

# EVN Technical and Operations Group Meeting

By Zoom teleconference (COVID-19), Hosted by MPIfR/Bonn,  
Nov 24 2020, 09:30 CET

## Minutes

### Participants:

The number of online participants peaked at 47 (28 registered on the Indico event page<sup>1</sup>), from 15 countries and 21 organizations/stations. Screenshots of the participants list are attached at the end of the minutes.

### Agenda:

The agenda is published online<sup>2</sup> on the Bonn RadioNet wiki.

#### 1. Local Arrangements/Opening Remarks (Bach (chair))

Bach welcomes everyone to the teleconference. No local arrangements necessary.

#### 2. Approval & last-minute additions to Agenda (all)

No additions to the shortened agenda were suggested and the agenda was approved.

#### 3. Acceptance of minutes from last meeting (all)

Minutes of the previous zTOG, online, May 5<sup>th</sup> 2020, were approved without comments.

#### 4. Review of Action Items from last meeting (all)

##### 1. **All:** Beam-maps at L- and C-band and send them to Keimpema

[https://deki.mpifr-bonn.mpg.de/Working\\_Groups/EVN\\_TOG/Beam\\_maps](https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/Beam_maps)

**Action Bach:** move to permanent action items list

Not done yet, action remains

**+Action Bach** investigate use of HOLOG for creating beam maps

Bach checked HOLOG FieldSystem procedure, does not work completely, requires further investigation. Action remains.

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<sup>1</sup> <https://events.mpifr-bonn.mpg.de/indico/event/179/registration/registrants>

<sup>2</sup> [https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:sustainability:tog:2020\\_11:tog-agenda-2020-11](https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:sustainability:tog:2020_11:tog-agenda-2020-11)

2. **All:** Upgrade to SDK9.4 first at the correlators then at the stations.  
**Action** done. Remove action item.
3. **All:** 80 Hz continuous calibration. Update the table on the wiki<sup>3</sup>  
It now has continuous calibration for some observing bands  
**Action** remains
4. **Vicente:** find `atm` binary or preferably source code for distribution, that can be used to calculate opacity from FS weather information and inject it into the log.  
Vicente not present at zTOG. Himwich occupied with FSL10 and other developments.  
**Action** remains
5. **Bach, Rottmann:** look at EHT station set-up document and see if it could be modified for use in the EVN  
The document looks applicable but of course some changes required, e.g. remove sections on equipment not in use in EVN  
**Action** remains
6. **Bach:** contact subgroup of interested/experts and to investigate how  $T_{\text{sys}}$  and opacity are determined at K band and higher at stations to improve K-band amplitude calibration  
Progressing, but not done  
**Action** remains
7. **Rottmann, Leeuwinga:** send emails to owners of 2 – 4 TB modules and ask what should be done with them  
Feiler: this should be on our plate too. Done. Rottman/Leeuwinga contacted owners. Rottmann: disks will be dumped. Leeuwinga: made inventory @JIVE: 260 packs < 4 TB, of which 130 still marked “in use” (test experiments, uncorrelated RadioAstron data). Interested parties for the remaining 130 small packs / disks contact Leeuwinga.  
**Action** remove action item

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<sup>3</sup> [https://deki.mpifr-bonn.mpg.de/Working\\_Groups/EVN\\_TOG/Continuous\\_calibration](https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/Continuous_calibration)

8. **Rottmann:** set up meeting with Verkouter, Kettenis, Alef, Rottmann and Wagner, to discuss the best format of VDIF packets.  
Not done but fixed anyway: was issue in DiFX reading multithread VDIF data, which was fixed in the software.  
**Action** remove action item
  
9. **Marcote, Bach, Campbell:** better impact reporting discussion and/or implementation  
Discussion started, continuing until day before this zTOG  
**Action** item remains
  
10. **Bach:** invite group of interested/experts for working on DBBC3 support in the Field System  
In fact, this topic was widened. Now that the FS is open sourced on GitHub, contributing to general FS developments is easier. Szomoru's list of expertise, compiled for the technical roadmap, is overlapping with this and may be used for recruiting experts.  
**Action** remove action item

## 5. Review of Permanent Action Items (all)

No changes to the list of Permanent\_Action\_Items<sup>4</sup> at this time. The new EVN website has been checked and most content has been migrated from the old to the new.

**New Action Bach** Review the list of Permanent Action Items

## 6. Reliability/Performance of the EVN

**Bayandina** presents a report on the EVN reliability/performance<sup>5</sup> for the last sessions.

Discussion points:

**Bayandina** Raises the question of incorporating weather information in the log in the presentation.

**Campbell** We see variation of number-of-parameters and even order of parameters in the `wx` command.

**Bach/Himwich** `wx` fieldsystem command only deals with specific (ancient) metserver, so all other `wx` log reporting is done by FS station-specific code.

**Campbell** This is driven by high-frequency observations so maybe should tie in with **Action Item 4**

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<sup>4</sup> [https://deki.mpifr-bonn.mpg.de/Working\\_Groups/EVN\\_TOG/Permanent\\_Action\\_Items](https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/Permanent_Action_Items)

<sup>5</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:tog2020\\_2\\_evn\\_performance\\_reliability.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:tog2020_2_evn_performance_reliability.pdf)

**Maccaferri** Mc, Nt did not participate in session II/2020 because of COVID-19 (as reported in **Bayandina's** report) but due to mechanical repairs.

**Campbell:** All cases where COVID-19 was direct or indirect cause were grouped under COVID-19; Nt, Mc repairs could not take place due to COVID-19 restrictions, so indirectly caused loss of observation.

**Bach** What are the empty cells in the ANTAB present at JIVE delay table?

**Cambell/Bayandina** The station did not observe there, which should have been made clearer.

In the Zoom Chat side discussions took place:

**Jun Yang : @Gabriele** It seems that SRT has the more problems (clock jumps) with FILA10G/DBBC2. Are you going to replace your Fila10g board in the near future?

**Gabriele Surcis (Sr) : @Jun** We have changed the FilaOUT of the DBBC2 after the K band NME. We still have some trouble with the synchronization of the Fila10G, after some days (randomly) it stops to be synchronized (actually the time in fmset looks frozen). We should have the DBBC3 by the end of 2021 and in meantime we are considering different possible solution for the Fila10G (we have it inside the DBBC2).

**Javier Gonzalez : @Olga** Do the LCP amplitude drops at Yebes appear at any band?

**Benito Marcote : @Javier** The two reported experiments were 6 and 5 cm (but we are probably still not completely sure it hasn't happened in other observations)

**Javier Gonzalez : @Benito** Thanks, we know the C band receiver has problems in the LCP channel, so we are working in a new receiver. But I have also noticed problems with particular IF-C channel in the DBBC2, which reports lots of NaN values for Tpi

## 7. Amplitude Calibration

**Bach** presents slides<sup>6</sup>. Ir has joined continuous calibration capable in some band(s). There are now twelve (12) stations offering continuous calibration in some bands, six (6) in all bands.

## 8. VLBI backends

**Bach** continues presentation from 7. containing DBBC2 and FiLa10G news. v107 beta5 now used for all observations. Small issues remain (see presentation). FiLa10G in Ef can output frame of wrong size when sending VDI threads to different destination in 2 Gbps mode.

**Eldering/Verkouter** Mc FiLa10G output wrong frame in non-split 4 Gbps. See also chat reports under 6. – it seems FiLa10G firmware can lose internal sync.

## 9. Recorders: Mark 5, 6, FlexBuff

**Bach** continues presentation from 8., from the reports some stations have issue with FlexBuff speed?

**Hammargren** We had some failing drives causing this, nothing fundamentally broken.

**Maccafferri** Root disk broke on Mc FlexBuff. After reinstall notice missing bytes in `scan_check`. Apply FlexBuff tuning and installing latest `jive5ab` (3.1) fixed this.

**Bach** On the Mark6 used as FlexBuff at Ef have RAID5, do not lose bytes

## 10. Stations

Presentation **Barbosa**<sup>7</sup> on radio astronomy on the Azores, more specifically potential refurbishing of ex-satcom 32-m dish to radio astronomical site.

**Alef** The secondary-focus BRAND receiver for the Ir 16-m dish could be interesting for stations without astronomical receiver as well.

**Bach** In fact, a design for this type of 32-m satcom dish would benefit several stations (Nz, Ghana).

**Verkouter** and the planned Greek conversion.

**Ulyanov** The Zolochiv dish too; currently use corrugated horn, which is optimized for C-band.

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<sup>6</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:tog\\_2020-11.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:tog_2020-11.pdf)

<sup>7</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:azores\\_engage\\_dbarbosa2020.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:azores_engage_dbarbosa2020.pdf)

## 11. e-VLBI

**Kettenis** presents test results, mechanism, and station requirements for 4 Gbps e-VLBI<sup>8</sup>.

**Kettenis** mentions that some stations occasionally send FiLa10G configuration commands.

**Himwich** Be sure to specify 'no recorder' when DRUDGing

**Quick** Must set rack type to plain 'DBBC' (w/o FiLa10G) but keep fila10g in `equip.ctl`

**Bach** Made parallel recording whilst doing 4 Gbps test. Can check if erroneous frame is present there – can transfer to JIVE if interested in this data.

**Verkouter** The recording would have stopped (as with e-VLBI) since it's the same network reading code in both cases. This certainly hints at an issue in the FiLa10G firmware when thread destination rewriting is active and should be communicated to **Dornbusch/Tuccari**.

## 12. JIVE

Presentation **Verkouter** on Technical operations and R&D at JIVE<sup>9</sup>.

## 13. Technical developments

Continued presentation **Bach** on technical developments.

Media requirements for 4 Gbps observing: 500 TB / station, 250 TB @ JIVE, 250 TB @ station.

**Leeuwinga** Have 17 FlexBuffs @JIVE. Most have already 10 TB disks, so doubling by using 16 TB drives not possible, only few still have 8 TB drives. Doubling the number of servers impacts rack space, power supply and cooling; has been investigated. Playing with ideas to separate CPU from storage using iSCSI or other network protocols.

**Rottmann** Bonn uses 36 disk enclosures, @ 12 TB drives ~ 400 TB / system. Using distributed BeeGFS file system – one big pool of storage. Has advantages.

**Bach** For power consumption the setup (number of disks per enclosure) doesn't matter that much, the disks themselves are the power consumers.

**Recommendation to all** discuss with JIVE before sending equipment

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<sup>8</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:4g-evlbi-tog.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:4g-evlbi-tog.pdf)

<sup>9</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:verkouter-r\\_d.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:verkouter-r_d.pdf)

Configure 4 Gbps mode: WASTRO = 32 x 32 MHz, instead of ASTRO = 16 x 64 MHz, because of 64 MHz filter shape.

**Maccaferri** Mc C-band receiver has only 900 MHz bandwidth; at L-band RFI prohibits wide band observations.

**Bach** 4 Gbps won't be useful at L-band anyway so won't be used there.

DBBC3 status

**Bach** presents Tuccari's slides<sup>10</sup>, who unfortunately could not make it.

v107 firmware completed, in use.

v108 hopefully final version, has improved filter shapes

**Dornbusch** DDCU and DDC have same filter coefficients; v108 has better power consumption characteristics.

**Bach** Likely to be completed by end of 2020?

**Dornbusch** Need a DBBC2 in the lab, which we don't have.

v123 is the VGOS tuneable version

v124 id. but has multicast support in the firmware (as does v125)

v125U is most interesting because of its flexibility – has filters from 128 MHz down to 2 MHz

**Dornbusch** DDCU stability issues were addressed; ran very hot using 128 BBCs. Latest version -20% power consumption. Seems it can do 8 IFs at room temperature (20°C). Initial phase check and setup are faster and more stable. Wz and On tests indicate no issues so far.

**Rottmann** Due to COVID-19 there was more lab time available, allowing a thorough follow-up of reported DBBC3 issues. Turned out to be mostly synchronization issues sharing an underlying cause. A cable guide problem could cause crosstalk on the PCIe bus. All reported problems solved with two modifications.

**Verkouter** Splendid news! Could DBBC3 stations please test this latest firmware soon such that 32 Gbps test plan can be restarted?

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<sup>10</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:dbbc\\_deployment\\_and\\_firmware\\_development\\_november\\_2020.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:dbbc_deployment_and_firmware_development_november_2020.pdf)

## 14. Field System, status and new features

Presentation **Himwich** about current FS status<sup>11</sup>. The `fresh` program has been made for geodetic schedules (download latest & DRUDGes them). The case for astro schedules is more difficult. Currently only downloads; DRUDGing is more involved. Could be implemented if sufficient interest.

Bach shows slide about EVN FieldSystem working group (continued presentation from **13**.)

**Himwich** Now that FS is on GitHub this is a good vehicle to foster cooperation and involvement. Would be great if the `checkdata` script/procedure could extract PCAL data if it's in there.

At this point the first part of the TOG ended. Due to Thanksgiving holiday in the USA and no updates from NRAO, it is suggested to continue on for 15 more minutes and skip the afternoon session. All agree.

**Rottmann** Sampler chips for planned/future BRAND receivers must be ordered now. Now that some stations have agreed and some have said "maybe", the actual order details are being negotiated with the supplier. Deadline for ordering extended to December 19, 2020, but the absolute minimum order size was raised by the supplier to 30 items, in a single, combined order, i.e. stations cannot place individual orders.

**Alef** If these sampler chips are not bought and the design must be adapted to accommodate future chips, staff that can do this might not be available anymore.

Technology roadmap:

**Bach** presents EVN technology roadmap recommendations, as compiled by **Szomoru**. If possible, take action, contact director to start feasible improvements at your station in accordance with these recommendations.

Based on current COVID-19 situation, a tentative date, late April 2021, for the next zTOG has been set.

The TOG ended at 13:20 CET, 20 minutes past schedule.

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<sup>11</sup> [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020\\_11:weh\\_tog\\_nov\\_2020.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2020_11:weh_tog_nov_2020.pdf)

Participants (42)

Q Search

- Harro Verkouter (me)
- Uwe Bach (Host)
- BC Bob Campbell
- Des Small
- AR Alan Roy
- AG Alastair Gunn
- AN Alexander Neidhardt
- AM Alexey Melnikov
- a andrea
- AM Ari Mujunen
- AO Arturs Orbidans
- Benito Marcote
- Bl Beppe (Mc)
- BH Bert Harms ( JIVE )
- be bob eldering
- CM Carlo Migoni
- CW Chen Wen(Kunming)

Invite Unmute Me Raise Hand Merge to Meeting Window

Participants (42)

Q Search

- CP Christian Plötz
- DN Dhanya Nair
- E Ed
- GS Gabriele Surcis (Sr)
- Helge Rottmann
- JG Javier Gonzalez
- JQ Jonathan Quick
- JK Juha Kallunki
- Jun Yang
- MB Marcis Bleiders
- MK Mark Kettenis
- ML Martin Leeuwinga
- Michael Lindqvist
- MK Mikhail Kharinov
- OU Oleg Ulyanov
- O Olga Bayandina (JIVE)
- PW Pawel Wolak (Tr)

Invite Unmute Me Raise Hand Merge to Meeting Window

Participants (42)

Q Search

- R Richard Blaauw
- RH Roger Hammargren
- Roman Feiler
- S Salvo Buttaccio
- VB Vladislavs Bezrukovs (VeA)
- WA Walter Alef
- ZP Zsolt Paragi
- 변도영

Invite Unmute Me Raise Hand Merge to Meeting Window

Bob Campbell Harro Verkouter Bert Harms ( JIVE ) Walter Alef Helge Rottmann Ari Mujunen Roger Hammargren

Benito Marcote Jun Yang Roman Feiler Olga Bayandina (JIVE) Martin Leeuwinga bob eldering Javier Gonzalez

Gabriele Surcis (Sr) Jonathan Quick Ed Himwich Richard Blaauw Des Small Beppe (Mc) Sven Dornbusch

Oleg Ulyanov Uwe Bach Carlo Migoni Juha Kallunki 변도영 Cristina CMiro Dhanya Nair

Alexey Melnikov Vladislavs Bezruko... Marcis Bleiders Bin Li (T6) Alastair Gunn Arturs Orbidans Mark Kettenis

Salvo Buttaccio Pawel Wolak (Tr) Eugeniusz Pazderski Chen Wen (Kun... andrea Michael Lindqvist Justin Bray

Christian Plötz