

IVS Newsletter

Issue 6, August 2003



2nd IVS Technical Operations Workshop to be Held at MIT Haystack Observatory in September

—Dan L. Smythe, MIT Haystack Observatory

Following the success of the First IVS Technical Operations Workshop held at MIT Haystack Observatory in March 2001, the Second IVS Technical Operations Workshop will be held at MIT Haystack Observatory in Westford, Massachusetts USA on 22-25 September 2003. The workshop will be oriented towards hands-on training and problem resolution in VLBI operations.

The intended audience for the TOW is the technical staff of the stations. The meeting will consist of hands-on workshops, group discussions, lectures, and seminars. Topics to be covered will depend upon the interests expressed by participants who provide feedback to the TOW Program Committee.

A partial list of potential topics includes the following:

Operations workshops

- Experiment pre-checks and experiment operations
- Mark 5 recorder operation and testing
- Pointing models and gain calibration

Maintenance workshops

- Rack, recorder, and receiver maintenance
- RFI identification and remedies
- Use of spectrum/FFT analyzer in system diagnosis

Lectures and demonstrations

- Basic Linux and Linux system administration
- Using S2 systems

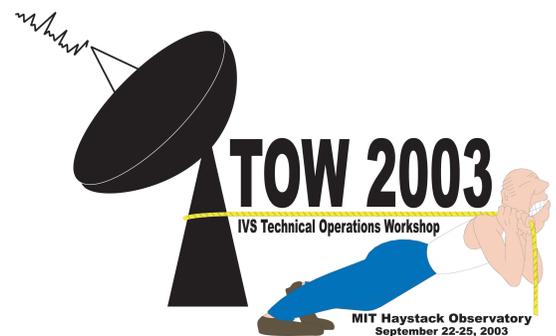
- Hydrogen maser monitoring and maintenance Seminars
- Science Overview
- IVS observing program evolution
- Real-time and near-real-time e-VLBI

Participants are encouraged to provide feedback to the Program Committee to indicate the topics on which they would like to receive training.

Please visit the meeting web site for the complete list of classes and then send your comments to ivstowpc@ivscc.gsfc.nasa.gov.

We hope that all VLBI stations will be able to send technical representatives. This meeting represents a rare opportunity for both training and communication with personnel from other stations, the coordinating center, and the correlators. Potential attendees should also read Mike Poirier's **VLBI How To...** column on page 3 of this Newsletter for some tips on how to prepare for the meeting.

<http://ivscc.gsfc.nasa.gov/meetings/tow2003>



New VLBI Brochure to be Published

The IVS Directing Board appointed a team to work on making a color brochure about VLBI available. The new brochure would be an update to the black-covered 16-page NASA brochure published in 1995. Because the original brochure was well received, the team decided not to redesign the booklet but rather to update the graphics and to re-write the text with a focus on international VLBI programs and the IVS. The team members are Ruediger Haas, Yasuhiro Koyama, Chopo Ma, Wolfgang Schlüter, Nancy Vandenberg, and Alan Whitney.

A request for contributions of antenna photographs was sent to all the stations. We hope to use as many antenna pictures as possible. The team would also welcome suggestions and contributions from anyone in the community. Graphics that help explain what VLBI does, its importance, and what the results mean would be especially useful.

The anticipated publication date for the new brochure is in fall 2003.

VLBI News

Sayonara (Good-bye) 26-m antenna at Kashima

—Hiromichi Tsuji, GSI, Yasuhiro Koyama, CRL

The Kashima 26-m antenna (station code: KASHIMA, DOMES number: 21701S001) stopped its operations in 2002 and was dismantled by the end of March 2003.

The antenna was originally constructed in 1968 at Kashima Space Research Center of the Radio Research Laboratory (now Communications Research Laboratory). In its early days, the antenna was equipped with a C-band receiver and was used in research and development for satellite communications.

Later, the antenna was upgraded with S-band and X-band receivers for VLBI observations and in 1983 started to participate in international geodetic VLBI sessions.

Through the international geodetic VLBI sessions, the antenna played an important role in confirming plate motions in the 1980s. After being transferred to the Geographical Survey Institute in 1992, the antenna was actively used in various international VLBI programs as the core site of Japan. As one of the achievements of the VLBI programs, the antenna's position was used as the de-facto origin of the Japanese Geodetic Datum 2000, which superseded the Tokyo Datum in April 2002 with a revision of the Survey Act. In other words, the antenna determined the position of Japan in the world.

The dismantling of the 26-m antenna started on January 6, 2003. The main reflector panels, the sub-reflector and the supporting structures were removed within the first few days. Elevation gears and motors, the receiver room, and stairs were removed in the second week. Then the concrete pedestal was removed over the next few weeks. Since many people are living nearby, the concrete was broken



Many people gathered at Kashima for the farewell ceremony on September 20, 2002.



This picture was taken in 1968 after the completion of the 26-m antenna. In the distance, an old 30-m antenna (already dismantled) is visible.

carefully and slowly to minimize the terrible noise. Lastly, the concrete foundation was removed, taking more than a month. The pictures and movies taken during the dismantling work are available at <http://www.crl.go.jp/ka/radioastro/sayonara26/sayonara26-e.html>.

Thus, the history of the 26m antenna was closed with many memories, but the role of the antenna will be inherited by the 32-m antenna at Tsukuba and two other antennas (34-m and 11-m) at Kashima.



(left) On January 6, 2003, the dismantling procedure began. (Below) This picture was taken after the dismantling. 34-m antenna is visible over the building in the left.



VLBI How To...

New IVS Pilot Project: Time Series of Station Coordinates and Baseline Lengths

—Axel Nothnagel, Geodetic Institute of the University of Bonn

Users of VLBI results have often asked for station coordinate time series and baseline length histories. The use of this type of time series is manifold. Time series of station coordinates may be used for a detailed analysis of periodic and aperiodic variations related to individual VLBI sites caused by various geophysical phenomena. Baseline length series can be inferred by coordinate lists and provide valuable insight into scale variations. Both types of information can also be compared with results of other techniques. In addition, time series of coordinates and baselines produced by different VLBI analysis software packages may help to investigate systematic errors of these packages.

In order to satisfy this demand and to augment the list of IVS products by another valuable service, a proposal was sent to the IVS Directing Board to start the formal process of introducing IVS time series of station coordinates and baseline lengths. The IVS Directing Board approved the proposal as a Pilot Project before a regular service will be established. Subsequently, a call for proposals has been sent out to the IVS Analysis and Associate Analysis Centers soliciting proposals for regular submissions of session coordinate results in SINEX format. The time requirements for the submissions of 6 weeks after correlation are much less tight than for EOP. Initial submissions should at least contain results of all sessions since January 1, 2002, gradually working backwards as the capacities of the participating Analysis Centers permit. Proposals are due by September 30, 2003 and the Pilot Project will officially start on January 1, 2004.

From the input files the IVS Analysis Coordinator's office will compute combined baseline lengths which will be uploaded to the IVS Data Centers on the basis of one file per baseline. Other products such as combined station coordinate time series may follow if there is demand for this. A file structure appropriate for this type of results will be set up in cooperation with the IVS Coordinating Center. Initially, baseline length files are planned to be updated bi-monthly.

Preparing for the 2003 TOW meeting

—Michael Poirier, MIT Haystack Observatory

As operations people, some of us will attend the 2003 TOW workshop at Haystack Observatory in September 2003. This workshop, like others in the past, will focus on improving the quality of the data that we provide to the correlators. Be sure to send feedback about the draft class list so that the topics on which you need training will be offered.

Prior to arriving we should be prepared for some discussions regarding local problems that we encountered during the previous year. A very helpful idea is write down a list of problems and or questions so that they can be presented to the experts during group meetings or private discussions. If you have a site check list, bring it to the meeting.

When you arrive, attend the icebreaker on Sunday evening and seek out people whom you may know. Ask them to introduce you to people that work at other stations. If you know no one, read the name tags that we all wear and just say hello. I am sure everyone will greet you with a smile and assist in your meeting of others. I will be happy to introduce everyone to anyone. Our stations may be located in different countries but we are all doing the same task with similar equipment.

Attend the individual workshops that focus in areas that you may have had problems. Ask questions during every class to make sure you understand the material. If your question was not answered in enough detail or you still have some confusion, ask the instructor for a time when it may be convenient to discuss your problem.

Plan to participate in the group discussions about suggested improvements to the Field System and to operational procedures. These meetings will be restricted to operator staff only, so everyone can feel free to express his or her opinion. The results of the discussions will provide feedback to the experts so that real improvements can be made overall.

We all have problems and we all have made mistakes which caused loss of data. The better we communicate our experiences to each other the better the operational data quality will be.

The Newsletter editors welcome Mike Poirier as the new contributor for the "VLBI How To..." column. Mike would like to get feedback on his columns and would like to hear from anyone with suggestions for future columns. Send your comments to michael.poirier@haystack.mit.edu.



IVS CHAIR INTERVIEW

Wolfgang Schlüter Begins Second Term as IVS Chair

Dr. Wolfgang Schlüter is the scientific director of the fundamental station Wettzell and Chair of IVS. He was re-elected to the Directing Board by the IVS Associate Members in January, 2003, and elected IVS Chair at the board meeting in April. Wolfgang was interviewed via e-mail by Hayo Hase.

Q. Wolfgang, looking back to your professional career as geodesist, when did you hear the first time in your life about VLBI and what did it mean to you then?

The first time I heard about VLBI was approximately 1978, when we at IfAG – the former BKG – had to set up our part of the program for our research group called “Sonderforschungsbereich Satellitengeodäsie SFB78”. An important topic was the upgrade of the Satellite Observation Station Wettzell to a Fundamental Station. The term “Fundamentalstation” was chosen at that time, which means collocation of the geodetic techniques such as SLR/LLR, VLBI and Doppler.

As I was working initially in the field of Astronomy/ Doppler and Earth Rotation, I was fascinated and supported as strongly as I could the idea of the vision to have a radio telescope for VLBI in Wettzell. However, as one of the young men in the IfAG team at that time, I did not have much influence! Later on, as the extension of Wettzell needed more manpower, I was asked by Prof Schneider, the speaker of the research group, to think about a move from Frankfurt – where IfAG was located – to Wettzell.

Q. As director of Wettzell you are familiar with the other geodetic space techniques like SLR, GPS, DORIS as well. Can you give us an explanation about why VLBI is an indispensable geodetic space technique?

I think VLBI is the primary space technique for the maintenance of the global reference frames, which we undoubtedly need in geodesy and in various related fields. VLBI has unique features, such as direct access to the CRF, provision of the complete set of EOPs, and the determination of UT1. These fundamental quantities are obtainable only by VLBI and they are essential for the other space techniques. Nevertheless the other space techniques have also their indispensable features and a combination of all the information obtained from the various techniques will make use of the different features and will provide best results. This idea is the driving force behind fundamental stations.

Q. You held also positions within in the IGS and ILRS. Which positions in which periods did you have?

I was a member of the IGS “Oversight Committee”, set up for the evaluation of the proposals made to establish IGS – this was in 1992-1994. I got the honour to work on that committee due to experience I gained during the organisation of large GPS campaigns, such as EUREF in 1989. As representative of the European Laser Ranging Consortium (EUROLAS) I was appointed a member of the ILRS Governing Board. My term was from 1998 to 2002. I have learned a lot from working for the different services, and I’m thankful to have many friends in all the services.

Q. Looking back to your first 4-year term as IVS Chair, would change anything? How would you characterize your experience during the first four years chairing the IVS?

As Chair, my role is to be the moderator of the Directing Board meetings and to represent IVS externally. What I can say is that we have been very active and jointly we accomplished a lot in the past four years. At the beginning we had to establish the service itself and to keep the obligation of maintaining the reference frames and the provision of EOPs by continuing with existing facilities.

Our service, established first as an IAG service, next became a service of IAU and a member of FAGS.

We reviewed our VLBI products and established proposals and procedures to move ahead. Today we have our own IVS program, which optimises the resources we have within IVS in order to provide products as best as we can. We now have two weekly rapid turn around EOP sessions, we have more regular CRF and TRF and R&D sessions, etc. We involved S2 and K4 technologies more in international programs. We are on the way to discuss visions of where to go in the future.

Q. Looking forward into the future, which are the most important tasks the IVS has to do in the coming 4 years or beyond? What contributions are expected from the IVS members?

The next steps are to improve the products towards future requirements which are placed e.g. by the IAG flagship project IGGOS (International Global Geodetic Observing System). VLBI has to provide dense time series – comparable to the IGS polar motion series, not as competition but in the sense of being complementary. High effort is necessary for such a realisation and we have to consider the technological feasibility and the costs. The dense GPS data show the potential of time series. Comparing and combining time series of different techniques will help to discover systematic effects and will improve the final products significantly. Current developments such as digital recording systems and e-VLBI will help to reach the goal by improving turnaround time, increasing capacity, and decreasing costs per observation.



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We have to consider necessary steps to improve the network. Some telescopes are old and need an update or a replacement. The inhomogeneous network station distribution needs to be improved.

IVS has to set goals, which are accepted by the IVS members as important, and then, I think, we can expect that the members will identify themselves with IVS and will keep up their support with strong contributions. I'm very thankful to the member organizations for the strong support and in particular for the increasing support IVS has received since 2002 for the new observing program.

Q. What are your personal wishes for IVS?

Personally, I would like to see recognition by the entire community that the IVS products are essential, and I would like to see stronger support by IVS member institutions and Associate Members.

Q. If you analyze your professional experience, what surprised you the most?

In the last decades we gained several orders of magnitude in accuracy. It was and is great to see the developments of technology and to see the growing international collaboration. I'm always surprised to see how ideas are born and how many of them become reality within the international collaboration.

e-VLBI Workshop Summary

—David Lapsley, MIT Haystack Observatory

In mid-May approximately 70 scientists and engineers gathered together at JIVE, set in a beautiful forest near the small town of Dwingeloo in The Netherlands, for two days of intensive e-VLBI discussion. The first such meeting was held at Haystack Observatory last year; the next meeting in 2004 will be held in Japan.

During the meeting, we were treated to presentations and discussions on recent e-VLBI work and accomplishments, plans for future e-VLBI work, status and plans of the interactions between the e-VLBI community and service providers, standards and protocols for e-VLBI data transfer and hardware and software interfaces between various components of e-VLBI systems. In addition, we were given an extremely informative and interesting tour of the Westerbork facility, treated to a banquet of Dutch food, wine and beer and entertained by some inspiring after dinner speeches.

All of the talks were interesting and well presented. Due to space limitations, I will summarize just a few that I found particularly interesting.

Yasuhiro Koyama from Kashima Space Center, Communications Research Laboratory (Japan) presented results of e-VLBI experiments with the K5 system: a PC-based Data Acquisition System with a PC-based software

correlator designed for e-VLBI experiments over IP. Recent successful experiments were conducted between Kashima and Koganei, Westerbork and Haystack with rapid turnaround of results. Future plans are for a PC-Array-based correlator and for the use of the Real-time Transport Protocol to transport VLBI data over IP.

Steve Parsley from JIVE talked about the planned EVN "proof of concept" project that would ultimately connect up to 5 radio telescope sites in real-time to the JIVE correlator using best-effort IP service. The detailed project plan for this work targets the first quarter of 2005 for the complete system of 4-5 telescopes capable of performing 1 Gbps real time VLBI.

Jouko Ritakari from Metsähovi Radio Observatory discussed some of the lessons learned from e-VLBI experiments in Finland, such as the limitation of the PC-based architecture, with current motherboards using standard hard disk controllers only able to provide 300-600 Mbps of data output. He also emphasized the benefits of using standard file formats for storing VLBI data.

Maxine Brown from the University of Illinois at Chicago/StarLight gave a very interesting presentation on the TransLight Intercontinental Lambda-Grid. Lambda grids are networks that switch optical wavelengths (or lambdas) and can provide dedicated, high bandwidth, point-to-point circuits supported by an infrastructure of sophisticated middle-ware simplifying the scheduling and provisioning of these circuits. The TransLight Global-Scale Experimental network will provide researchers with a leading edge networking paradigm to support their e-Science experiments, while at the same time allowing them to compare the results of using this network paradigm with those of the traditional production level research networks.

Many thanks go to Steve Parsley and the organizing committee for their efforts in putting together this excellent meeting. It was evident from the presentations and discussions that the international VLBI community is committed and working hard towards the move to e-VLBI. It was generally agreed that lambda switching and the Internet's Real-time Transport Protocol are both well suited for the transport of e-VLBI data. Indeed, it was agreed during discussion sessions that RTP should be included in the draft VSI-E specification.

There were a number of impressions that I gained from what was my first e-VLBI workshop: the international and multi-disciplinary nature of the community; the helpfulness and spirit of co-operation that is so much a part of this community and has undoubtedly been behind its remarkable successes; finally, the overwhelming enthusiasm and eagerness of everybody that I spoke with. These qualities are what will ensure the continued progress and growth of VLBI and, indeed, e-VLBI as we move into the future.

News from the IVS Directing Board

—Wolfgang Schlüter, BKG

The 9th IVS Directing Board Meeting was held on April 5, 2003. For the first time the members met at two locations. Most of the members had already been in Paris, as some of them participated in the IVS Analysis Workshop, held at Paris Observatory. Some of the US representatives met at Goddard Space Flight Center in Greenbelt, employing video conference facilities. Due to 7 hour time delay between Greenbelt and Paris our remote US colleagues had to start at 2:00 a.m. local time!

All board members, those whose term expired and those who were newly elected, were invited to attend the board meeting. On behalf of the board members, the Chair welcomed the new members Zinovy Malkin from the Institute of Applied Astronomy, St. Petersburg/Russia and Bill Petrachenko from Natural Resources Canada.

Appreciation and thanks was expressed to departing board members Nicole Capitaine, IAU representative, to Wayne Cannon, Space Geodynamics Laboratory/Canada and to Paolo Tomasi, Istituto di Radioastronomia/Italy for their contributions in the board. Nicole Capitaine was replaced as IAU representative by Patrick Wallace from UK, who could not attend the meeting. Wayne and Paolo's terms expired. Shigeru Matsusaka and Wolfgang Schlüter, both re-elected as Networks Representatives, began their second four year term. It was acknowledged thankfully by the board that their re-election was an indication of confidence given by the IVS Associate Members. Wolfgang Schlüter was re-elected by the board members as Chair for a second term.

In order to improve the communication between the geodetic/astrometric VLBI community represented by IVS and the astronomical community, Franco Mantovani, Istituto di Radioastronomia/Italy, as proposed by the EVN, was invited to participate in the meeting. His contributions to the discussion about the Mark 5 agenda item were very useful. It was decided by the board to invite guests on a case to case basis, depending on the agenda, for future meetings.

Harald Schuh, University Vienna, Austria had been proposed by the IVS board as one of the service representatives for the IAG Executive Committee, which will be established after the new IAG Structure becomes effective. Harald was nominated by the IAG Nominating Committee and finally elected by the IAG national delegates. The board congratulated Harald and wished him success.

The plan for Mark 5 deployment proposed by Nancy Vandenberg and Alan Whitney was accepted by the board. It is a very valuable contribution and guide to coordinate and realize the transition from Mark 4 to Mark 5 as soon as possible.

The Pilot Project on Tropospheric Parameters was carried out successfully by the project team chaired by Harald Schuh. Seven Analysis Centers contributed their results, which were combined by the Institute for Geodesy and Geophysics of the University of Vienna. The accuracy of the tropospheric wet path delay is 1.8 mm on average, agreeing well with the comparable IGS product. The board accepted the results of the Pilot Project and approved the tropospheric parameters as an official IVS product. The tropospheric parameters will be derived from the regular IVS observations R1 and R4, and will be made available with a delay of roughly 6 weeks. Congratulations and thanks to the Pilot Project team for their effective and good work.

The Analysis Coordinator Axel Nothnagel proposed a second IVS Pilot Project: Time Series of Station Coordinates and Baseline Lengths. Axel will soon prepare the written proposal and will ask the board for official approval.

During the meeting the board members got some experience in video conferencing across the Atlantic. The meeting was successful, but the board members realized that a face-to-face meeting could not be replaced by video conference unless there are strong reasons.

The IVS Newsletter is published three times annually, in April, August, and December. Contributed articles, pictures, cartoons, and feedback are welcome at any time.

Please send contributions to ivs-news@ivscc.gsfc.nasa.gov. The editors reserve the right to edit contributions. The deadline for contributions is one month before the publication date.

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The newsletter is published in color with live links on the IVS web site at <http://ivscc.gsfc.nasa.gov/>.

A Taste of History....

Geodesy observations were especially useful during the early days of the VLBA (from about 1987-95) because they were usually processed quickly and any problems encountered were reported quickly. This is in stark contrast to normal astronomy observing in which we rarely had any feedback after the data left the VLBA. We did need a bit of a thick skin during this period. Many of the normal geodesy stations were running routinely for up to half of real time, and their operations were well shaken out and quite reliable. Meanwhile there were these new VLBA stations that kept having problems. I even saw Pie Town referred to as "Cow Pie Town" by some of the geodetic site techs. We just had to have faith that the VLBA would eventually prove itself, which it did. Meanwhile, the geodetic groups maintained interest in the VLBA because the data quality, despite some operational problems and tape playback problems, was very good — some of the best that they had seen.

— Excerpted from Craig Walker's article "Early VLBA Operations" in *Radio Interferometry: The Saga and the Science: Proceedings of a Symposium Honoring Barry Clark at 60, NRAO Workshop Number 27, 1998.*

Regular Use of Mark 5 Continues to Grow

–Nancy Vandenberg, NVI Inc./GSFC

During July several stations began regular use of Mark 5 recorders for 24-hour geodetic sessions. The Mark 5 has been routinely used for the daily 1-hour intensive sessions since late 2002.

Westford (USA) began using Mark 5 for the IVS-R1 sessions on June 23, and will continue to use Mark 5 as much as possible, depending on the disk module supply. Hobart (Tasmania) began using Mark 5 exclusively in late July, just in time as their headstacs were failing. Wettzell (Germany) and Kokee Park (USA) began to participate in the R4 sessions with Mark 5 recorders in July.

With the delivery of more systems and significant numbers of disk modules in August, the correlators will have additional Mark 5 systems and more stations will be able to participate in the Mark 5 system. Stations that have not yet placed their orders should do so as soon as possible. By the end of the calendar year, the IVS plan shows the correlators fully outfitted and almost all IVS stations having Mark 5 systems.

More information about Mark 5 can be found at <http://www.haystack.edu/mark5> and the IVS deployment and usage plans for Mark 5 are at <http://ivscc.gsfc.nasa.gov/program/mark5.html>.

Kashima-Westford UT1 Results via e-VLBI in Less Than 24 Hours

–Alan Whitney, MIT Haystack Observatory
–Yasuhiro Koyama, CRL

On Saturday June 28 colleagues at Kashima and Haystack Observatory completed the process of estimating UT1-TAI from VLBI data less than 24 hours after the start of data acquisition. Data were collected at Kashima on the K5 system and at Westford on the Mark 5A system. The first fringes were detected less than one hour after the completion of the 2-hour experiment.

Approximately 83GB of data were transferred between the two sites in under 3 hours at a maximum sustained rate of 107 Mbps. After some initial difficulties, correlation was completed at the Haystack Mark 4 correlator 13 hours after the end of the experiment and at Kashima using K5 software correlator about 7 hours later. After the correlation processing, UT1-TAI was estimated with a total turnaround of about 22 hours.

With improved coordination and a little practice, we believe that future experiments can greatly reduce this time, perhaps to as little as 4-6 hours. Further experiments are planned.

IVS Members Attend VLBA Meeting

–David Gordon, Raytheon ITSS/GSFC

In June, NRAO and New Mexico Tech sponsored a scientific meeting in Socorro, New Mexico, to commemorate the tenth anniversary of the dedication of the VLBA. Approximately a dozen IVS members attended and participated. The meeting began with tours of the Pie Town VLBA antenna and the VLA, followed by four days of oral and poster presentation on various astronomical and geophysical usages of the VLBA and VLBI in general, and the future of VLBI.

Most of the papers were astronomical in nature, showing a great proliferation of work ranging from the smallest scales (the solar corona, the interstellar medium, stellar masers, proper motions, and parallaxes) to the grander cosmological scales (quasar jets, gravitational lenses). Interestingly, much of the work reported on made use of VLBA imaging using phase referencing of nearby calibrators, a technique which depends heavily on the underlying terrestrial and celestial reference frames and the geophysical model used at the VLBA correlator – all of which have been provided by the geodetic VLBI community.

Three IVS members presented oral talks on use of the VLBA for geodesy, geodynamics, and astrometry (D. MacMillan, L. Petrov, and D. Gordon) that were well received. There were also a number of excellent poster papers on the VLBA calibrator surveys (L. Petrov et al.), the K/Q reference frame and images (C. Jacobs et al.; A. Fey et al.), and astrometric processing of VLBA data (D. Gordon). Other oral presentations of interest to IVS members included talks on the North American array, the square kilometer array (SKA), the low frequency (LOFAR) array (C. Lonsdale), VLBA observations for spacecraft navigation, new correlator technologies, disk based VLBI systems (A. Whitney), and e-VLBI. The last talk was a review of the meeting by Sri Kulkarni of Caltech, in which the geodetic/astrometric VLBA programs received very favorable mention.

This meeting provided an excellent opportunity to demonstrate to the astronomical VLBA user group the importance of the geodetic and astrometric work being done on the VLBA. Proceedings of this meeting will be published by the Astronomical Society of the Pacific in an upcoming Conference Series edition.

Upcoming Meetings...

IVS Technical Operations Workshop
Haystack Observatory
Westford, MA.
September 22-25, 2003

Journees 2003
Institute of Applied Astronomy,
St. Petersburg, Russia
September 22-25, 2003

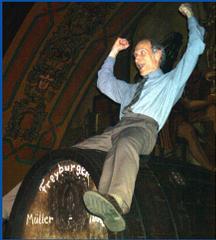
IVS Directing Board
Haystack Observatory
Westford, MA
September 29, 2003

3rd IVS General Meeting,
Natural Resources Canada
Ottawa, Canada
February 9-11, 2004

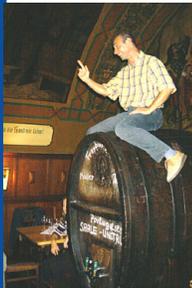
<http://ivscc.gsfc.nasa.gov/meetings>



At the icebreaker, meeting participants enjoyed refreshments and an interesting speaker who talked about a recent crossing of Greenland on foot.



"Riding the barrel" at Auerbach's Keller. James Campbell strikes a "ride 'em cowboy" pose, Arno Mueskens (right) gives tips on technique.



BKG Hosts 16th European VLBI Meeting

–Thomas Hobiger, IUGG Vienna
–Harald Schuh, IUGG Vienna

The Bundesamt fuer Kartographie und Geodaesie" (BKG) hosted the 16th Working Meeting on European VLBI for Geodesy and Astrometry in the historic city of Leipzig, Germany on 9-10 May, 2003. The purpose of the meeting was the exchange of results of the most recent geodetic and astrometric VLBI research, the provision of information on the VLBI radiotelescopes and correlators and the discussion of future joint projects. Although most of the participants came from European countries, the organizing committee was glad to welcome scientists from overseas, too. About 50 participants presented their work and discussed the newest developments in VLBI and special research topics with other colleagues.

Highlights of the presentations

- Volkmar Thorandt and Gerald Engelhardt discussed progress on REPA, the new interactive graphics tool of the Calc/Solve software package.

- Hayo Hase reported on the successful completion of one year of observing by TIGO at Concepcion, Chile.
- Axel Nothnagel presented a paper on VTRF2003, a conventional VLBI Reference Frame.
- Several speakers presented results of local ties, very important in different aspects of space geodesy and especially in ITRF computation.

The social events that took place are also worth mentioning. The dinner at the world famous "Auerbach's Keller" was a special highlight. There, a perfect entertainer made us familiar with German literature while we enjoyed dinner. Afterwards we were able to attain everlasting youth by drinking a mysterious mixture and climbing and riding the big wine barrel.

The BKG organizers, especially Volkmar Thorandt, did a great job bringing the European VLBI community together for interesting presentations and fruitful discussions that were very valuable to all.

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