

31st Directing Board Meeting – Summary Notes

Location: Shanghai Astronomical Observatory, China
Date: 8 March 2014
Note taker: Dirk Behrend
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Attending Board members: Axel Nothnagel (Chair), Dirk Behrend, Alessandra Bertarini, Patrick Charlot, John Gipson, Rüdiger Haas, Hayo Hase, Alexander Ipatov, Shinobu Kurihara, Jim Lovell, Chopo Ma, Arthur Niell, Bill Petrachenko, Harald Schuh, Fengchun Shu.

Absent: Ed Himwich.

1. Welcome (Axel Nothnagel)

Axel Nothnagel welcomed the Board members.

2. Approval of Agenda

The Board approved the agenda for the 31st DB meeting.

3. Approval of Minutes of the 30th DB Meeting (Axel Nothnagel)

The Board approved the notes of the 30th DB meeting.

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

Axel led the formal vote on South Africa to host the next IVS General Meeting in 2016. He wrote a letter of support for the GFZ Analysis Center. He led the discussion and organized the formal vote about the VGOS observing plan, which was accepted by the Directing Board via e-mail vote.

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

Dirk was involved in preparing the General Meeting 2014. He chaired the Program Committee and prepared the program consisting of six sessions. The meeting was announced in two IVS Newsletter articles and the First Announcement (June 14, 2013) and Second Announcement

(October 15, 2013). In cooperation with the LOC, Dirk prepared and sent several messages about logistical aspects of the meeting and the program.

The CC prepared and published the December and April issues of the IVS Newsletter. The work on the 2013 Annual Report (AR2013) is in progress; AR2013 is prepared in two-column format similar to the EVGA Proceedings volumes. The deadline for submissions to the GM2014 Proceedings is April 30, 2014. The volume will be published by the Chinese publishing house at Science Press. The editors will be Dirk Behrend, Karen Bayer, and Kyla Armstrong.

The Design Team for a new IVS tri-fold, consisting of Dirk Behrend, Hayo Hase, Jim Lovell, and Axel Nothnagel, discussed the desired design features. The consensus was to create a directly printable online document in either letter or A4 size. The preferred brochure fold remained the tri-fold, similar to the previous tri-fold from 5/2001. The content should be less programmatic but rather oriented towards products and results. It should sport an attractive title and have extensive graphical support (to the extent possible). The Design Team identified two different audience groups: professional peers and general public. To honor the different needs of these groups, two separate tri-folds will be prepared—one at the professional level and the other for public outreach. The preparation time was anticipated to be 1.5 years.

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:

- CONT14: The observing network was determined with 17 stations at 16 sites; there will be ten northern and seven southern hemisphere stations. Several stations/institutions purchased media in support of CONT14. A station check-out was performed in the period from November 2013 to February 2014. The final observing schedules and notes will be prepared in April 2014. More information is available on the IVS Web site at the URL <http://ivscc.gsfc.nasa.gov/program/cont14/>.
- R&D sessions in 2013/2014: The R&D sessions RD1309, RD1310, RD1401, and RD1402 were used to check out the stations and observing mode for CONT14. The remainder of the R&D sessions in 2014 are planned for observing link sources between Gaia and ICRF2 (Category 4 sources from Bordeaux proposal).
- Tsukuba repair: The rail track repair was accomplished earlier than expected. Tsukuba re-started observing in early December 2013.
- Sejong status: The OPC agreed on avenues for assistance to Sejong.
- VGOS observing plan: The OPC agreed on the modified plan with trial experiments and a pilot project to ease in the VGOS observing.
- Future legacy observing (brainstorming): The OPC suggested using the new VGOS antennas in S/X/Ka setup and observing very short baselines (intra-station). Mixed networks of S/X and broadband stations should be observed to connect the two networks.

The Board agreed that the OPC has the mandate to do the coordination of the broadband observing.

6.2 Network Coordinator (Ed Himwich)

A determination of the data yield for 2013 was based on 1432 station days (159 out of 182 sessions). The correlator yield by station was at 81.6%, which is slightly less than in previous years (85–88%); most of the decrease could be attributed to the maintenance work at Tsukuba and Wettzell.

A lot of progress had been made on the VEX2 specifications. Some work was still to be done. The next version of the FS Linux distribution was under development.

6.3 Analysis Coordinator (John Gipson)

For the ITRF2013 contribution it was recommended to not apply pressure loading; the reason for this being that GPS cannot apply this effect. Sabine Bachmann (BKG Frankfurt) had four solutions at hand at the time of the meeting.

6.4 Technology Coordinator (Bill Petrachenko)

The Technology Coordinator (TC) worked on the following items in the period since the last Board meeting:

- Technology comparisons:
 - Feeds and DBEs done previously
 - Recorders now distributed
 - Hayo producing antenna comparison
- Summary of mixed mode issues (V2C effort)
 - LO offsets, bandwidth offsets, and so on
- RFI (Chris Beaudoin working on RFI detection system for Kokee Park)
- VEX2 (required for automation of VGOS processes)
 - Nearly done (Alan Whitney, Ed Himwich, and Walter Brisken)
- Operations plan
 - Observing plan (done)
 - Data transmission plan
 - Correlator plan
 - Analysis plan
- Readiness for VGOS trial campaigns of 2015
 - VGO0001 – VGO0005 (June to December)
 - Site readiness for trials: from eight potential stations (Noto, Kokee, Westford, GGAO, Ishioka, Sheshan, Wettzell, and Yebes) two were already operating at broadband (with

- successful demonstration of fringes) and four were expected to be operating at broadband by mid/end-2014; the other two might come up at broadband in 2015.
- Data transmission readiness for trials: based on test schedules with one observation every 30 s with a maximum integration time of 15 s, one–two 24-TB-Mark-6 or four 24-TB-Mark-5C modules would be needed per station.
 - DiFX correlator readiness for trials: Bonn was ready in terms of needed cores and Mark 6 units; Washington was lacking Mark 6, whereas Haystack was lacking a sufficient number of cores. Expansions were planned.
 - Expected performance of trials: with the caveat that the relative performance is based on formal errors, scatter w.r.t. GPS, and simulation results, it is expected that the trials will give comparable results to the R1/R4 sessions. With larger networks in later years, the performance will be significantly better than the recent CONT campaigns.
- What is the role of IVS in S/X/Ka observing?

The Board agreed that the general path should be broadband. However, since the IVS is a service for reference frames, among other things, there should also be activities for supporting Ka. This activity would need PIs, who would write a proposal for data combination and so on. The Board initiated the creation of a Task Force, which will be chaired by Alessandra Bertarini.

6.4.1 Decision on proposal of IGN for an IVS Technology Development Center at Yebes, Spain

The Board unanimously accepted the proposal.

6.5 VGOS

6.5.1 VLBI2010 Committee (Bill Petrachenko, Arthur Niell)

Most items were already covered under TOP 6.4. Bill added that a memo was written up about the mixed-mode observing. The hardware development in general was going in the right direction.

The Board agreed on renaming the committee from VLBI2010 Committee (V2C) to VGOS Technical Committee (VTC).

6.5.2 VLBI2010 Project Executive Group (Hayo Hase)

The group was renamed from VLBI2010 Project Executive Group (V2PEG) to VGOS Project Executive Group (VPEG). The VPEG consists of the following members: Hayo Hase (chair), Dirk Behrend, Chopo Ma, Arthur Niell, Axel Nothnagel, Bill Petrachenko, and Xiuzhong Zhang. Since the last Board meeting, the VPEG had four teleconferences and one face-to-face meeting. The VGOS observation plan was approved by the Board via e-mail vote in mid-December and then disseminated.

The VPEG continued to work on the operational plan: the observation plan was completed, work started on the data transfer and correlation plan (led by Alessandra Bertarini and Bill Petrachenko) as well as on the analysis plan (led by John Gipson and Axel Nothnagel). Technical questions that need to be addressed include source structure correction, phase connection over the observed bands, and mixed-mode scheduling and observation. A preliminary version of a radio telescope comparison sheet was put together; it was still missing the performance measurements.

6.5.3 Status and progress of VGOS projects

Yebeas would become broadband as early as the beginning of 2015. At Kokee Park the VGOS antenna would be erected next to the 20-m antenna. The new antenna would be an InterTronic antenna and the commissioning was planned for September 2015. The correlation of broadband data requires complex correlation for the RDBE; this has been implemented but phase cal was still missing. The broadband correlation was still in the queue.

There might be another funding opportunity for Tahiti in the middle of 2015. Then an application should be prepared and submitted.

The beginning of the construction work at Sheshan is planned for this year and it should be completed in 2015. The contract for construction will be awarded to one out of two candidate antenna manufacturers. The decision about the type of broadband feed has not been made yet.

6.5.4 RFI at IVS Stations (Bill Petrachenko)

Chris Beaudoin was working on the Kokee RFI system. Not much work was done on the intra-site RFI.

6.5 VLBI Education and Training

Proposed Terms of Reference for a Committee on Training and Education (CTE):

- To organize IVS Training Schools on VLBI for Geodesy and Astrometry on a tri-annual basis in connection with, for instance, IVS General Meetings, regional VLBI meetings, and the IVS Technical Operations Workshops (TOW).
- To establish and maintain contacts to higher education institutions worldwide that provide education in geodesy, geosciences and astrometry, with the aim of raising the interest in geodetic and astrometric VLBI among students.
- To develop education and outreach material that can be distributed to education institutions in a broader sense, including schools.

Proposed members of the IVS CTE:

- Rüdiger Haas (Chalmers University of Technology, Sweden) (Chair)

- Alessandra Bertarini (Bonn University, Germany)
- Johannes Böhm (TU Vienna, Austria)
- Chris Jacobs (JPL, USA)
- Christopher Beaudoin (MIT Haystack Observatory, USA)
- Fengchun Shu (SHAO, China)
- Thomas Hobiger (NICT, Japan)
- James Lovell (UTAS, Australia)

Suggested members for regions/continents missing so far:

- Africa: ??
- Russia: Yuri Bondarenko
- South America: Claudio Brunini

The Board unanimously accepted the establishment of the new committee.

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

7.1 Task Force on IVS Intensives (Rüdiger Haas)

Activities since the last Board meeting:

- Tsukuba is back
- UR.UT1-UTC activity:
 - 2 sessions during IVS R1-experiments
 - 1 dedicated session UR.13.03
 - Involving: Onsala and Tsukuba
 - EOPI files produced

Outlook on future activities:

- Concerning observational activities
 - Continue UR.UT1-UTC sessions and improve analysis strategy (e.g., adapted window length, Kalman filter approach)
 - Dedicated 4-station UR.UT1-UTC sessions if telescope time allows. Use two east-west baselines simultaneously, one each in the northern and southern hemispheres: On-Ts, (On-Wf), Hh-Hb
 - CONT14 as ultra-rapid campaign with two east-west baselines giving near real-time UT1-UTC
- Concerning analysis work
 - Develop unified analysis strategy for INTs
 - Use external atmosphere parameters for INT-analysis (Niko Kareinen, new PhD student at Chalmers, IVS Pilot Program)
 - Develop three different INT-products (ultra-rapid, rapid, final)
 - Develop combination approach and new analysis approaches, e.g., Kalman filter
- Concerning results

- Continue discussion with IERS rapid service on the use of UR
- IVS should make available the ur.eopi files
- Need to prove that we can achieve the same level of accuracy as the rapid service
- Concerning documentation
 - Report on the Task Force needs to be written

7.2 Publication about IYA super session (Patrick Charlot)

The paper has not been submitted yet. It is planned to submit it in the next two months to 'Astronomy and Astrophysics.'

7.3 Seamless Auxiliary Data (Axel Nothnagel)

A lot of data is hidden somewhere without direct access to it. Data should be available regularly. Alexander Neidhardt volunteered to lead a dedicated activity. Axel proposed to set up a Task Force on Seamless Auxiliary Data. The Board agreed on establishing a Task Force on Seamless Auxiliary Data led by Alexander Neidhardt. Initial members are Arthur Niell, John Gipson, and Rüdiger Haas.

7.4 Working Group on Satellite Observations with VLBI (Harald Schuh)

Harald presented a proposal for establishing an IVS Working Group on the Observation of GNSS Satellites using VLBI. The proposal included the purpose (promotion and coordination), justification (technique tie for improved ITRF), draft Terms of Reference, outcomes, and structure.

The Board gave Harald the mandate to prepare the charter and structure for a Working Group on Satellite Observations with VLBI.

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

Most action items were already covered in earlier agenda items and completed.

9. Discussion on Procedures for Smooth Decisions on GM and DB Meeting Locations (Axel Nothnagel, all)

The Board discussed and agreed on procedures for fixing the venues of upcoming General Meetings and Directing Board meetings. The final version reads:

General Meetings

At any time, IVS Member Organizations can apply to the IVS Directing Board (DB) through the IVS Coordinating Center of their desire to host an IVS General Meeting. The proposal should contain at least the time frame, location, and name of the person responsible for the organization of the meeting. The DB should decide on the proposal two and a half years in advance. Until the decision is made the proposal is considered pending.

Directing Board Meetings

The DB aims at selecting its meeting dates and locations at least one year ahead to allow its members enough time for their travel arrangements and to give the host sufficient time for preparation. DB meeting dates and locations should be selected taking into consideration that a half-yearly interval is maintained and that costs are minimized, e.g., by linking the DB meetings to other conferences of IVS interest. The preferred months for the meetings are March/April and September/October.

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

10.1 IAG

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

For the General Meeting in Shanghai three young scientists were awarded travel grants. The next General Assembly of the IUGG will be held in Prague in 2015.

10.1.2 Service Assessment 2014/2015 of the IAG (Harald Schuh)

The IAG has 13 international services. Several of them are far from perfect. Hence, the IAG Executive Committee decided in September 2013 to perform an IAG Services Assessment.

A kick-off meeting will be held on 25 April 2014 in Vienna on the occasion of the EGU assembly. The services are asked to participate in person by one official. The Board agreed that Axel would represent the IVS at the kick-off meeting.

10.1.3 Newsletter contributions (Harald Schuh, Dirk Behrend)

Possible topics for the IAG Newsletter could be articles about GM2014, CONT14, and possibly the IYA2009 paper.

10.1.4 GGOS (Harald Schuh)

There were GGOS elections of the Coordinating Board: Tom Herring and Erricos Pavlis are the service representatives. A re-organization of GGOS was under way to slim down to a lean structure.

10.2 EVGA (Rüdiger Haas)

Work was done to settle on the venue for the next EVGA meeting (EVGA 2015) and likely a connected Directing Board meeting. [After the Board meeting, the EVGA 2015 meeting was fixed to 17–21 May 2015 in Ponta Delgada, Azores, Portugal.]

10.3 IAU and IAU Division A (Patrick Charlot)

10.3.1 IAU Division A (Patrick Charlot)

The 29th IAU General Assembly will be held in Honolulu, HI, USA from 3–19 August 2015.

10.3.2 ICRF3 (Chopo Ma)

We held the third meeting of the IAU WG on ICRF3 on March 7 in Shanghai. The main areas of activities are: (1) Improvement of the data set for the ICRF3 analysis (another set of observations of the VCS calibrator sources, eight sessions scheduled by David Gordon as PI; southern sky sources to be improved through LBA sessions and by AUSTRAL sessions); other wavelengths (e.g., X/Ka), C. Jacobs got time on ESA antenna in Argentina to be scheduled together with DSN stations; continued catalog work with VLBA in K-band. (2) Analysis and comparison, C. Jacobs invited other IVS ACs to provide results for comparison purposes.

The main goal of the WG is to prepare a roadmap of how ICRF3 should be done. This will be presented at the IAU General Assembly in 2015. The next WG meeting will be held in about six months (e.g., in conjunction with the Journées).

10.4 IERS (Chopo Ma)

Work is done on preparing the next terrestrial frame (ITRF2013). Beyond that, the IERS is moving along without major problems.

10.5 EVN (Patrick Charlot)

The KVN joined the EVN. The Sardinia radio telescope is coming online (the telescope was inaugurated on 30 September 2013). The EVN was conducting joint observations with RadioAstron on specific dates. The next EVN Symposium will be held in Cagliari, Sardinia on 6–10 October 2014.

10.6 ICSU World Data System (Dirk Behrend)

There will be a Joint WDS/CODATA Conference (International Conference on Data Sharing and Integration for Global Sustainability, SciDataCon 2014) held in New Delhi, India from 2–5 November 2014. This meeting will be the first of a new series of joint biennial WDS–CODATA conferences.

The Web site of the WDS was improved and updated. The new Web site includes an issue tracker tool and a membership management tool. It uses plone (an open-source content management system) and is the first stage of a bespoke WDS integrated platform.

10.7 Asia-Oceania VLBI Group for Geodesy and Astrometry (Shinobu Kurihara)

There was a face-to-face meeting in Shanghai. In Potsdam, we prepared a draft for the Terms of Reference. We sent an e-mail to all Asia-Oceania IVS members and got responses from most of them. About twenty people attended the face-to-face meeting. The chair and secretary will be determined in the next few months.

11. Recent Meetings

11.1 IVS General Meeting at SHAO (Fengchun Shu)

The LOC was responsible for the following:

- Weimin Zheng: human resources, sponsors, Seshan visit and banquet
- Fang Wu and Wenting He: miscellaneous work
- Many volunteers: registration, meeting room

There were a total of 149 participants:

- International participants: 95
- SHAO participants: ~24
- Chinese participants other than SHAO: 30
- Registration fee waiver: 7

11.2 Other??

Alessandra reported on the EVN TOG meeting. One question was the choice of recorder and backend to be used in the EVN? The tendency is for FlexBuff. Almost all EVN stations will use jive5ab. 4-Gbps tests are under way and observing may come.

12. Upcoming Meetings

12.1 Discussion and decision on Spring 2015 DB meeting (33rd) (all)

The first 2015 DB meeting will preferably be held in conjunction with the EVGA meeting.

12.2 Other??

The next Unified Analysis Workshop (UAW) will be held in conjunction with the IGS Workshop at Caltech in Pasadena, CA on 27–28 June 2014. The participants for the IVS were determined to be: John Gipson, Axel Nothnagel, Johannes Böhm, Sergei Kurdubov, and Chopo Ma.

13. Summary of Action Items

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

14. Miscellaneous (all)

None.