

# 29th Directing Board Meeting – Summary Notes

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*Location:* Metsähovi Observatory, Finland  
*Date:* 8 March 2013  
*Note taker:* Dirk Behrend  
*Version history:* 8 March 2013, 22 July 2013

Attending Board members: Harald Schuh (Chair), Dirk Behrend, Alessandra Bertarini, Patrick Charlot, John Gipson, Rüdiger Haas, Hayo Hase, Alexander Ipatov, Shinobu Kurihara, Chopo Ma, Arthur Niell, Axel Nothnagel, Bill Petrachenko, Fengchun Shu, Oleg Titov, Gino Tuccari, Alan Whitney.

Absent: Jesús Gómez González, Ed Himwich, and Jim Lovell.

Attending guests: Line Langkaas and Per Erik Opseth (TOP 5).

## 1. Welcome (Harald Schuh)

Harald Schuh welcomed the incoming and outgoing Board members as well as attending guests.

## 2. Approval of Agenda

The Board approved the agenda for the 29th DB meeting.

## 3. Approval of Minutes of the 28th DB Meeting (Harald Schuh)

The Board approved the notes of the 28th DB meeting.

## 4. Short telecon with Jim Lovell about AuScope (Jim Lovell)

The AuScope geodetic VLBI array consists of three 12-m telescopes: Hobart (plus 26-m telescope, GNSS, and gravimeter), Katherine (plus GNSS), and Yarragadee (plus GNSS, SLR, DORIS, and gravimeter). The telescopes have been operational as an array since mid-2011 and are operated remotely from Hobart. Current funding allows support for 70 days/year of observing (full array) in the IVS observing program (until the end of 2014). Additional funding is likely for 30+ more days for astrometry. AuScope is gaining experience in remote operation of an array from a control center, provides feedback to the eRemoteControl software developers, and is prepared to check out remote operation of non-AuScope stations. The research activities focus on source structure, antenna deformation, and non-tidal deformation. For VLBI2010, an upgrade is needed from the room-temperature legacy S/X system to the broadband system. This upgrade has

the highest priority and is planned for 2015. We started work on a Stirling-cycle cryogenics system to reduce cost and maintenance. A wish is to have a second antenna at each site. A publication about the facility and initial results was accepted by Journal of Geodesy (DOI: 10.1007/s00190-013-0626-3).

## **5. Information about Norwegian proposal for UN resolution for space geodesy (Per Erik Opseth)**

Per Erik recently was faced with the task of defining the future of geodesy in Norway. A hot topic in Norway at the moment is sea level rise; this is high on the agenda for politicians. Geodesists can measure and possibly predict sea level changes, but they cannot prevent them. The first thing to do was to explain to the decision makers why geodesy is needed. Geodesy needs to become visible in the media; a fact that holds true not only for Norway but for other countries as well, and it is thus a task of GGOS and geodesy on a global scale. However, GGOS is rather a cooperation among scientists and not among policy makers. The task has to be brought to a political level.

In 2011, the United Nations created an initiative on global geospatial information management (<http://ggim.un.org>, UN-GGIM). At the Second High Level Forum on Global Geospatial Information Management in Doha, Qatar in February 2013 the need for geodetic support was recognized and the so-called UN Doha Declaration was passed. The declaration contains the following passage: “We will commit ourselves to work together as an international community, under the coordination of the United Nations, to work with all stakeholders to establish a sustained operational global geodetic reference frame and infrastructure, to support the increasing demand for positioning and monitoring applications with associated societal and economic benefits.” A final UN resolution about the need for geodesy can help Norway and possibly other countries (especially developing countries).

## **6. IVS DB Chair’s Report (Harald Schuh)**

Harald represented the IVS at several events. For the IVS Directing Board elections 2012/2013 he organized the election for the at-large members. He signed the Letter of Agreement between ICSU-WDS (World Data System) and the IVS. The IVS is now an official Network Member of the WDS. Harald was active in the VLBI2010 Project Executive Group (V2PEG) and had contact to various groups that were interested in VLBI2010 (e.g., in Indonesia and South Africa). He prepared a letter of support on behalf of the IVS to BIG (Indonesia). He contributed to the Final Report of Working Group 5 on Space Science Applications.

### **New component proposal:**

- Effelsberg Network Station proposal:

The Board unanimously approved the proposal from Effelsberg to become an IVS Network Station.

## **7. IVS CC Director's Report (Dirk Behrend)**

The Coordinating Center (CC) organized the IVS Directing Board elections together with the Election Committee. The newly elected representatives are: Jim Lovell (Network Stations), Axel Nothnagel (Analysis & Data Centers, 4-year term), Arthur Niell (Analysis & Data Centers, 2-year term), and Rüdiger Haas (Technology Development Centers). The newly elected At-Large members are: Alexander Ipatov, Shinobu Kurihara, and Fengchun Shu.

Dirk prepared with Hayo Hase and Heidi Johnson the IVS Newsletter issues #34 (December 2012) and #35 (April 2013); the latter was still to be completed at the time of the meeting. Online and printed versions were distributed.

The Proceedings volume for the 2012 General Meeting was completed in December 2012. The volume has 492 pages with 88 papers. The publication approval at NASA GSFC was still in progress.

The 2012 Annual Report was under preparation. The editors of this Annual Report would be K. Baver, D. Behrend, and K. Armstrong. The publication target was the end of spring.

The CC was working on the coordination of the Seventh Technical Operations Workshop (TOW2013), which was held May 6–9, 2013 at MIT Haystack Observatory.

The IVS was accepted as Network Member of the World Data System (WDS). After discussion with the WDS-IPO the original membership type was changed from Regular Member to Network Member.

## **8. Reports of the Coordinators and Committee Chairs**

### **8.1 Observing Program Committee Chair's report (Dirk Behrend)**

Issues discussed in the period since the last Board meeting were:

- RD1301, R&D sessions in 2013: The first R&D session of 2013 (RD1301) was used to observe in mixed mode between broadband and legacy VLBI stations. The purpose of the subsequent R&D sessions was to monitor and improve the GAIA–ICRF2 link sources and to vet selected sources for the geodetic good catalog.
- Planning for CONT14: The dates for CONT14 were May 6–20, 2014.
- Australian Domestic Astrometry Sessions: Geoscience Australia approved funding for up to 60 four-station astrometry sessions (using AuScope plus one more station).

## **Network Coordinator report (Ed Himwich, given by Dirk Behrend):**

The 2012 station performance report was based on 145 sessions representing 1068 station days. 221 stations days were still missing (e.g., from OHIG, T2, and EUR sessions). The overall yield by station was about 86.3%, which is in line with previous years (85–88%). The overall data used by analysts was about 69%, which is about twice as much loss as for the station yield. Of course, the loss at one station affects more than one baseline.

## **8.2 Publication about IYA Super Session (Patrick Charlot)**

Patrick reported that some progress was made. The analysis work on creating images of the sources at X-band was almost completed. The paper was in a rough draft, but it was not in a state to be distributed yet.

## **8.3 Analysis Coordinator's report (Axel Nothnagel)**

For the determination of ITRF2013, the handling of the non-tidal atmospheric pressure loading is under discussion (application at the observation level or not). Zuheir Altamimi (IGN France) favors applying the loading effect a posteriori.

The IERS Conventions 2010 were published in 2011. The Analysis Centers were slow in adopting the new conventions and making the required changes in their analysis software packages. The Analysis Centers should be encouraged to make it happen. There is a massive reprocessing effort needed to include the augmentations.

For the combination work, four Calc/Solve and one QUASAR solutions were used; Occam at DGFI was missing.

## **8.4 Technology Coordinator's report (Alan Whitney)**

The 1<sup>st</sup> International VLBI Technology Workshop was held at Haystack Observatory in October 2012. The technology workshop is the continuation of the International e-VLBI workshops, which were held since 2000, with a broadened scope. The scope of the workshop now includes the entire VLBI signal chain from receiver to digital data capture and transmission. The technology workshop was followed by a DBE Intercomparison Workshop also held at Haystack Observatory.

VEX2:

- Enhanced capabilities of VEX2:
  - Support for general “sample before channelization” systems
  - Dual-polarization support
  - VDIF support

- Support for Ethernet data connections (recording/e-VLBI)
- Very near finalization

#### VDIF:

- VDIF data format implementation has been (or is being) adopted in all known new VLBI equipment designs
- VDIF2 specification approval pending:
  - Primary new capability is support of non-standard sample rates (such as 32/27 Ms/sec planned by ASKAP and 16.666... Ms/sec planned at MeerKAT)
  - Request for VDIF support of non-standard sample rates came from the ASKAP and MeerKAT communities
  - Standard VLBI can still use original VDIF

#### e-VLBI progress

- Progress on 10-Gbps connection between GGAO and Haystack Observatory in support of VLBI2010 testing

### 8.5 VLBI2010 Committee report (Bill Petrachenko, Arthur Niell)

As a request from the TecSpec Workshop, two comparison tables were established and distributed. One shows the similarities and differences of the digital backends, the other does this for the feeds.

RFI remains a major concern for the broadband system. In phase 1 of our RFI investigation we asked the stations for existing RFI data. These showed that in general the situation was not too bad. Above 3 GHz there was nothing that indicated a major problem. Work was done on mitigating (e.g., physical barriers) the RFI impact from interference created at the station itself (e.g., DORIS beacon and SLR aircraft avoidance radar). GGAO and Westford have broadband systems installed allowing RFI studies with the VLBI system.

### 8.6 VLBI2010 Project Executive Group Chair's report (Hayo Hase) PDF

The V2PEG held monthly telecons and met for two face-to-face meetings.

Fulfilled request from VLBI2010 Technical Specifications Workshop (TecSpec):

- comparative VLBI2010 feed table
  - 13-01-23 distributed
  - [http://ivscc.gsfc.nasa.gov/technology/vlbi2010-docs/feed\\_comparison\\_130214.pdf](http://ivscc.gsfc.nasa.gov/technology/vlbi2010-docs/feed_comparison_130214.pdf)
- comparative VLBI2010 digital backend table
  - 13-02-14 distributed
  - [http://ivscc.gsfc.nasa.gov/technology/vlbi2010-docs/dbe\\_comparison\\_130121.pdf](http://ivscc.gsfc.nasa.gov/technology/vlbi2010-docs/dbe_comparison_130121.pdf)
- both tables have been authored by Bill Petrachenko and will appear in the 2012 Annual Report

Open issues:

- RFI:
  - potential local RFI by DORIS and SLR-radar at GGOS sites (mitigation efforts became part of proof-of-concept)
  - increasing commercial use of bandwidth within 2–14 GHz
- There continue to be large gaps in the station coverage (e.g., Africa, North America, India). The financial resources are limited. There is no strategy on how to expand the VGOS/GGOS network to new countries.

V2PEG Membership: Harald Schuh was ex officio member as IVS Chair; with the end of his chairmanship he had to leave the V2PEG; the new chair would take his position as new ex officio member. Alan Whitney resigned due to his retirement. The Board approved the proposal to add Prof. Zhang from SHAO as new V2PEG member.

## 8.7 Short Reports on Status and Progress of VLBI2010 Projects

Shinobu-san reported about the progress with the Ishioka VLBI station. The land has been leased from the Ibaraki Prefecture. Ishioka is about 17 km northeast of Tsukuba. The telescope will be 13.2-m in diameter, almost identical to the RAEGE antennas. The biggest difference is the frequency range of 1–40 GHz as opposed to up to 100 GHz for the RAEGE antennas. The antenna and the observation building will be completed by the end of March 2014.

Alexander reported about the activities for the new generation Russian VLBI network. The main principles of the new generation VLBI network are:

- full compatibility with the QUASAR radio telescopes,
- that the project be based on the results of the VLBI2010 Committee work,
- that the real site radio climate be taken into account,
- that the radio telescopes work on a 24/7 basis, and
- that the radio telescopes be placed at maximum longitudinal distance from each other.

The proposed locations of the new 12-m class telescopes are Badary, Kaliningrad, Ussurijsk, and Zelenchukskaya. The antennas at Badary and Zelenchukskaya are approved and are expected to be operational in 2015. Money for Kaliningrad and Ussurijsk should also be available and construction might begin in 2015.

Fengchun reported on the status of the VLBI2010 stations in China. Selected sites are Shanghai, Urumqi, and Changchun. The aim is to obtain fringes on the Sh-Ur baseline by 2016, followed by the baselines to Changchun.

## 8.8 RFI at IVS Stations (DORIS and SLR Radar Interference) (Arthur Niell, Bill Petrachenko)

Work is under way to put a physical barrier to block out signal of the SLR radar or DORIS that goes into VLBI antenna. Tests are being done with four-foot by four-foot panels.

## 9. Reports of the IVS Working Groups

### 9.1 IVS WG4 on VLBI Data Structures, Chair's report (John Gipson)

John said that he presented the new VLBI data structure at the EVGA meeting and that a 120-page manual existed.

Directing Board agreed that the WG4 can officially be closed and that a final report should be written.

### 9.2 IVS WG5 on Space Science Applications, Chair's report (Axel Nothnagel, Patrick Charlot)

Axel reported that he had distributed a draft of the final report. There was feedback from several people that could be worked into the draft within the next three weeks. The Board agreed on the closure of the working group under the condition that the final report should be completed.

### 9.3 IVS WG6 on VLBI Education and Training, Chair's report (Rüdiger Haas)

Activities since the last Board meeting:

- Organization of the “EGU and IVS Training School on VLBI for Geodesy and Astrometry” at Aalto University, Espoo, Finland
  - An evaluation questionnaire was handed out
  - Lecture material will be collected and made available via the EVGA Web page
  - Suggestion to repeat the VLBI School in a three-year cycle tagged on to an EVGA or IVS-GM meeting (i.e., EVGA, IVS-GM, EVGA, IVS-GM, etc.)

The Board agreed that the VLBI School should be repeated on the suggested three-year cycle.

## 10. Report of Task Force on IVS Intensives (Rüdiger Haas)

Activities since the last Board meeting were:

- UR.dUT1 (ultra-rapid dUT1)
  - Several sessions during 24-h experiments of the IVS series R1, RD, and T2 using the baseline Onsala–Tsukuba
  - EOPI files
- UR.EOP (ultra-rapid EOP)
  - Several Sessions during 24-h experiments of the IVS series R1, RD, and T2 using a network consisting of Onsala, Tsukuba, Hobart and HartRAO
- A dedicated four-station UR.EOP experiment was planned for December 17/18, 2012

## Outlook

- Concerning observational activities: continue UR.EOP sessions and improve analysis strategy
- Concerning analysis work: unified analysis strategy, three different Int products (ultra-rapid, rapid, final), develop combination approach, develop new analysis approaches
- Concerning results: continue discussion with IERS Rapid Service on the use of UR
- Concerning documentation: report of the Task Force needs to be written

## **11. Items related to IAG, IAU, WDS, and Related VLBI Groups**

### **11.1 IAG (Newsletter contributions, IAG Commission 1 and Sub-Commission 1.4, Commission 3, GGOS)**

An article about the VLBI School could be submitted to the IAG Newsletter.

The Scientific Assembly of the IAG will be held in Potsdam, Germany in September. It is anticipated to be the largest scientific assembly as it is also celebrating 150 years of IAG.

A GIAC meeting will be held in Vienna in connection with a UN meeting.

Axel and Dirk were confirmed as members of the GGOS Consortium.

### **11.2 EVGA (Axel Nothnagel)**

The EVGA had a successful meeting in Helsinki. At the business meeting, Axel stepped down as EVGA chair. The newly elected chair is Rüdiger. The secretary is Susana García-Espada.

### **11.3 IAU and IAU Division A (Patrick Charlot)**

The IAU gets a new structure renaming divisions and commissions. The Working Group on ICRF3 has been initiated under the chair Chris Jacobs. The first meeting was held on March 7, 2013 in Helsinki. The work to be done is extensive. Another working group that was established Working Group on the ICRS. There has been no meeting yet. The chair is François Mignard. The Journées 2013 will take place in September 16-18 in Paris. There will be a dedicated session on the ICRF3.

### **11.4 EVN (Patrick Charlot)**

Work was done on the Proceedings of the 11<sup>th</sup> EVN Symposium; it will be published through the 'Proceedings of Science.' At the last Board meeting in November 2012 in Madrid, it was



discussed to have out-of-session observations. The Board tried to find a way forward to support observations outside of the three EVN observing periods. JIVE is considering a new structure under the European Research Infrastructure Consortium (ERIC). The next Board meeting will be in Manchester, England in April 2013.

## **11.5 ICSU World Data System (Dirk Behrend)**

See TOP 7.

## **12. Recent Meetings**

The EVGA meeting was very successful.

## **13. Next IVS General Meeting at SHAO (Fengchun Shu)**

The LOC was established: Weimin Zheng (SHAO, Chair), Wenting He (SHAO, Secretary), Jinling Li (SHAO), Xiang Liu (Urumqi), Guangli Wang (SHAO), and Xiuzhong Zhang (SHAO).

Early Consideration:

- When: March 2–7, 2014
- Who: 100–150 participants
- Where: Hope Hotel or Shanghai Jiaotong University

Next steps:

- April 2013
  - First announcement
  - Setup of the meeting Web site

Program Committee:

- Dirk Behrend
- Bill Petrachenko
- John Gipson
- Ed Himwich
- Fengchun Shu
- Shinobu Kurihara
- Arthur Niell
- Alessandra Bertarini
- Rudiger Haas
- Alexander Ipatov
- Patrick Charlot

The Board meeting shall be held on the Saturday of the General Meeting week.

The Board suggested using two-column layout and making better use of space.

## **14. Acceptance of New Analysis Coordinator**

### **New proposal:**

- Analysis Coordinator proposal from GSFC (John Gipson):

The Board unanimously approved the proposal. John will be the IVS representative to the GGOS Bureau of Standards and Conventions.

## **15. Election of new IVS Chair (Harald Schuh)**

Axel was suggested as candidate for the new IVS Chair.

The Board unanimously approved Axel as the new chair of the IVS Directing Board.

## **16. Upcoming Meetings**

Upcoming meetings in 2013:

- EGU General Assembly, Vienna, Austria, 7–12 April 2013.
- Earth Tide Symposium, Warsaw, Poland, 15–19 April 2013.
- Inauguration event of the TTW, Wettzell, Germany, 26 April 2013.
- IAG Scientific Assembly, Potsdam, Germany, 1–6 September, 2013.
- 2<sup>nd</sup> International VLBI Technology, Jeju Island, South Korea, 10–12 October 2013.

### **16.1 7<sup>th</sup> TOW, Haystack (Dirk Behrend)**

See TOP 7

### **16.2 Next DB meeting (Axel Nothnagel)**

The next Directing Board meeting will be held after the IAG Scientific Assembly in Potsdam, Germany on Saturday, September 7, 2013.

## **17. Miscellaneous (all)**

None.