

30th Directing Board Meeting – Summary Notes

Location: GFZ Potsdam, Germany
Date: 7 September 2013
Note taker: Dirk Behrend
Version history: 7 September 2013

Attending Board members: Axel Nothnagel (Chair), Dirk Behrend, Alessandra Bertarini, Patrick Charlot, John Gipson, Rüdiger Haas, Hayo Hase, Ed Himwich, Alexander Ipatov, Shinobu Kurihara, Jim Lovell, Chopo Ma, Bill Petrachenko, Harald Schuh, Fengchun Shu.

Absent: Arthur Niell.

1. Welcome (Axel Nothnagel)

Axel Nothnagel welcomed the Board members.

2. Approval of Agenda

The Board approved the agenda for the 30th DB meeting.

3. Approval of Minutes of the 29th DB Meeting (Axel Nothnagel)

The Board approved the notes of the 29th DB meeting.

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

Axel sent six letters to NASA officials about the impact of travel restrictions because of the US sequestration. Axel was involved in the V2PEG activities. He attended the IERS Local Tie Workshop in Paris (21–22 May 2013). The definition of the reference points is planned for inclusion in the recommendations of this workshop; the recommendations, however, have not been written yet. Axel gave a presentation about the IVS at the IAG Scientific Assembly in Potsdam.

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

Dirk prepared and sent a letter to Wettzell about the future operations of the 20-m Radio Telescope Wettzell (RTW). The RTW should co-observe for at least 2–3 years with the Twin

Telescope Wettzell (TTW) in order to connect the existing (30-year) TRF time series of the RTW with the TRF time series of the TTW. For maintaining and densifying the CRF, the RTW should be operated well into the future.

The April and August issues of the IVS Newsletter were prepared and published. The 2012 Annual Report was completed in June with 428 pages and four special reports: WG5 report, DBE test report, DBE comparison, and feed comparison.

The last tri-fold about the IVS dates back to 2001. A new tri-fold could be prepared and distributed at the IUGG General Assembly 2015 in Prague. The Board approved the generation of a new tri-fold. A design team consisting of Dirk, Axel, Hayo, and Jim will work on the creation of the new tri-fold.

The CC organized the TOW2013 meeting together with Haystack staff. The CC coordinated the Program Committee activities and prepared the teaching schedules. It maintained the meeting Web page. The meeting was very successful with about 60 participants from 15 countries.

The First Announcement for GM2014 was published on June 14. The Program Committee was named at the last Board meeting and recently commenced its work.

For the World Data System (WDS) the CC participated in an online survey of the WDS Working Group on Open Metadata Catalogue and Scalable Knowledge Network. A goal of the WDS is to establish a single portal (WDS Data Portal) to allow discovery of the data across the very heterogeneous WDS. A draft for the ICSU-WDS Bylaws was distributed to the WDS Members for feedback with comments due by 3 October 2013.

6. 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:

- R&D sessions in 2013:
 - RD1302–RD1304: Vetting of sources for the geodetic good catalog
 - RD1305–RD1308: Observing link sources between GAIA and ICRF2 (Cat 4 of Bordeaux proposal)
 - RD1309–RD1310: Checking out stations and observing mode for CONT14
- GAIA link sources: R&D sessions and source monitoring program
- Tsukuba repair:
 - Rail track repair, down until end of January 2014
 - Reduced observing after repair work is likely
 - Kokee replaces Tsukuba in Int2 on Sundays, there are no Saturday Int2 sessions during Tsukuba's repair
- Wettzell repair:
 - 20-m gearbox replacement and antenna upgrade (July–September 2013)
 - Ny Ålesund and Svetloe are replacement stations in Int1, Int2, and Int3 sessions

- Parkes:
 - Three sessions approved for August 19–21
 - CRF76, T2091, and RD1306
- 2014 planning:
 - Observing plan approved
 - Cynthia Thomas selecting individual observing dates
 - Organization of regional CONTs with AuScope
 - X/Ka astrometry: wait for actual proposal
 - CONT14
- CONT14 (<http://ivscc.gsfc.nasa.gov/program/cont14/>)
 - Dates: May 6–20, 2014 (0–24 UT)
 - Test schedules: May–July 2013
 - Station check-out: November 2013 – January 2014
 - Final schedules/notes: April 2014

There was consensus to change the allowed minimum Sun distance angle for scheduling from 15° to 4°.

6.2 Network Coordinator (Ed Himwich)

Station performance: The data yield for the period January through July 2013 is based on results from 81 sessions representing 695 station days. Ten experiments were yet to be processed. The overall correlator yield by station was about 84–90%, which is in line with previous years (84–90%). The overall data used by analysts was about 70%; i.e., the data loss about doubles from correlation results to analysis results. The loss at one station affects more than one baseline. The data loss at the analysis level includes also other issues detected by the analysts. Anything above about 80% yield would have to be considered good.

News: The Matera sampler appears to be fixed. Bonn/Effelsberg is sending a sampler to Crimea. Kokee was repaired after the power failure. There have been efforts to improve the results of DSS13, so far no luck. Sejong station in South Korea is coming online and needs help.

Jim reported about an e-mail request he received as Network Representative from Sejong staff. The e-mail briefly described the history and current status of Sejong and ended with a request for help from the IVS. Jim suggested as possible avenues to assist the station the performance of a thorough check-out of the station, the coordination of test experiments, and training of local staff. The first thing to do is to get more detailed information on current status and problems.

6.3 Analysis Coordinator (John Gipson)

The new IVS Analysis Coordinator's Web site was set up at GSFC. John was in conversation with Sabine Bachmann (BKG Frankfurt) about how to make submissions to the Combination Center. The next big thing will be the IVS contribution to ITRF2013: John was in e-mail correspondence with Zuheir Altamimi (IERS). Zuheir does not want to apply Atmospheric

Pressure Loading at the observation level, which is the standard in VLBI analysis. John said that the latest IERS Standards still needed adoption. The upcoming new release of Calc11 will include these standards; he needed to contact the authors of the other software packages on this topic.

6.4 Technology Coordinator (Bill Petrachenko)

Technology Developments:

- Haystack/Goddard
 - Mark 6 in advanced state of development: units will be delivered in September for GGAO12 and Westford
 - RDBE 3.0: ready for test on antenna, includes addition of complex data and PCAL; 4*512-MHz and 2*1024-MHz versions are under development
 - Broadband front end being fabricated for Kokee 20-m antenna: delivery to site expected on time by the end of September, installation probably not until spring 2014
 - Westford broadband front end being rebuilt to include MCI and improved calibration unit
 - Ready to test 80-Hz synchronous detection
- Broadband upgrade to Noto, Gino Tuccari, INAF
 - Cryogenic front end under construction (Italian broadband feed)
 - Tertiary mirror designed to make antenna optics compatible with feed
 - DBBC3 data acquisition: direct sampling at front end using ADB3H and Core3H boards
 - Completion expected early in 2014
- Chalmers/Onsala/Omnisys – Eleven Feed front end
 - Omnisys in final stages of testing Wettzell front end
 - National Semiconductors investigating fast A/Ds for VGOS
- AuScope
 - Joint project with Callisto for Sterling Cycle broadband cryo front end: compact, reliable, no maintenance but only 70K cooling
 - Deformation studies: temperature sensors and geodetic targets in place, awaiting good weather
- China
 - Shanghai 65-m starting VLBI tests with GBT and VLBA
 - Keep working towards establishing VGOS antennas in China
 - New PCB for CDAS (1 GHz ADC; Vertex 7; 10 GigE interface)
 - Installed DiFX software correlator and started processing data
 - Research into Space VLBI project key technology
- Japan
 - NICT developing fixed frequency broadband system (time transfer)
 - GSI
 - Establish Ishioka site
 - K6/iDAS record and streaming system: no removable media, hence for e-VLBI only
- Russia, IAA
 - Developing end-to-end S/X/Ka system
- Spain, RAEGE
 - Developing cryo S/X/Ka feed

- LNA development

Second International VLBI Technology Workshop

- Seogwipo, Jeju Island, South Korea
- 10–12 October 2013

6.5 VGOS

6.5.1 VLBI2010 Committee (Bill Petrachenko)

The first broadband geodetic 24-hour session was observed on May 22, 2013 on the 600-km baseline Westford–GGAO12. The main purpose of the test was to calculate correlated fluxes.

Technology summaries and comparisons (V2PEG)

- Broadband and S/X/Ka band feeds
- Digital back ends and down converters
- Recorders (Alan Whitney)

Automation

- VEX2 definition (Alan Whitney, Ed Himwich, Walter Brisken)
 - Language for defining system configuration
 - Essential for automation of VGOS systems

Schedule optimization

- Challenges of mixed S/X and broadband observations
- Lower S/X data rates and small broadband antennas lengthen integration times in S/X mode

Source structure

- Source structure added to VieVS simulator (Stas Shabala and Jamie McCallum)
 - Core jet assumption with random core-jet direction and separation proportional to structure index
 - Tested with CONT11 schedules
 - With no turbulence can bias station positions by 1–2 mm on average (5 mm max) with biases changing depending on schedule

John brought up the possibility of using CONT14 data to produce source maps and to look into source structure. John and Patrick will look into the possibility of producing source maps with CONT14 data.

Atmosphere

- Working on ray tracing (Swedish student, David Eriksson, at NVI)
- GEOS 5.9.1 (3 hour updates, 50 km grid, 72 vertical levels)
- Small but consistent improvement (CONT11 and R1/R4)
- Reduces impact of elevation angle cut-off

Technology development items were covered under TOP 6.4.

6.5.2 VLBI2010 Project Executive Group (Hayo Hase)

The V2PEG held monthly teleconferences and met for a face-to-face meeting since the last Board meeting. Several letters were prepared and sent: a letter of advice to Pierre Kaufmann in Brazil, a letter of support for HartRAO in South Africa, a breakdown of costs for Mosab Hawarey in Jordan, and a letter of request to SHAO in China. There was an invited talk at the EGU 2013 meeting.

Current open issues are the VGOS operational plan and a radio telescope comparison sheet. There is a draft version of the comparison sheet which is to about 90% complete. Bill prepared a draft version of the VGOS operational plan in early July. The discussion about the plan is ongoing.

6.5.3 Status and progress of VLBI2010 projects

Patrick reported about activities with respect to establishing a possible Tahiti GGOS site (including a VGOS antenna). A presentation was requested by and given to a group of advisors who make recommendations to policy makers.

Axel reported about the Spanish/Portuguese RAEGE project. The project is pretty much on track with their plans.

Alexander reported that the concrete tower for the 12-m antenna at Zelenchukskaya is ready and that the foundation of the Badary antenna has been poured. By the end of 2013, the production of prototypes for the equipment (e.g., feed, front-end, DAS) should be completed. The radio telescopes will be assembled at the observatories in 2014. First observations are planned for 2015.

Kurihara-san reported about the progress at the Ishioka site. The foundation has been laid and the antenna pedestal is under construction. Three front-ends will be used: QRFH, Eleven feed, and the RAEGE tri-band feed (S/X/Ka). The data acquisition system (K6/iDAS) is under development and should be delivered by the end of March 2014.

Fengchun mentioned that the funding process for the Chinese three-station project became more complicated than expected; there was no progress to report. In a separate project (mostly funded by SHAO) a VGOS antenna will be erected close to the old 25-m antenna at Seshan. It will mostly be an experimental station.

Rüdiger said that the building permit for one of the telescopes was rejected by the county because of the presence of protected wading birds. A second proposed location for this telescope was then rejected for archeological reasons.

Jim reported that Graham Appleby was looking into applying for funds for a VGOS antenna in Herstmonceaux, England.

Chopo mentioned that USNO has funding for building a 12-m antenna at Kokee Park. Work was in progress to close the tender and to sign a contract with an antenna constructor.

6.5.4 VGOS operational plan (Bill Petrachenko)

Since the VGOS broadband systems are nearing completion (see V2C report) and the VGOS network is expanding (see V2PEG report), it is time to develop a strategic plan for VGOS deployment and operations. The strategic plan is currently a significant focus of V2PEG and is still under development.

Types of VGOS sessions required:

- mixed-mode sessions (i.e., legacy and broadband) with legacy networks (e.g., R1 and R4) in order to generate strong geodetic ties between VGOS and legacy sites
- 24-hour sessions with VGOS sites only (using 3–14 GHz to avoid S-band RFI) to determine strong station positions for the VGOS sites
- begin daily EOP sessions (that are much improved over daily UT1 Intensives): use 3–14 GHz to avoid S-band RFI, use the same network every day, start with four 1-hour bursts each separated by six hours

By the end of 2014, the VGOS broadband network will consist of five stations (GGAO12, Yebes, Wettzell, Ishioka, and Seshan) with three of these stations co-located with legacy stations). The Master Schedule has seven VGOS broadband sessions for 2014. Additional experimental sessions can be added if required.

Starting with 2015, test experiments and pilot projects will be observed, which will eventually transition into regular broadband operations. In early 2015 tests will be executed with a weekly 24-hour broadband session and daily broadband EOP sessions. Both tests could last 1–2 months. In the second half of 2015, a pilot project with a combination of both session types could be started and then expanded over the following years.

6.5.5 RFI at IVS Stations (Bill Petrachenko)

In the VGOS RFI Survey seven responses for 15 sites and 23 antenna locations we received. Most sites in the survey can operate in the full VGOS 2–14 GHz range without saturation. Most significant RFI is in the 1–3 GHz range. All sites can operate in the 3–14 GHz range without saturation. It appears that the spectrum is fairly clean between the RFI. A number of major sites (e.g., Haystack, GGAO, Wettzell, Ny Ålesund, Kokee) did not respond. Haystack and La Plata are discussing the development of a standard RFI monitoring system; there is no funding at this point.

At GGOS sites, there is intra-site RFI due to DORIS and SLR aircraft avoidance radar. With the GGOS goal to have technique separation < 100 m, VLBI requires strong (~30 dB) attenuation of DORIS and SLR radar signals. Haystack/Goddard investigates the use of physical barriers (e.g., buildings, topography, special built structures). Gino Tuccari tests High Temp Super Conductor

(HTSC) notch filters before the LNA. For SLR, interlocking of the SLR/VLBI schedules and the use of other techniques for ensuring aircraft avoidance should be considered.

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

7.1 ex. IVS WG4 on ‘VLBI Data Structures’, status of final report (John Gipson)

Working Group 4 on VLBI Data Structures (WG4) was closed at the previous Board meeting. In the meantime, John wrote a draft of the WG4 Final Report. The feedback time for the WG4 members was still ongoing.

Before transitioning to the new format, the Calc/Solve software needs to be converted to using the openDB format. The next release of Solve with Calc11 is in the debugging stage. There will be a transition time of one year to the new openDB format allowing other software packages to be updated as well.

7.2 IVS WG6 on ‘VLBI Education and Training’, status of final report and transition to IVS Committee (Rüdiger Haas)

Since the last Board meeting, the lecture notes of the VLBI School have been posted on the EVGA Web site (http://www.evga.org/material_vlbi_school_2013.html) and a draft of the WG6 Final Report has been written and distributed to the Directing Board for comments.

The Directing Board agreed that the WG6 could officially be closed and that an IVS Committee on Training and Education should be created. Rüdiger was suggested as the Chair of the new committee. The Board unanimously voted for Rüdiger as the Chair of the IVS Committee on VLBI Education and Training.

7.3 Task Force on IVS Intensives (Rüdiger Haas)

Since the last Board meeting, several ultra-rapid EOP/UT1–UTC sessions (UR.EOP) were observed during 24-hour experiments (e.g., R1 and R&D). The sessions involved Onsala, Tsukuba, HartRAO-26m, HartRAO-15m, Hobart-12m, and Hobart-26m. We produced EOPI files as results. Since May 2013 Tsukuba is not operational; attempts to include Westford were not successful so far.

Outlook:

- Observations:
 - continue UR.EOP sessions and improve analysis strategy (e.g., adapted window length, Kalman filter)
 - dedicated 4-station UR.EOP sessions as telescope time allows

- use two east-west baselines simultaneously in each hemisphere (e.g., On–Ts and Hh–Hb)
- use CONT14 as ultra-rapid campaign with several east-west baselines
- Analysis:
 - develop unified analysis strategy for Intensives
 - use external atmospheric parameters in analysis (new PhD student at Chalmers)
 - develop three different INT products
 - develop combination approach and new analysis approaches (e.g., Kalman filter)
- Results:
 - continue discussion with IERS Rapid Service about the use of UR.EOP
 - IVS should make available the UR.EOP EOPI files
 - prove to IERS Rapid Service Bureau (USNO) that the ultra-rapids have same quality as the regular Intensives
- Documentation:
 - write report about Task Force work

7.4 Publication about IYA super session (Patrick Charlot)

The Bordeaux Group (mostly Arnaud Collioud) was still working on the imaging side. The work was close to be finished for the X-band data (after some problems had been solved). The S-band data should be processed a lot faster. The paper has not been finished yet. Patrick will contact Dirk to work on the author list.

8. Discussion on actions concerning obsolete IVS components (Axel Nothnagel)

For the discussion, obsolete IVS components were considered those that did not appear in any recent IVS-related report. There was general consensus among the Board that Axel could write a letter to these components and suggest that their membership be closed.

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

9.1 IAG

9.1.1 Commission 1 and Sub-Commission 1.4, Commission 3 (Harald Schuh)

The IAG Scientific Assembly was just held in Potsdam, Germany. A new Working Group on ‘Theory of the Earth Rotation’ was established. The WG is chaired by Jose Manuel Ferrandiz (Univ of Alicante, Spain) and is a joint effort between IAG and IAU (Commission 19).

9.1.2 Newsletter contributions (Harald Schuh, Dirk Behrend)

In the August issue of the IAG Newsletter, two articles were published about VLBI: the VLBI School in Helsinki and the funding of the VGOS Antenna in Hartebeesthoek.

9.1.3 GGOS (Harald Schuh)

GGOS is developing slowly. The re-organization of the GGOS structure is now finished. There was a Panel Discussion at the IAG Scientific Assembly.

The next Unified Analysis Workshop is scheduled for 27-28 June 2014 in Pasadena, CA. Five people and the Chair will be invited to participate.

9.2 EVGA (Rüdiger Haas)

The EVGA Secretary Susana García-Espada moved from Spain to Svalbard. She started a 3-year job on September 1, 2013.

The EVGA Proceedings 2013 were printed and were to be distributed starting the week following the Board meeting. The Web version will be available soon. The EVGA Web site has been updated (e.g., with the VLBI School lectures).

Kurihara-san reported that the Asian and Pacific countries intended to establish a regional VLBI community for Asia-Oceania very similar to the EVGA. The Board fully approved this notion.

9.3 IAU and IAU Division A (Patrick Charlot)

9.3.1 IAU Division A (Patrick Charlot)

The restructuring of the IAU is continuing. Six new people were elected to the Steering Committee of Division A (formerly Division 1). The current President is Sergei Klioner (TU Dresden).

As a simplification the decision has been taken to only have Symposia and Focus Meetings at the General Assembly.

9.3.2 ICRF3 (Chopo Ma)

The IAU ICRF3 Working Group consists of 20 members (http://www.iau.org/science/scientific_bodies/working_groups/192/members/). The purpose of the working group is to produce a detailed implementation and execution plan for formulation of the third realization of the ICRF and to begin the process of executing that plan. The implementation plan along with execution progress will be reported to IAU Division A at the XXIX General

Assembly of the IAU in 2015. The targeted completion of ICRF3 will be the XXX General Assembly of the IAU in 2018.

9.4 EVN (Patrick Charlot)

The Proceedings of the EVN Symposium 2012 in Bordeaux should be ready within about month.

New EVN scheduler: Richard Porcas will retire at the end of the year. Designated successor is Alistair Gunn.

The Sardinia telescope was inaugurated on September 30, 2013.

The next Board of Directors meeting will be held on November 12, 2013 in Dwingeloo.

9.5 ICSU World Data System (Dirk Behrend)

See TOP 5.

10. Recent Meetings

10.1 7th TOW, Haystack (Dirk Behrend)

See TOP 5.

10.2 IAG Scientific Assembly (Harald Schuh)

The IAG Scientific Assembly was focused on history, marking 150 years of IAG. But there were also a lot of presentations about the future. There were about 500 participants. Several talks on combination (e.g., VLBI with GPS) showed the importance of combination work. As a new idea the VLBI observations of satellites was presented. Under GGOS a new Working Group called Plato (Performance simuLations and Architectural Trade-Offs) was established.

10.3 Other recent meetings

None.

11. Upcoming Meetings

11.1 Next IVS General Meeting at SHAO (Fengchun Shu)

The LOC has been formed and the meeting Web site set up. The First Announcement was released in June 2013. A poster for the General Meeting was designed.

The registration will be opened soon. The Second Announcement will be distributed on October 15, 2013. Abstract deadline will be December 15, 2013 and registration deadline January 30, 2014.

The preliminary schedule has 3.5 days of GM (Mon–Thu morning), an Analysis Workshop Thu afternoon, and a side trip to Sheshan on Friday (half-day). Further side meetings (e.g., mini-TOW, ICRF3) can be scheduled Friday, Saturday, or Sunday.

11.2 31st DB Meeting at SHAO, March 8, 2014 (Fengchun Shu)

The spring 2014 DB meeting will be held on Saturday, March 8, 2014 and will take place in the same room as the 2010 fall DB meeting.

11.3 32nd DB Meeting – Fall 2014 (Shinobu Kurihara)

The VGOS station at Ishioka will be inaugurated in October 2014. GSI plans on holding a symposium of the Japan VLBI Consortium around that time. GSI proposed to hold the 2014 fall DB meeting in Tsukuba. The Board agreed to the proposal.

12. Summary of Action Items (Dirk Behrend)

The Board agreed on the list of action items. [The list was distributed to the Board after the meeting.]

13. Miscellaneous (all)

None.