



# Report from the event supported by RadioNet

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<b>TITLE</b>	<i>TOG &amp; GTG MEETINGS</i>
<b>DATE:</b>	<i>04-05 OCTOBER 2018</i>
<b>LOCATION:</b>	<i>GRANADA, SPAIN</i>
<b>MEETING WEBPAGE:</b>	<a href="https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:sustainability:tog:2018_10">https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:sustainability:tog:2018_10</a>
<b>HOST INSTITUTE:</b>	<i>INSTITUTO DE ASTRONOMÍA DE ANDALUCÍA &amp; INSTITUTO GEOGRÁFICO NACIONAL – UNIVERSIDAD DE ALCALÁ DE HENARES (UAH)</i>
<b>RADIONET</b>	<i>TO BE FILLED BY MANAGEMENT</i>
<b>BENEFICIARY / NO:</b>	

# Report:

## 1 SCIENTIFIC SUMMARY

### LINKS

The following public pages contain information about the meeting:

1. <http://www.oan.es/tog2018/>
2. [https://deki.mpifr-bonn.mpg.de/GMVA/GMVA\\_Technical\\_Group/3rd\\_GTG\\_Meeting\\_Granada](https://deki.mpifr-bonn.mpg.de/GMVA/GMVA_Technical_Group/3rd_GTG_Meeting_Granada)
3. [https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:sustainability:tog:2018\\_10](https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:sustainability:tog:2018_10)
4. <https://events.mpifr-bonn.mpg.de/indico/event/80/>
5. [https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2018\\_10:tog\\_2018\\_2\\_minutes.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2018_10:tog_2018_2_minutes.pdf)
6. [https://deki.mpifr-bonn.mpg.de/@api/deki/files/11623/=Minutes\\_granada.pdf](https://deki.mpifr-bonn.mpg.de/@api/deki/files/11623/=Minutes_granada.pdf)

### OBJECTIVES OF THE MEETING

The TOG (Technical and Operations Group of the EVN) meeting takes place every 9 months in a different observatory of the EVN to allow a direct exchange of technical expertise and experience between the station personnel. Every 18 months the TOG meeting is held together with a meeting of the GMVA technical group (GTG). The meetings are attended by VLBI friends and technical staff of the stations and the correlators as well as by selected external experts. The meeting reported about here took place in Granada and was a joined TOG+GTG one: the first day devoted to the TOG and the second to the GTG. This meeting was locally organized by the IGN (Instituto Geográfico Nacional; Radionet partner is the UAH) and Instituto de Astrofísica de Andalucía (IAA) which hosted the meeting at its premises in Granada.

The meeting time and location was chosen to be close to the EVN symposium which was held Oct 8-11<sup>th</sup> also in Granada. This allows the technical staff to get into direct contact with the astronomers - the users of the European VLBI Network - in order to receive feedback and thus allowing to further improve the quality of the infrastructures.

The general objective of the TOG+GTG meeting is to identify operational issues of the EVN and GMVA infrastructures and discuss strategies to mitigate those in the future. Permanent agenda items deal with improving the quality of calibration, maintenance of the data acquisition and recording equipment as well as of the used software components. In addition strategies of improving the scientific capabilities of the infrastructures are being discussed. The main results of the Granada meeting will be discussed in the following section.

The presentations and subsequent discussions can be found in the minutes of the meeting (see [\[5\]](#) and [\[6\]](#)).

### MAIN RESULTS OF THE GRANADA MEETING

#### TOG

Several issues were identified that need further work and need to be tackled to improve the operations and quality of the data from the EVN. The actions to undertake have been assigned to different participants. The main issue that was discussed were the strategies to solve the 2 Gbps recording rate problem. A road-map was devised and tests with a new DDC firmware version (V107) were scheduled and will be performed within the next weeks. The main goal is to recover the 2 Gbps recording rate for EVN session 2019-1. During the next TOG meeting all items discussed will be reviewed to check the advances and applied solutions. The list of action items together with the people they have been assigned to can be found within the minutes of the meeting, which can be looked up at this link:

[https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2018\\_10:tog\\_2018\\_2\\_minutes.pdf](https://radiowiki.mpifr-bonn.mpg.de/lib/exe/fetch.php?media=na:sustainability:tog:2018_10:tog_2018_2_minutes.pdf)

## **GTG**

One of the main achievements of the Granada GTG meeting was to discuss and agree on a strategy of doubling the GMVA recording capability from currently 2Gbps to 4Gbps. Such an upgrade would have a major impact on the scientific capabilities and would enable new science for the GMVA users. Whereas the European GMVA stations are technically ready for the upgrade the VLBA stations (USA) will require replacement of the recording hardware. Funds for the required hardware changes have been secured by the US partners and upgrades are ongoing. Doubling the recorded bandwidth also requires doubling the data storage capabilities at the stations and the Bonn correlator. All partners have agreed to provide these capabilities. A schedule containing a number of test observations in the course of 2018 and early 2019 was worked out. In case of a positive outcome of the tests the GMVA would be able to offer the 4Gbps mode as the new standard mode starting from fall 2019.

A number of action items have been identified and have been assigned to members of the Technical Group. For a list of action items and the meeting minutes see:

[https://deki.mpifr-bonn.mpg.de/GMVA/GMVA\\_Technical\\_Group/3rd\\_GTG\\_Meeting\\_Granada](https://deki.mpifr-bonn.mpg.de/GMVA/GMVA_Technical_Group/3rd_GTG_Meeting_Granada)

## **SCHEDULE AND AGENDA OF THE EVENT**

### **SCHEDULE**

Thursday 4<sup>th</sup> (TOG meeting: [Agenda](#))

- 09:00-10:30 TOG meeting 1st session
- 10:30-10:50 Coffee break
- 10:50-12:30 2nd session
- 12:30-13:10 Talk to the IAA (public session)
- 13:10-14:30 Lunch
- 14:30-16:30 3rd session
- 16:30-16:45 Coffee break
- 16:45-18:00 4th session
- 18:00-18:10 Meeting final remarks

Friday 5<sup>th</sup> (GMVA tech meeting: [Agenda](#))

- 09:00-10:45 GTG meeting 1st session
- 10:45-11:00 Coffee break
- 11:00-13:00 GTG meeting 2nd session
- 13:00-14:30 Lunch
- 14:30-15:00 Meeting final remarks

#### Local organizing committee

- Iván Agudo (IAA, Granada, Spain)
- Alicia Pelegrina-López (IAA, Granada, Spain)
- Antonio Fuentes (IAA, Granada, Spain)
- Teresa Gallego (IAA, Granada, Spain)
- Naím Ramírez-Olivencia (IAA, Granada, Spain)
- Laura Barbas (OAN-IGN, Yebes Observatory, Spain)
- Javier González (OAN-IGN, Yebes Observatory, Spain)

#### Scientific organizing committee

- Pablo de Vicente (OAN-IGN, Yebes Observatory, Spain)
- Uwe Bach (Max-Planck-Institut fuer Radioastronomie, Germany)
- Arpad Szomoru (Joint Institute for VLBI ERIC, Netherlands)

### AGENDA & PRESENTATIONS

#### October 4<sup>th</sup>, 2018 (TOG meeting)

Local Arrangements/Opening Remarks (Vicente, Agudo)

1. Approval & last minute additions to Agenda (all)
2. Acceptance of minutes from last meeting (all; [Minutes from Shanghai meeting](#))
3. Review of Action Items from last meeting (all; see [Action Items from last meeting](#))
4. Review of Permanent Action Items (all; see [Permanent Action Items](#))
5. Reliability/Performance of the EVN
  - The 2 Gbps problem. V105E and V106E DBBC2 firmware (Blanchard, Vicente, all)
  - Reliability/Performance of the EVN. (Blanchard)
  - NME results (Blanchard)
  - Feedback from last sessions. (Blanchard)
  - Amplitude calibration. (Blanchard)
  - Grafana. A reminder (Vicente)
6. Amplitude Calibration
  - Review of continuous cal at the stations (Vicente)
7. VLBI backends
  - DBBC2 firmware: V107 (de Vicente, Bach & all)
  - DBBC2 firmware: wastro mode
  - DBBC2 firmware: PFB (information from stations).
  - Other VLBI backends: MDBE, OCTAD news
8. Recorders: Mark 5, Mark6, Flexbuf
  - e-shipping: problems & solutions (Verkouter)
  - Flexbuff status and 2 Gbps (all)
  - Disk inventory and purchase status (Vicente, all)
  - Possible flexbuff upgrades: more space (Vicente)
9. Stations
  - Status on Nk in Ghana. (James Chibueze)
  - Presentation of ROT telescope (A. Sargsyan)

10. e-VLBI
  - Current correlator capabilities and future ones.
  - KVAZAR network integration in the eVLBI. Dates.
  - 2 Gbps at the remaining stations.
  - e-Merlin developments (Varenius)
11. Technical Developments
  - Recent developments in Dwingeloo: White Rabbit and SDR (P. Boven)
  - Plan for higher incremental recording rates up to 32 Gbps.
  - DBBC3. Current status. Backwards compatibility and available firmware (?)
  - Auxiliary scripts & central repository?(Vicente)
12. JIVE
  - Technical Operations and R&D at JIVE, (Szomoru)
13. VLBA
  - VLBA status report (W. Brisken)
  - Globals and recording compatibility. Recorded Mark6 operations.
14. Field System, status and new features
  - Status report, new developments (D. Horsely)
15. Long term future
  - DBBC3 tests & future implementation at the FS
  - Review of potential developments in the next 2-3 years
  - EVN Science document. Chapter on Technology
16. Jumping JIVE
  - WP5. New stations.
17. Date and place of the next TOG meeting
  - To be decided
18. AOB

**TOG presentations:**

- Developments at JIVE. A. Szomoru (Netherlands)
- V107 tests. U. Bach (Germany)
- DBBC3 status. W. Alef (Germany)
- eMerlin status. E. Varenius (UK)
- EVN amplitude calibration. J. Blanchard (Netherlands)
- EVN performance. J. Blanchard (Netherlands)
- Compact tri-band mm receiver ([KVN](#)). T. Jung (South Korea)
- Kutunse status. J. Chibueze (Ghana)
- Quasar VGOS antenna. D. Marshalov (Russia)
- TOG chair notes. P. de Vicente (Spain)
- White Rabbit protocol and SDR at Dwingeloo P. Boven (Netherlands)
- e-Shipping: problems and solutions. H. verkouter (Netherlands)
- ROT Telescope A. Sargsyan (Armenia)
- Status and future developments of the FS. D. Horsley (USA)

**October 5<sup>th</sup>, 2018 (GTG meeting)**

1. Local Arrangements/Opening Remarks (de Vicente)
2. Agenda
3. Minutes and Action Items from last meeting
4. Reports from the stations (all)
  - Report from NRAO (Brisken)
5. Report from correlator
  - Changes in procedures/personnel (Rottmann)
  - Ros to replace Porcas as scheduler
  - Yurii P. for GMVA correlation support and test observations
  - Session 1/2017 (Yurii P.)
  - Session 2/2017 (Yurii P.)
  - Session 1/2018 (Yurii P.)
6. GMVA observations & operations
  - 4 Gbps mode @ VLBA
  - 4 Gbps mode w. DBBC2/3
  - Media / disk space
7. GMVA calibration - Discussion session
  - Problems with sensitivity of VLBA antennas (Krichbaum/Rottmann)
8. AOB:
9. Closing remarks

**GTG presentations:**

- VLBA in the GMVA. W. Brisken (USA)
- Analysis of the GMVA sessions. Y. Pidopryhora (Rusia/Germany)
- GMVA 4 Gbps possible modes. H. Rottmann (Germany)
- Gain of VLBA antennas. H. Rottmann (Germany)

**2 PARTICIPANTS**

Alastair Gunn	Jodrell Bank Observatory	UK
Arevik Sargsyan	ROT	Armenia
Walter Brisken	NRAO	USA
Yuri Pidopryhora	MPIfR, Bonn	Germany
Arpad Szomoru	JIVE	Netherlands
James Chibueze	Ghana Space Science and Technology Institute	Ghana
Gabriele Surcis	INAF – Cagliari Astronomical Observatory	Italy
Bob Campbell	JIVE	Netherlands
Paul Boven	JIVE	Netherlands
Carlo Migoni	INAF - Cagliari Astronomical Observatory	Italy
Iván Águdo	IAA	Spain
Dmitry Marshalov	IAA RAS	Russia
Pablo Torne	IRAM	Spain
Salvador Sánchez	IRAM	Spain

Eskil Varenius	Jodrell Bank Observatory	UK
Ignacio	IRAM	Spain
Walter Alef	MPIfR, Bonn	Germany
Harro Verkouter	JIV-ERIC	Netherlands
Jay Blanchard	JIV-ERIC	Netherlands
Benito Marcote	JIV-ERIC	Netherlands
Jun Yang	Onsala Space Observatory	Sweeden
Jung Taehyun	Korea Astronomy and Space Science Institute	Korea
Katharina Immer	JIV-ERIC	Netherlands
Ross Burns	JIV-ERIC	Netherlands
David Horsley	NASA-NVI	USA
Guifre Molera	Finnish Geodetic Research Institute	Finland
Javier González	Observatorio de Yebes (IGN)	Spain
Helge Rottman	MPIfR, Bonn	Germany
Valdislavs Bezrukovs	Ventspils International Radio Astronomy Center (VIRAC)	Latvia
Martin Leeuwinga	Joint Institute for vlbi ERIC	Netherlands
Michael Lindqvist	Onsala Space Observatory	Sweeden
Do-Young Byun	KASI	Korea
Pablo Vicente	Observatorio de Yebes (IGN)	Spain
Richard Blaauw	Astron	Netherlands
Roger Hammargren	Onsala Space Observatory	Sweeden
Uwe Bach	MPIfR	Germany

There were 36 attendants, from 12 different countries of Europe, Asia, America and Africa. Only two women attended the meeting. The conference picture was taken in front of the IAA headquarters in Granada where the meeting took place.

## 2.1 RADIONET NEWSLETTER

The following attendants requested to be subscribed to Radionet Newsletter:

- *Removed for privacy reasons*

## 3 RADIONET FINANCIAL CONTRIBUTION

Two external experts funded by Radionet attended: James Chibueze who talked about the conversion of a telecommunication antenna into a radiotelescope in Ghana and David Horsley, the current maintainer of the VLBI-Field-System, the control program used to drive the antennas and manage the VLBI backends and recorders at almost all of the EVN and GMVA stations.

Three attendants who belong to Radionet Institutes requested economic support: Carlo Mignoni (INAF), Uwe Bach (MPIfR) and Antonis Polatidis (ASTRON). Antonis Polatidis **did not attend** the meetings and hence he will not claim for the expenses.

UAH, a Radionet Institute, paid for the lunches and coffee breaks that took place at the location of the meeting and will claim these expenses later to Radionet Management.

Arevik Sargsyan attended from Crimea to learn and obtain information on how to adapt their telescope for VLBI observations and possibly join the EVN network in the future. She requested for funding to Jumping JIVE project and **will not be funded** by Radionet



Summary of the economic maximum requests for funding:

Name	Institution / Type	Reason	Maximum budget
		Partial trip funding	Private
		Partial trip funding	Private
		Partial trip funding	Private
		Partial trip funding	Private
UAH	Radionet Institute	Expenses on lunches & coffee breaks	



#### 4 PUBLICATIONS

- *In case of future publication - please provide additional information: place & date. Remember to insert the acknowledgment of the RadioNet support:*

*The project leading to this publication has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730562 [RadioNet]*