

38th Directing Board Meeting – Summary Notes

Location: CNR IRA/INAF, Bologna, Italy
Date: 12 October 2017
Note taker: Dirk Behrend
Version history: 12 October 2017, 07 February 2018

Attending Board members: Axel Nothnagel (Chair), Dirk Behrend, Patrick Charlot, Francisco (“Paco”) Colomer, John Gipson, David Hall, Thomas Hobiger, Evgeny Nosov, Torben Schüler, Gino Tuccari, Takahiro Wakasugi, Guangli Wang.

Excused: Ludwig Combrinck, Ed Himwich, Arthur Niell.

Guests: Tiziana Venturi.

1. Welcome (Axel Nothnagel)

Axel Nothnagel welcomed the attending Board members and Tiziana Venturi as guest.

2. Approval of Agenda

The Board approved the agenda for the 38th DB meeting.

3. Approval of Minutes of the 37th DB Meeting (Axel Nothnagel)

The Board approved the notes of the 37th DB meeting with a few minor changes.

4. IVS DB Chair’s Report (Axel Nothnagel)

Activities since the last Board meeting included:

- Inauguration speech of Onsala Twin Telescopes
- LoI between EVN and IVS signed
- Presentation on IVS at 2nd General Meeting of the AOV
- Communications for replacement of Alessandra Bertarini on the Directing Board
- Letters of farewell to Chopo Ma and Alessandra Bertarini
- 2017 GGOS Unified Analysis Workshop at Paris
- Letter to Per Erik Opseth concerning loss of radio quietness at Ny Ålesund

5. IVS CC Director's Report (Dirk Behrend)

Main activities since the last Board meeting:

- Publications:
 - Biennial Report: editing work largely done
 - Newsletter: August issue published
- Talks and Reports:
 - IVS report for the IAG Travaux 2015–2017
 - IVS contribution to IERS 2016 Annual Report
 - GSFC/Code 61A Seminar talk about state and future of IVS
- Mailing lists:
 - Moved service from 'ivscc' to 'lists.nasa.gov'
 - Weeded out inactive lists (from 72 down to 18, 6–8 lists to be added when needed)
 - Management options reduced, no influence on spam handling
- IVS 2018 General Meeting:
 - Longyearbyen, Spitsbergen, Norway
 - 3–8 June 2018
 - Program Committee: Thomas Hobiger, Chet Ruszczyk, David Hall, Torben Schüler, Lucia McCallum, Oleg Titov, Evgeny Nosov, John Gipson, Gino Tuccari, Dirk Behrend, Takahiro Wakasugi
 - First Announcement: to be distributed soon

Other activities:

- IVS Membership: Santiago Belda as Corresponding Member in preparation of the Universidad de Alicante to become an IVS Analysis Center in mid-term future
- San Juan, Argentina: 40-m antenna coming up as S/X antenna, location is 70 km west of SLR site, interest in a few IVS sessions (main purpose is astrophysics), slight chance of VGOS antenna
- Notes of DB meeting #37 (Chalmers)
- Master Schedule 2017
- OPC, VPEG, and VTC participation

Axel will prepare with Dirk a draft of a call for an IVS Outreach and Communications entity.

6. Short Reports of the Coordinators and Committee Chairs

6.1 Observing Program Committee Chair's report (Dirk Behrend)

Issues discussed in the period since the last board meeting were

- Observing plan for 2018: The OPC agreed on the plan for 2018 prepared by Cynthia Thomas.
- Status of mixed mode (VGOS to S/X): Haystack was working on the mixed mode, but it was not yet operational, with the post-processing being the last hurdle to take.
- Status of AGGO: The start of operations at La Plata, Argentina was delayed.

- AUA and AOV logistics: The contact person for the AUA sessions is the AOV Secretary (Lucia McCallum of UTAS).
- OPC membership: Chopo Ma retired at the end of September 2017. The OPC assembled a draft list of candidates for a possible successorship for Chopo.
- CONT17: The campaign will be observed November 28 through December 12, 2017 on two legacy S/X networks with 14 stations each and from December 4–8, 2017 on a VGOS broadband network with likely six stations. The correlation will be done at three correlators (Bonn, Socorro, and Haystack).
- CRF/CRDS sessions: The PI/scheduler for this session series was changed from Alan Fey to Alet de Witt.

The Board approved to fill Chopo's OPC position with Patrick and either Jim Long or Frank Lemoine.

6.2 ICSU World Data System (Dirk Behrend)

No activity.

6.3 Technology Coordinator (Gino Tuccari)

Main activities:

- Maintaining tables of existing VGOS equipment for improving technical compatibility
- Distributed correlation
- Letter of Intent on cooperation between IVS and EVN
- Plan of scheduled visit to IVS stations

Tables of existing VGOS equipment:

- The tables will be included in the proceedings of the recent EVGA meeting as report about the compatibility meeting
- Useful if up-to-date: a periodic update request will be sent to pertinent groups
- A password editable Web version is under preparation

Distributed correlation:

- A report about the first test that was coordinated by Alessandra will be part of the EVGA proceedings
- For the next test a new coordinator has to be identified
- Additional correlation points required (e.g., Wettzell?)

Station visits:

- Visit to the IVS/VGOS stations are planned to meet personnel and improve knowledge and compatibility
- Kashima station and NICT was visited in August
- Useful meeting with the team operating in the station and at the NICT headquarters in Tokyo

6.4 VGOS

6.4.1 Development progress report

Skipped.

6.4.2 VGOS Technical Committee (Jamie McCallum, written note)

The VTC held one telecon since the last Board meeting, covering the state of VGOS operations with status reports from observatories and the Haystack correlator. The VTC Wiki was updated with a status change of the HartRAO VGOS antenna.

6.4.3 VGOS Project Executive Group (Hayo Hase)

Skipped.

6.4.4 Observatory monitoring and control (Jamie McCallum)

Paco mentioned that Alexander Neidhardt had just released a document within the Jumping JIVE project on the astronomy side (with synergies to geodesy). John mentioned that David Horsley had done some work at Goddard in that field.

6.5 Network Coordinator (Ed Himwich)

ITU Registration of VGOS Stations:

- Organizational efforts started last winter
- Contact with stations started at the end of August
- 13 institutions responsible for VGOS stations were contacted
- Developed spreadsheet to track progress
- Collected and sent information to assist stations with submission materials

Peculiar Offsets:

- A plot showed the residuals to the Average Peculiar Offsets for each station of the R1 and R4 sessions in 2017.
- The nominal level is at about 0 μs , which roughly corresponds to the offset at the start of the year. This is believed to be the nominal level for at least the past 25 years (but is not confirmed). Deviations correspond to shifts in UT1 (with an opposite sign).
- In 2017, there was a chaotic spring and summer with, e.g., new backends and fmout-gps problems including sign. From about DOY 75 to DOY 194, the deviation oscillates between 0 μs and $-2.5 \mu\text{s}$.

- The plan is to fix affected databases (about 40) with significant errors, i.e., with deviations larger than 1 μ s.
- The situation has stabilized as of DOY 226 (return to nominal level, stable to $\pm 0.025 \mu$ s).

6.6 Analysis Coordinator (John Gipson)

Status of Action Items:

- Ask USNO to use multi-tone phase-cal:
 - Done. USNO switched to multi-tone in August.
 - First session was R4802 = 17JUL27XA
- Transition to vgosDB:
 - GSFC developed software to use vgosDB in all stages of data processing.
 - Haystack has routinely used vgosDB in analysis of VGOS sessions since 2015.
 - Much progress, but deadline postponed at least a month, probably more.

Transition to vgosDB:

- Correlators:
 - All correlators have successfully made vgosDB from correlator output using *vgosDBmake*. Replacement for *dbedit* written by S. Bolotin.
 - Slight issue with GSI time-tags.
 - GSFC is working on vgosDB version of *geo_export*.
- Analysis Centers:
 - ‘V4 ACs (which produced edited and resolved data).
 - USNO has successfully used *nuSolve* to edit & resolve
 - GSFC & USNO discovered in early October 2017 that we could not use *solve* to generate baseline weights from vgosDB. The problem was fixed and will be included in the upcoming *solve* release.
 - BKG still has issues installing the January 2017 release of *calc/solve*.
 - Other IVS ACs:
 - Most ACs can use vgosDB.
 - Exceptions: Occam, QUASAR.
- CDDIS:
 - Want us to ‘vet’ vgosDB submissions to ensure that they are valid, contain the required files (and no extra files), and that they don’t contain any malware.
 - David Horsley (GSFC) wrote software to do the vetting.
 - Newest development: CDDIS requires control of any and all processing of data to include security checks, metadata extraction, and placing in archive. vgosDB submission code needs to be re-coded by CDDIS personnel, with an ETA not before January 2018.

Archiving Correlator FITS files:

- A few people have asked for these. Need to approach correlator directly, because IVS has no central repository.
- It would be nice to archive these and make them available. But also needs some policy in place.

Unified Analysis Workshop (UAW):

- Five VLBI attendees from IVS: John Gipson, Robert Heinkelmann, Hana Krásná, Dan MacMillan, Axel Nothnagel, and Minghui Xu
- Adhoc Working Group on HF-EOP
 - Chaired by John Gipson.
 - Goal is to evaluate HF-EOP models and make recommendations to IERS.
 - Representation from all techniques.
 - Change in definition of Mean Pole Tide: IVS analysis software will need to be modified.
 - New Relativity Model: agrees with consensus at the 1 ps level.

6.7 Committee on Training and Education (Rüdiger Haas)

The next VLBI Training School is planned for March 2019 in connection with the EVGA 2019 meeting on Gran Canaria. There should be an increased focus on VGOS aspects.

The intent is also to modify the school based on the students' evaluation of the last school: better coordination among teachers, more homogeneous (e.g., notation), shorter lectures, and more exercises.

7. Short Reports of IVS Working Groups and other IVS assignments

7.1 Correlator issues

A replacement is needed for A. Bertarini to champion the distributed correlation effort. David said that the USNO correlator group had the manpower to tackle this.

7.2 WG7 on Satellite Observations with VLBI (Rüdiger Haas)

Overview on IVS WG7:

- 20 WG members and WG correspondents
- 4 Sub-WGs:
 - Sub-WG-1 (ToR-1) “Technical Issues”
 - Sub-WG-2 (ToR-2) “Scheduling and Simulations”
 - Sub-WG-3 (ToR-3) “Correlation”
 - Sub-WG-4 (ToR-4) “Analysis”

Activities so far:

- Participation in E-GRASP proposal
- Several GNSS–VLBI sessions in Europe, Australia, and intercontinental
- Discussion on observations, near-field models, and data analysis
- Various simulations performed
- Correlation tools developed

- Data analysis started
- Exchange of data between interested groups is planned

The first Face-to-Face meeting was held in connection with the “First International Workshop on VLBI Observations of Near-field Targets” in Bonn, October 2016. A second Face-to-Face meeting was organized in conjunction with the EVGA 2017 in Gothenburg, May 2017. A third Face-to-Face meeting is planned in connection with the 10th IVS General Meeting in Longyearbyen, June 2018.

7.3 Task Force on Seamless Auxiliary Data (Alexander Neidhardt)

Nothing to report.

7.4 Working Group 8 on Galactic Aberration (Dan MacMillan)

The Working Group decided on a recommended Galactic Aberration Constant (GAC) and performed tests of the model implementation in VLBI solutions.

An estimate for GAC based on geodetic VLBI could be derived from nine estimates in the range of 5.2–6.4 $\mu\text{as/yr}$. The mean for the geodetic GAC amounted to $5.6 \pm 0.12 \mu\text{as/yr}$. An estimate for GAC based on galactic astronomy could be derived from five estimates in the range of 4.8–5.4 $\mu\text{as/yr}$. The mean for the astronomic GAC amounted to $4.9 \pm 0.17 \mu\text{as/yr}$.

The WG recommendation at this point could be summarized as follows:

- Chose the average of the geodetic mean and astronomic mean: $\text{GAC} = 5.3 \pm 0.3 \mu\text{as/yr}$.
- The model should be applied in analysis at a reference epoch of 2000.0 so that the resulting CRF catalog is consistent with model:
 - not necessary to include aberration proper motions in catalog;
 - model can be appended to catalog as auxiliary information.
- An option was implemented in *Calc/Solve* to apply aberration. *VieVS* also has the capability. Aberration effect on estimated source positions has been investigated.
- Working Group final report should be ready by October/November.

7.5 Establishment of Working Group on Source Structure Effects

This was not a formal proposal by anyone. The benefits of source structure modeling needed still to be demonstrated. The topic will be revisited at a later stage.

8. Reports of Action Items of Last DB Meeting (all)

All action items have been worked and reported on.

9. Discussion of missing actions in IVS (all)

The Board started to discuss a table of missing actions divided into several fields: scheduling, observations, data transfer, correlation and fringe fitting, data storage, Web presence, outreach, analysis, radio telescope surveys, documentation, and public relations and advertising. A few of these actions were assigned during the discussion and given a priority (1–5 with 5 being the highest).

10. Marketing, outreach, public relations (all)

A major item was already discussed with the preparation of a call for an IVS Outreach and Communications component.

11. Safeguarding VLBI observing frequencies/CRAF

Skipped.

12. Items related to IAG, IAU, WDS, and related VLBI groups

12.1 IAG

12.1.1 Commission 1 and Sub-Commission 1.4, Commission 3 (Axel Nothnagel)

The IAG Scientific Assembly took place in Kobe, Japan. There were also plenty of commission meetings.

12.1.2 Newsletter contributions (Dirk Behrend)

Axel and Rüdiger provided info about the inauguration of the Onsala Twin Telescope.

12.1.3 GGOS (Axel Nothnagel, Dirk Behrend)

GGOS has a new chair in Richard Gross. Richard was elected by the IAG Executive Committee and would take over the reins from Hansjörg Kutterer.

The GGOS Days 2017 were scheduled for October 31 through November 2 in Vienna, Austria as a three-day meeting of all GGOS organizational groups.

12.2 EVGA (Rüdiger Haas)

The last EVGA working meeting was held in May 2017 in Gothenburg at Chalmers. In connection with the meeting, the inauguration of the Onsala Twin Telescopes was celebrated. There were almost 100 participants. The proceedings volume was expected to be ready by November 2017.

The next EVGA meeting was planned for March 2019 at the Universidad de las Palmas de Gran Canaria. In conjunction with that meeting, the inauguration of the VGOS antenna on Gran Canaria and the 3rd IVS VLBI School were planned.

12.3 Asia-Oceania VLBI Group for Geodesy and Astrometry (Takahiro Wakasugi)

Observing program:

- Six sessions in 2017
- 1 Gbps where possible
- Two sessions correlated and released, three sessions were being processed.
- One session was still to come on November 23 (without Ishioka)
- Sharing of scheduling and correlation between GSI, SHAO, UTAS, NGII (validation)

2nd AOV General Meeting:

- 1st meeting was held in Tasmania in November 2015.
- 2nd meeting was held from July 31 to August 1, 2017 at Kobe City, Japan as a splinter meeting of IAG-IASPEI 2017.
- Meeting was hosted by GSI and had 19 participants: JPN (11), AUS (4), CHN (2), NZL (1), DEU (1).
- Activity reports of each institution, discussion of several topics.

12.4 IERS (Axel Nothnagel)

The IVS has had Chopo Ma in a cross-assignment. Rüdiger Haas would very likely be named the IERS Representative on the IVS Board. There was consensus among the Board that Guangli should be the second IVS Representative on the IERS Board.

12.5 IAU

12.5.1 IAU Division A (Patrick Charlot)

IAU Symposia Proposals:

- No symposium of interest to IVS selected for IAU General Assembly 2018

- Two proposed
 - Reference Systems and Frames (Proposer: R. Gross)
 - High-Resolution and High-Precision Astronomy (Proposer: J. Moran)
- IAU Symposium 348 “21st Century Astrometry: crossing the Dark and Habitable Frontiers” selected but not really our field (Proposer: A. Krone-Martins)
- A new proposal submitted for 2019
 - The Earth’s Time Varying Rotation: A Centennial Celebration
 - Proposers (SOC): R. Gross, C. Huang, D. Thaller
 - Dates: October 7–11, 2019
 - Location: Brussels
- 39 Letters of Intent received

IAU General Assembly 2018

- To be held on 20–31 August 2018 in Vienna
- Deadlines:
 - Early bird registration: 31 January 2018
 - Regular abstract (oral and poster) submission: 28 February 2018
 - Final Program: 1 May 2018
 - Poster-only submission: 31 May 2018
 - Regular registration: 30 June 2018
- Deadline for proposing resolutions: 20 February 2018

12.5.2 ICRF3 (Patrick Charlot)

Patrick reported that the ICRF3 work had been progressing well with, in particular, the production of a second round of ICRF3 prototype catalogs by 2017 June 30. The working group also provided a prototype catalog to the *Gaia* team for input to Data Release 2. The next face-to-face meeting was scheduled for the next two days (October 13–14) in Bologna, where a number of decisions were about to be taken.

12.5.3 BVID-2 (Patrick Charlot)

The Bordeaux VLBI Image Database (BVID) in few figures:

- 75 sessions (57 RDV sessions)
- 5800 VLBI images for 1322 sources (mostly at X-band and S-band, some at K-band and Q-band)
- 12,575 structure correction maps and visibility maps
- 10 GBytes of data
- About 1000 connections/year

The new database when publicly available will be advertised widely.

12.6 EVN (Patrick Charlot)

The EVN is preparing a vision document. The idea is to produce a scientific and technical roadmap. To that end, a first person-to-person meeting was held at Jodrell Bank in September. The next EVN Consortium Board of Directors meeting was scheduled for 14 November 2017 at Onsala, Sweden. The next EVN Symposium will be held in Granada, Spain from 8–11 October 2018. The JIVE Director will change (from Huib van Langevelde). The position was advertised widely, the selection process was underway.

13. Highlights of recent meetings

Axel mentioned the most recent meetings of EVGA, TOW, and EGU. Most of them we discussed already at the previous Board meeting.

14. Upcoming Meetings

The next IVS-related meeting will be the IVS General Meeting in Longyearbyen in June 2018.

15. Summary of Action Items

There were four action items resulting from this Board meeting (separate document).

16. Miscellaneous (all)

At the IVTW there was a discussion on how to have a technology exchange between the various VLBI arrays. The IVS should have some presence in such discussion groups.