

24th Directing Board Meeting – Summary Notes

Location: Shanghai Astronomical Observatory, Shanghai, China
Date: 23 October 2010
Note taker: Dirk Behrend
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Attending Board members: Harald Schuh (Chair), Dirk Behrend, Patrick Charlot, Andrey Finkelstein, Rüdiger Haas, Hayo Hase, Ed Himwich, Shinobu Kurihara, Chopo Ma, Axel Nothnagel, Oleg Titov, Gino Tuccari, Alan Whitney, Xiuzhong Zhang.

Attending guests: Shigeru Matsuzaka, Alexander Ipatov, John Gipson (TOP 7.1), Leonid Gurvits (TOP 7.3).

1. Welcome (Harald Schuh)

Kerry Kingham could not attend. Two guests attended for the duration of their agenda topics: John Gipson and Leonid Gurvits. Shigeru Matsuzaka and Alexander Ipatov were observers for the complete meeting.

2. Approval of Agenda

The board approved the agenda for the 24th DB meeting.

3. Approval of Minutes of the 23rd DB Meeting (Harald Schuh)

The board approved the notes of the 23rd DB meeting.

4. IVS DB Chair's Report (Harald Schuh)

Oral Presentations about the IVS and VLBI2010:

- SKANZ 2010, Auckland, New Zealand, 15.02.2010
- RMIT, Melbourne, Australia, 22.02.2010
- Workshop 'Science with the new 12-m Antenna', Arecibo, Puerto Rico, 10.05.2010
- Ny Ålesund, Svalbard, Norway, 26.05.2010 (Bjørn Engen was hired to manage the project.)
- Norwegian Ministry of the Environment, Oslo, Norway, 28.05.2010
- National Mapping Authority (NMA), Hønefoss, Norway, 28.05.2010
- SIMGEO, Recife, Brazil, 28.07.2010
- University of Vicosa, Minas Gerais, Brazil, 05.08.2010

- AGU Spring Meeting, Foz do Iguassu, Brazil, 09.08.2010

Letters on behalf of the IVS:

- to Per Erik Opseth (Norwegian Mapping Authority, Hønefoss, Norway) supporting radio silence at Ny Ålesund
- to Inaba-san, GSI, Japan (Director of Geodetic Department) welcoming GSI also as an IVS Operational Analysis Center
- to Tasso Tzioumis, Australia (CSIRO) welcoming Parkes Observatory as an IVS Network Station
- letter of support for Géraldine Bourda
- congratulatory letter to the LOFAR Directors for the inaugural event in June 2010

Politecnico di Milano DIIAR (PMD) submitted a proposal for PMD to become an IVS Associate Analysis Center. The Board unanimously approved the proposal.

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

Activities since the last board meeting were:

- Publication of April and August Newsletters
- Publication of 2009 Annual Report
- Preparation of the 2010 General Meeting proceedings
- Maintenance of mailing lists and Web site
- Observing program coordination
- Support of VLBI2010 Committee (V2C)
- Support of VLBI2010 Project Executive Group (V2PEG)
- Condolence message and sympathy card for A.-M. Gontier's passing

Correspondence:

- Letter to CSIRO (Dr. Tasso Tzioumis) welcoming Parkes as IVS Network Station.
- Letters to GSI (Director General Dr. Komaki) and NICT (President Dr. Miyahara) supporting the efforts of both institutions of Kashima replacing Tsukuba in the IVS observing program during Tsukuba's repair.
- Performance review of HartRAO for the South African NRF.
- Letter of request to SHAO (Prof. Zhang) to organize the 24th IVS Directing Board meeting including a station visit to Sheshan.

The Directing Board endorsed the implementation of a hard deadline for future Annual Reports and General Meeting Proceedings.

Activities for the next several months include:

- Publication of December 2010 and April 2011 Newsletters.
- Publication of the GM2010 Proceedings.

- Prepare Board elections.
- Continue work on bibliography.
- Continue GGOS activities.
- Coordinate IVS' WDS activities.
- Coordinate next Directing Board meeting.

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:

- VLBA situation: The RDV sessions were suspended indefinitely from the VLBA. Dirk drafted a letter of concern and sent it to the VLBA. The RDV sessions were resumed in June.
- TIGO (after earthquake): A special series of five 3-hour sessions on the network Hobart-Kokee-TIGO-Westford were observed to determine post-seismic effects after the Chile earthquake.
- 2010 R&D sessions: The R&D sessions in April and May 2010 continued the series of sessions to improve Intensive scheduling. The OPC agreed to use the station time from the remaining R&D sessions of the year to bolster the rapid-turnaround sessions.
- CONT11: The OPC decided to observe a continuous VLBI campaign in 2011 (CONT11) in the second half of September.
- Media Pool: GSFC decided to purchase PATA disks to upgrade 107 of the 960-GB modules to 4-TB modules.
- Wettzell repair (and Intensives): Wettzell needed to replace the elevation bearings and was down during the 3-months repair work, which was scheduled for summer/fall 2010. Until the repair, Wettzell continued to observe the Intensive sessions, but reduced the observational load in the 24-hour sessions to once per week. Ny Ålesund agreed to serve as substitute station for Wettzell in the Int1 Intensives during the repair, while Westford agreed to serve as substitute in the Int2 Intensives.
- Intensives (Ts down due to lightning strike): Dirk discussed with GSI and NICT the possibility of Kashima 34-m replacing Tsukuba in the Int2 and Int3 Intensives while Tsukuba was being repaired for a lightning strike. The two agencies agreed and arranged the necessary contract modifications. The "replacement Intensives" had a different letter code than the regular Intensives, as the main baselines were different.
- Mark 5A/5B transition plan.
- e-transfer coordination: The Coordinating Center started to compile a list of e-transfer capabilities for stations and correlators.
- AuScope status.
- 2011 planning: The OPC approved the observing plan for 2011.
- Purpose of 2011 R&D sessions: The sessions should be used to check out the CONT11 observing mode at the participating stations.
- 0127+084 occultation event on 3 May 2011: The occultation event of 0127+084 by Mars on 3 May 2011 cannot be observed by VLBI; it should probably be a single dish observation.

In 2011, the observing plan may move from being media and station time driven to perhaps driven by data transfer capabilities. The major changes with respect to the previous observing year are that the Australian and New Zealand stations come online; HartRAO and Fortaleza are repaired and observe again; the addition of the regional AUSTRAL session series; in general larger networks; and the observation of the continuous VLBI campaign CONT11.

6.2 Publication about IYA Super Session (Patrick Charlot)

At the last Directing Board meeting, the decision was made to have a publication about the IYA09 session. Bordeaux Observatory intends to do some imaging work using this session. As the RDV sessions are correlated at Socorro but the IYA09 session was correlated at Haystack, some additional work will be necessary. The paper should include some astrometric results.

6.3 Analysis Coordinator's extended report (Axel Nothnagel) and status of Call for Proposals for 'IVS Special Analysis Centers Specific Observing Sessions (SAC-SOS)' (Axel Nothnagel)

The timeliness for submission of the individual Analysis Center results of the rapid-turnaround session needs improvement. In an ideal case (e.g., R1449) the six Analysis Centers submitted their results all within 1–2 days of each other. However, in other cases there is a week between the deliveries of the various ACs or one of the ACs did not submit at all. The delay/non-submission impacts the combination work.

Combination issues: The official start of EOP combinations at BKG Frankfurt was 1 Oct 2009. However, the change of responsible staff members caused and continues to cause friction loss and the quality of the combination suffers. The quality of the EOP results is deteriorating. For 2010 there is a trend in the EOP combination. Combination issues: transition to IAU2000/IAU2006 X/Y Precession/Nutation (partials for X and Y nutation, $d\psi$ and $d\epsilon$ via transformation); support for NMA (GeoSAT); report datum-free CRF NEQ elements in SINEX files; combination of Intensives on the basis of SINEX files (pending).

In order to preserve the raw correlator output (~1 GB per session) for possible later usage, the files should be stored at an IVS Data Center or a different data repository.

There was one proposal for SAC-SOS: from the Vienna group. The Directing Board accepted the proposal. The SAC-SOS call is a standing call.

6.4 Network Coordinator's report (Ed Himwich)

The 2009 station performance report was based on 135 experiments; 22 missing experiments were not yet available. There were 1051 station days (~7.8 stations per experiment). About 226 station days of data were lost (~21.5%). The data loss does not include HartRAO and is an

increase with respect to previous years. However, most of the increase can be attributed to how data loss is tracked.

Warkworth is waiting for their DBBC. The Hobart 12-m antenna is undergoing testing; six good sessions between the 12-m and 26-m antennas are necessary for a good tie. Katherine and Yarragadee, Wettzell Twin Telescope, and GSFC 12-m antenna are under construction.

The Mark 5B upgrade at Matera is complete. The upgrade at Ny Ålesund is in progress. TIGO and Kokee will start soon with their upgrade. Wettzell will commence with upgrade when the 20-m returns into operation.

6.5 Technology Coordinator's report (Alan Whitney)

VDIF: The VDIF data format has generated significant interest and there is a push to implement it. It is widely recognized as important and has been implemented in several systems (RDBE at Haystack, Fila10G at Metsahovi/MPI/Gino Tuccari, LBA (Chris Phillips) in Australia.

VTP (VLBI Transport Protocol): The VTP Task Force (Chris Phillips (chair), Mark Kettenis, Mamoru Sekido, Richard Hughes-Jones, and Alan Whitney) is still debating some issues with an effort to make it as simple as possible. There is a push to have the final draft for review before end of CY2010. VTP will be a common specification of a transfer protocol for e-VLBI.

VEX2: The VEX2 Task Force (Walter Brisken (chair), Ed Himwich, Mark Kettenis, Cormac Reynolds, and Alan Whitney) has been working to update VEX to support new devices and operational modes. Significant progress has been made, and the work is continuing.

The 9th International e-VLBI Workshop took place in Perth, Australia in October with about 50 participants. The SKA has a high demand for multi-Tbps data rates. This is feasible but not economically viable; it may be in 5–10 years from now.

A Patriot 12-m antenna has been erected at GGAO. A successful RDBE test has been performed between the Westford 18-m antenna and the GGAO 5-m antenna. Mark 5C can be ordered from Conduant (several have already been delivered), but it is still premature to use in production work.

6.6 VLBI2010 Committee report (Bill Petrachenko given by Dirk Behrend)

Monte Carlo simulations of “realistic” networks were done in order to predict the performance of a network that might realistically operate by 2015. An 18-station test network was selected that included fast new antennas, slower new antennas, and some legacy antennas. The most realistic test network is a moving target depending on current antenna proposals. The modes included observing of 4x1-hr, 4x2-hr, and 8x1-hr per day. The network of mixed capabilities was more challenging to schedule, but resulted in significantly better EOP formal errors than the CONT campaigns, in particular for the 8x1-hr mode. The full potential of the VLBI2010 setup cannot be

exploited because of the mixed network constraints; for instance, the fast antennas spent 67% of their time in idle state. The current and future simulation work is mainly directed at improving scheduling algorithms and supporting antenna proposals.

There are possible RFI issues arising from co-locating different techniques at the same site. Intra-site RFI sources could originate from an SLR aircraft avoidance radar or from a DORIS beacon. The VLBI2010 2–14 GHz broadband feed and LNA are wide open to the 9.4-GHz SLR-pulsed radar transmissions and the 2-GHz DORIS beacon. LNA saturation may degrade or destroy the entire 2–14 GHz range. Proposed power limits at input are -70 dBW for SLR radar and -80 dBW for DORIS. As a preliminary conclusion, a line-of-sight physical barrier will possibly be needed to attenuate DORIS and SLR radar signals in order to allow a 100-m proximity to the VLBI2010 antenna.

6.7 VLBI2010 Project Executive Group Chair's report (Hayo Hase)

During the General Meeting week in Hobart, the V2PEG met in person and formulated the following strategic goals: perform UT1 measurements from 2013 onwards in VLBI2010 mode, establish a certification process on VLBI2010 compliance, and identify potential individuals or organizations to foster VLBI2010 in certain countries or regions.

The V2PEG received requests and/or sent the following letters of support:

- March 2010: requests from Saudi Arabia, India, and Norway
- April 2010: radio-quiet zone support for Ny Ålesund
- May/June 2010: sent letter to South Africa and South America (SIRGAS)
- August 2010: request from France for Tahiti
- September 2010: request from Finland
- October 2010: request from Spain, letter to GSI

The V2PEG will conduct a survey of the IVS Network Stations with respect to their VLBI2010 plans. Feedback from the survey results will be sent back to the stations. Follow-up support will be provided to interested parties.

6.8 Short Reports on Status and Progress of VLBI2010 Projects

Xiuzhong reported about the Chinese proposal for four VLBI2010 antennas: Sheshan, Urumqi, Tibet, and Northern China. Kurihara-san mentioned the GSI proposal which was submitted; the proposal is for one VLBI2010 antenna probably at the Tsukuba site.

Andrey reported that IAA obtained funding for VLBI2010 feasibility studies. The plan is to have four stations: Badary (2013) and Zelenchukskaya (2014) from the Quasar network as well as Ussurijsk and Kaliningrad (not approved yet). The latter two sites would be under the auspices of the Ministry of Defense in support of Glonass. The two small Quasar dishes would function as backup.

7. Reports of the IVS Working Groups

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

The goals for the new data structure are: completeness, ease of access, reduced redundancy, flexibility, commonly used subsets easily available (e.g., NGS cards), ability to access subsets of data, common data storage format. The current data structure (Mk3 database) was designed so that all relevant data is in one database. The new structure uses a modular approach to data: a special file called a wrapper points to other files that contain the data. The other files are (usually) NetCDF files that contain closely related data, but they could also be in other formats such as FITS. The wrapper concept, together with storing most of the data in NetCDF format, meets all the design goals.

Key stages in transition:

- wrapper grammar must be well specified.
- contents of individual files must be well specified.
- need to write software to convert Mk3 databases to nuDB format.
- develop interfaces so software can use new format.
- distribution of data in new format.

John will complete the conversion program *db2nuDB* and finish the interface to Calc/Solve. The new format may possibly be distributed by the EVGA meeting in Bonn in March 2011.

7.2 IVS WG5 on Space Science Applications, Chair's report (Leonid Gurvits)

The WG5 on Space Science Applications was formed in March 2009 and is co-chaired by Leonid Gurvits and Patrick Charlot. It is tasked with the investigation of synergies in scientific and technological areas between the IVS core activities and VLBI experiments in application to planetary and space science missions. The Terms of Reference were approved in August 2009 and the membership has been finalized. There were slower than expected activities mostly due to unexpected personnel developments. Since June 2010 an overview of the relevant space programs has been done. Synergies lie where spacecraft (S/C) function as VLBI targets, where state-vectors of S/C are estimated, and with geodetic support of antennas involved in S/C tracking and VLBI surveys of reference sources for S/C VLBI tracking. Work on a White Paper has begun in October 2009 with establishing and redacting the glossary; actual writing has started in August 2010.

7.3 IVS WG6 on VLBI Education and Training, Chair's report and Final Approval of Members (Rüdiger Haas)

A summer school could be organized in 2011. A possible location would be Onsala either in early June 2011 or during the CONT11 campaign. With perhaps 20–30 students to be expected,

five teachers may be appropriate. An open question is financial support for such a summer school.

Possible topics for an IVS summer school could be:

- hardware and observations (actual observation Onsala–Metsahovi),
- correlation (DiFX @ Onsala),
- data analysis,
- applications in geosciences and interpretation of results,
- applications in astrometry and interpretation of results.

The Director of Onsala is, in general, willing to support the school by providing, for instance, room facilities. A proposal for support from the Swedish Research Council is in preparation and needs to be submitted in fall 2010.

8. DORIS Interference at IVS Stations (Status of Tests) (Ed Himwich)

See also TOP 6.6. Frank Lemoine (GSFC) proposed to form a joint study group on RFI between DORIS and VLBI. Harald supported this idea and suggested that a DORIS beacon be made available for testing. There are seven co-location stations with DORIS and VLBI.

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

The Task Force on IVS Intensives consists of 9 members: Rüdiger Haas (chair), Axel Nothnagel, Kerry Kingham, Brian Luzum, Dirk Behrend, Shinobu Kurihara, Thomas Hobiger, Minttu Uunila, and Zinvoy Malkin. The Task Force topics are: unified analysis strategy for INT, three level INT products, routine automated ultra-rapid dUT1, and additional ultra-rapids.

The three-tier INT products are based on the latency for having results: Ultra-rapid dUT1 (within 1 hour), Rapid dUT1 (within 6 hours), and Final dUT1 (within 24 hours). Onsala and Tsububa have successfully run tests of Ultra-rapid dUT1 during regular 24-hour sessions. GSI has tested INT2 sessions in ultra-rapid mode; the results are being evaluated at USNO.

10. Demonstration of Dynamic Web Page for Every IVS Session, and Approval (Patrick Charlot)

Patrick gave a demonstration of the IVS LIVE Web site (<http://ivslive.obs.u-bordeaux1.fr>) using session F10296. The Board was very impressed and thanked Arnaud Collioud for the excellent job. The Board unanimously approved to make the site publicly available.

11. Items related to IAG, IAU, FAGS, and Related VLBI Groups

11.1 IAG

11.1.1 IAG Newsletter Contributions (Dirk Behrend)

The next topic for the IAG Newsletter should be the coming-online of the AuScope antennas.

11.1.2 IAG Commission 1 (Chopo Ma, Harald Schuh)

Harald reported that the REFAG meeting was held in Paris about two weeks ago. The ITRF2008 was presented by Zuheir Altamimi (IGN France); an alternative solution by DGFI called ITRF2008d was also presented.

11.1.3 Journal of Geodesy, Special Issue on CONT08 (Axel Nothnagel)

The guest editors (Axel Nothnagel, Urs Hugentobler, and David Salstein) wrote the foreword for the special issue and publication was envisioned for March/April 2011. The CONT08 issue of Journal of Geodesy is a good vehicle to show at the stations that their data have been used.

11.1.4 Nomination of an IVS Candidate for IAG Executive Committee Elections (Harald Schuh)

There was consensus among the Board that Axel should be the proposed IVS candidate for a services' position on the IAG Executive Committee.

The Board agreed that Dirk should be the contact person for the effort to make the ITRS an ISO standard.

11.2 EVGA (Axel Nothnagel)

The next EVGA meeting will be held in Bonn in the last week of March 2011. The host will be MPIfR. Planned are two days of EVGA meeting, a half-day IVS Analysis Workshop, and a visit to Effelsberg.

11.3 IAU (Patrick Charlot)

The Journées were very interesting; among other things, the improvement of ephemeris and aspects pertaining to reference frames were covered. Harald added that there would be the joint GGOS/IAU workshop in Shanghai the days following the Board meeting. The IAU General Assembly 2012 will be held in Beijing in August 2012.

11.4 EVN (Patrick Charlot)

Meetings:

- Past:
 - last EVN CBD + JIVE Board in Torun/Warsaw on 21–22 April 2010 cancelled due to volcano eruption in Iceland (replaced by telecon)
 - TOG meeting: Helsinki, 21 June 2010
 - JIVE Board meeting: Schiphol, 12 July 2010
 - EVN Symposium: Manchester, 20–24 September 2010
 - EVN CBD meeting: Svetloe, 7–8 October 2010

EVN Symposium:

- very successful meeting (>100 participants)
- most presentations based on recent EVN observations
- 7 scientific sessions
- EVN users meeting held at Jodrell Bank

Recent news:

- KVAZAR stations joined EVN for the first time in May–June 2010 session
- Number of e-VLBI and ToO proposals is increasing
- e-VLBI already more reliable than disk-based VLBI
- EXPRoS completed: regarded as “extraordinary successful” by EC
- NEXPRoS (EXPRoS follow-up) approved early August
 - bring increased sensitivity, flexibility and robustness of real-time VLBI to all EVN experiments
 - step towards exclusive use of real-time high-bandwidth e-VLBI for EVN

RadioNet

- RadioNet2 (2009–2011)
 - Mid-term report for RadioNet submitted end of August
 - Mid-term review held in Riga early October
- RadioNet3 proposal (2012–2015) is being prepared
 - in response to a targeted call from EC for large infrastructure
 - includes transnational access, networking activities and joint research activities
 - involves >20 RadioNet institutes
 - coordinator: A. Zensus (MPIfR)

11.5 ICSU World Data System (Harald Schuh, Dirk Behrend)

The World Data System (WDS) is being established as successor organization of FAGS and WDC. The committee in charge of setting up the Terms of Reference prepared a first draft of statutes.

11.6 Geodetic Applications of the SKA (Oleg Titov)

The Australian SKA Pathfinder (ASKAP) as a prototype for SKA can be used for geodesy as a single big dish. It may be worthwhile to do some simulations.

12. Next IVS DB Elections (Dirk Behrend)

The Board established the Election Committee at its previous meeting with Kerry (chair), Oleg, and Dirk. Five positions were to be re-filled: two representative and three at-large positions. A general article about the elections was published in the April 2010 issue of the IVS Newsletter. Three members of the current Board (Kerry, Andrey, and Xiuzhong) were not eligible for re-election. The Board approved the suggested timeline for the 2010 elections.

13. Meetings

13.1 Recent Meetings (EGU2010, Journées 2010, REFAG2010, 9th International e-VLBI Workshop) (all)

Most meetings were covered in previous TOPs. The next e-VLBI workshop will be held at Haystack Observatory in fall 2011. The next TOW is scheduled for 9–13 May 2011 and will be held also at Haystack Observatory.

13.2 Next DB Meeting (Harald Schuh)

The next Board meeting will be on 1 April 2011 in Bonn.

The next Journées 2011 will be held in Vienna on 19–21 September 2011. The following Board meeting is to be held directly after the Journées.

14. Miscellaneous (all)

None.