

## Chair's Report at the Third IVS General Meeting

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### Abstract

This report presents the status of the IVS and gives some prospects for the future.

### 1. General

The International VLBI Service for Geodesy and Astrometry holds its General Meetings (GM) every two years. The first IVS GM in Kötzing, Germany, held February 21-24, 2000, was guided by the keynote “Highlights and Challenges of VLBI”. The goal was to provide an interesting and informative program for a wide cross section of IVS members on the high goals of VLBI technology and its potential for the future. The keynote for the second IVS GM in Tsukuba, Japan, held February 4-7, 2002, was “Prospectives for the Future” in keeping with the reorganization of IAG around the motivation of geodesy as “an old science with a dynamic future” and noting the challenging role of IVS in maintaining global reference frames on the highest accuracy level. Products and observing programs were reviewed in the Working Group 2 report, and proposals were made and discussed with the goal of having a common plan for improvements in the coming years, in order to meet the service requirements. The keynote of the third IVS GM in Ottawa, Canada, held February 9-11, 2004, is visions for the next decade following the main theme of “Today's Results and Tomorrow's Vision”. The outstanding VLBI results available today are the foundation and motivation for the next generation VLBI system requirements. All speakers were encouraged to address the results of today and to consider possible future directions.

So far the GMs have been held in Europe, Asia and North America, which reflects the global task and the global international collaboration of IVS. It is obvious that the next GM should be in the southern hemisphere. I thank the University of Concepción, Chile, where the German Transportable Integrated Geodetic Observatory (TIGO) is located, for their willingness to host the IVS GM in 2006.

Much work was done for GM 2004 by the Local Organizing Committee and also by the IVS Coordinating Center. I express my thanks to the Geodetic Survey Division, Natural Resources Canada for hosting the third IVS GM and for organizing the meeting in Ottawa, in particular to the members of the Local Organizing Committee:

- Calvin Klatt
- Anthony Searle
- Mario Bérubé.

I also thank the IVS Coordination Center, in particular Nancy Vandenberg, for strong support.

For the preparation of the GM 2004 program I thank the Program Committee and the session conveners. They were:

- Wayne Cannon (SGL/Crestech, Canada)
- Rüdiger Haas (Onsala Space Observatory, Sweden)
- Hayo Hase (BKG-TIGO, Germany)
- Ed Himwich (NVI, Inc./GSFC, USA)
- Kerry Kingham (USNO, USA))
- Yasuhiro Koyama (CRL, Japan)
- David Lapsley (MIT Haystack, USA)
- Zinovy Malkin (IAA, St. Petersburg, Russia)
- Arthur Niell (MIT Haystack, USA)
- Axel Nothnagel (Univ. Bonn, Germany)
- Bill Petrachenko (NRCan, Canada)
- Wolfgang Schlüter (BKG, Germany)
- Harald Schuh (TU-Vienna, Austria)
- Volker Tesmer (DGFI, Germany)
- Oleg Titov (Geoscience Australia, Australia)
- Nancy Vandenberg (NVI, Inc./GSFC, USA)
- Alan Whitney (MIT Haystack, USA).

I thank all the participants for making the meeting successful by attending and by preparing and presenting papers, chairing sessions and more. We have six very interesting sessions:

- VLBI: Today's Results and Tomorrow's Vision (4 oral presentations, 1 poster)
- VLBI2010 (13 oral presentations, 2 posters)
- Network Stations, Operation Centers, Correlators (9 oral presentations, 7 posters)
- New Technology Developments in VLBI (12 oral presentations, 7 posters)
- Analysis Strategies and Software (8 oral presentations, 10 posters)
- Results and Geodetic/Geophysical/Astrometric Interpretation (18 oral presentations, 16 posters.)

with 64 oral presentations and 43 posters, which is remarkable as we have 111 registered participants.

## 2. “Today’s Results, Tomorrow’s Vision”

In general VLBI provides products for the Celestial Reference Frame (CRF) uniquely, for the Terrestrial Reference Frame (TRF), and delivers the combining elements between both frames as the Earth Orientation Parameters (EOP), uniquely the complete set in particular the velocity of the rotation as DUT1. As no other technique is capable of providing the fundamental products for CRF and for the EOP, and in particular the DUT1, in the future IVS will continue to place emphasis on its strengths. We will have to carry on the fundamental role of VLBI for contributing to research programs related to global and climate change, natural hazards and Earth observations and for many applications in navigation, in positioning and for space missions as well.

Considering the keynote “Today’s Results and Tomorrow’s Vision” I will focus on two events which recently have demonstrated the excellence of VLBI/IVS products. “Today’s Results ....” are basic products for research and for many applications.

The MARS Mission, which was reported in the newspapers recently, is a good example of the application of VLBI products. Precise VLBI results were needed to point antennas to the space vehicles for communication. As a spectacular event, the mission was recognized by German newspapers and “by accident” the contribution of VLBI, supporting the mission with EOPs, was mentioned in various articles to the public.

As a significant application of the excellence of VLBI products in research, the work done by the IAU Working Group “Non-Rigid Earth Nutation Theory” chaired by Dr. Veronique Dehant, Royal Observatory Belgium, has to be mentioned. The working group won the Decartes Prizes 2003, which is the highest award for science in Europe. VLBI contributed the precise EOP time series needed to confirm the theory. I would like to express my respect and congratulations to the Working Group.

Geodetic VLBI has been successful over the past three decades; however, a number of factors are converging to make progress more difficult. Most antennas and equipment were developed in the 70’s and 80’s and are close to being worn out today. Increasing interference (in particular at S-Band) decreases the data quality. The network distribution and locations of antennas are not ideal and are unbalanced. The operational costs vs. efficiency (due to old equipment) have to be improved. Overall new technology and improved strategies will be required.

To develop plans for the future or even to think about a new VLBI generation, visions are needed. The IVS Working Group 3: “VLBI2010” was established by the IVS Directing Board at its 10th Meeting, in order to come up with recommendations to be presented in a vision paper as VISION 2010. Such a document is strongly needed for:

- planning the long term developments
- planning budgets of contributing agencies
- initiating new developments
- motivating contributors
- optimizing future resources.

With the adoption of the keynote “Today’s Results and Tomorrow’s Vision” for this General Meeting, it is expected we will initiate additional input from the attendees. The Program Committee invited well known keynote speakers, who were asked to focus to future requirements they

would like to see realized in VLBI in their field. It is with pleasure that I thank the keynote speakers for their willingness to present a paper:

- Patrick Charlot: “The ICRF: 2010 and Beyond”
- Martine Feissel-Vernier et al.: “VLBI and the Earth Rotation: Geophysical and Geodetic Challenges”
- Hermann Drewes and Chris Reigber: “IGGOS—Its Mission, Scientific Rationale, and First Steps and Ideas for its Design and Development.”
- Benjamin Chao: “Earth Rotation Dynamics: Review and Prospects”
- John LaBrecque: “The International Global Network of Geodetic Fiducial Stations”.

### **3. Important Steps Since GM 2002**

Since the General Meeting 2002 significant improvements have been made to meet the service requirements. In January 2002 the new IVS observing program was introduced. The quality and quantity of observations were increased and additional resources were included, following the resolution released at the GM 2002. All together this resulted in strong improvements in the IVS products. For research investigations CONT02 was carried out, providing an important data set to investigate VLBI capabilities and to support research in the combination with other techniques. The transition from Mark IV (tape recording systems) to Mark 5A (disk recording systems) was organized and realized successfully and in a remarkably short period of time. This transition opened up new capabilities and increased the efficiency by decreasing the operation costs. Using the VLBI Standard Interface (VSI) the newly developed disk-based recorders such as Mark 5 (USA) and K5 (Japan) can be combined in observing sessions, which gives more flexibility in the use of network stations. Employing disk-based recorders pushed forward the development of e-VLBI. Several e-VLBI experiments have been performed successfully in national, international and global experiments. The developments for e-VLBI are close to being employed in routine operation, e.g. for the Intensives. It also has to be mentioned that troposphere time series are provided now regularly as an official IVS product.

### **4. Concern to Guarantee Product Availability with High Quality and Timeliness**

Recognizing the urgent need for the products that the IAG services such as the IVS, the ILRS and the IGS are providing today, and considering the resulting responsibility of the services, I take, as Chair of IVS, the opportunity to express some concern.

Due to lack of money, agencies might be forced to consider reduction of support for IVS. Consequently this might result in a decrease of quality of the generated products. Finally it could result in a collapse, if major contributors might be forced to withdraw their support. In any case, it should be considered that IVS is dependent on contributions of agencies, as they proposed in their response to the call for participation. The product generation through collaboration – as the IAG services are doing – is most effective: all agencies contribute according to their ability and in return all partners benefit from products which could never be achieved from a national institution by itself. I emphasize that IVS optimizes the use of VLBI resources to obtain the best products. It is obvious that this kind of service organization is sensitive to any reductions of support, but this

approach keeps the costs low and results in high quality products. I remind you that IVS needs the long term continuous support which ultimately remains the responsibility of all members and member institutions. I urge everybody to do their best to continue the excellent work, which will be the best argument for being respected in, and for maintaining the support of, society.

## **5. From the Directing Board**

With the beginning of the year 2003 the second four-year Directing Board terms commenced and some changes have to be mentioned. James Campbell, University of Bonn, Germany, withdrew from the board as IAG representative. He was replaced by Harald Schuh from the University of Vienna, Austria. Harald was appointed by the IAG. Nicole Capitaine, Paris Observatory, France as IAU representative was replaced by Patrick Wallace, Rutherford Appleton Laboratory, U.K. By a decision of the board, the new representative for the Analysis and Data Centers became Zinovy Malkin, Institute of Applied Astronomy, St. Petersburg, Russia. The term expired for the at large members Wayne Cannon, Space Geodetic Laboratory, Ottawa, Canada and Paolo Tomasi, Istituto di Radioastronomia CNR, Bologna, Italy. The new members elected by the board were William Petrachenko, Natural Resources Canada, and Franco Mantovani, Istituto di Radioastronomia CNR, Bologna, Italy.

I like to take this opportunity to express my sincere thanks to James Campbell, to Nicole Capitaine, to Wayne Cannon and to Paolo Tomasi for their important support and their significant contributions in the IVS Directing Board. It was a pleasure to collaborate with all during the first four years. I congratulate Harald Schuh, who is also one of the representatives of the services in the new IAG Executive Committee, William Petrachenko and Franco Mantovani on being elected to the IVS Directing Board.