper: how to interpret ftp plots
- B.Campbell: any plans for a DBBC workshop for Arecibo?
- U.Bach: more lengthy discussion on DBBC calibration etc.
- M.Lindqvist: concerns from users at EVN meeting
- A.Walter: mm-VLBI, calibration and atmospheric issues

W.Alef: Would it be possible for someone from Haystack to come to Arecibo? Open. Date of meeting for TOG 25th-30th August (28th -30th better?), 1-2 people per observatory, 3 from JIVE.

ACTION: Inquire about fares and connections on these days within 2 weeks

ACTION: Tapasi to provide an estimate of accommodation cost (25 people on site)

ACTION: Alef to DRAFT a program for Arecibo. All to give feedback

14) Topics for TOW meeting

Invitation by A.Whitney, seconded/highly encouraged by W.Alef.

Suggestions for astronomical topics

- DBBCs (suggestion from all) -> someone from NRAO covers RDBE
- teach calibration (single dish?), and extending calibration issues to high frequencies
- Field System
- radio astronomical science overview
- * calibration seems to be the preferred topic

ACTION: JIVE to send someone to teach at TOW

15) AOB

M.Leeuwinga would like remote access to station Mark 5a's. No objection to this.

ACTION: A.Szomoru will provide a checklist for stations, what JIVE would like them to check/do before the start of experiments.

D.Small would like to move the log monitoring script to /etc/rc.d so that it automatically starts on reboot.

P.Casaro: Money has been allocated; if bureaucracy is fine, Nt should be up by the end of the year.

B.Campbell/W.Alef: Are there discrepancies between schedules On-Source information and On-Source information from the logs? If so, we need to ask the question is the information in the schedule catalog right or is the telescope too pessimistic about when the telescope is on source. Would be good to get updated information on slew parameters.

16) Please provide written Station and Correlator reports by January 25th!

Action Items

1. Rusczyk to send email on EVNtech with the explanation of all details how to deal with SDK9
2. Small (JIVE) and Walker to incorporate information on frequency agility in SCHED
3. All friends to enter RFI-events in the database.
4. Szomoru to investigate if/how the number of ftp-tests could be increased, as a high time priority of the NEXPRES
5. Stations to send updated information for the SCHED catalogue
6. Alef to schedule a monthly telecon between the EVN and VLBA to clarify interoperability issues.
7. JIVE to inform Alef about the retired disks for keeping the inventory up to date.
8. Stations to update the page of the disk inventory. They should contact Alef to gain access.
9. Stations to indicate the disk space on new modules. Email to W.Alef.
10. W.Alef would like a summary/overview of what stations get better or worse after calibration.
11. A. Whitney to send information about A. Roger's Updown Converter to match bandpasses (with regards to issue of mis-matched IFs) to W.Alef.
12. Arrange small telecon next week with Chet and including A.Szomoru, B.Campbell, W.Brisken and W.Alef to get the SDK9 related information.
13. To inform directors at next CBD meeting to put aside a few 1000 euros for new modules/new disks, old modules have single disks which fail more easily.
14. On wants their old disk packs for upgrades
15. Inquire about fares and connections on these days within 2 weeks
16. Tapasi to provide an estimate of accommodation cost (25 people on site)
17. Alef to DRAFT a program for Arecibo. All to give feedback
18. JIVE to send someone to teach at TOW