

# IVS Newsletter

Issue 10, December 2004



## 12th Directing Board Meeting

—Wolfgang Schlüter, IVS Chair, BKG

The 12<sup>th</sup> Directing Board Meeting was held in combination with the 3<sup>rd</sup> e-VLBI Workshop in Makuhari/Japan on October 8, 2004. After the welcome, as the first item, the board reviewed and approved a proposal from the Institute of Applied Astronomy, St. Petersburg/Russia for a new IVS Network Station at Zelenchukskaya in the Caucasus. It is highly appreciated to get support from the second Russian QUASAR station.

Activities since the last board meeting were reported by the chair, by the director of the

Coordinating Center and the chair of the Observing Program Committee Nancy Vandenberg, and by the Coordinators Axel Nothnagel (Analysis), Ed Himwich (Network) and Alan Whitney (Technology).

It was stated that the transition from Mark IV to Mark 5 and K5 has been realized successfully. The observing program in 2005 will be very similar to 2004; a CONT05 campaign is in consideration if the resources are available. For the Coordinating Center Dirk Behrend has been employed as deputy director. The board wishes him success for his new work. Dirk was active in VLBI, in particular during the Europe geodetic sessions, supported in the 5<sup>th</sup> Framework Program from the European Union.

IVS contributes to the IERS combination pilot project. For the IVS solution, internal combinations are evaluated and provided to the IERS Analysis Coordinator. The solution is a datum free solution, which is of highest importance for combination with solutions from the other techniques. Unfortunately Christoph Steinforth, who works in Axel's team, will leave soon. We thank him for all he has done for IVS and wish him success in his new position.

About 100 Mark 5A systems are deployed at stations and correlators. The disk failure rate is about

0.5%. The design for the Mark 5B is completed. An upgrade kit should be available by third quarter 2005. K5 systems are routinely used at the Japanese sites. A K5 software correlator is already employed. Mark 5 data can be converted to K5 format employing VSI.

The Working Group 3 (VLBI2010) held a one-day working meeting ahead of the e-VLBI Workshop. A draft of the WG3 report was discussed. The report needs to be shortened and more focused on the audience, which is the geodetic and astrometric community plus others such as funding agencies. The final report will be reviewed at the next Board meeting.

Axel Nothnagel and Chopo Ma were re-elected by the IVS board as our representatives to the IERS board. Thanks to both for their willingness to continue working for IVS in the IERS board.

Concerning the IVS Directing Board, the terms for the representatives for the Technology Development Centers, currently filled by Arthur Niell, and for the Analysis and Data Centers, currently filled by Zinovy Malkin, expire in February 2005. Also the terms for the three At Large positions expire (Yasuhiro Koyama, Franco Mantovani, Bill Petrachenko). An Election Committee was selected. The members are Kerry Kingham (chair), Shigeru Matsuzaka and Nancy Vandenberg.

The board meeting was organised by Yasuhiro Koyama from NICT in the comfortable Makuhari Prince Hotel. During the stay an earthquake of magnitude 5.7 occurred, approximately 20 km away, and a typhoon moved towards Tokyo/Makuhari, arriving on Saturday afternoon. The board members got personal experience of the natural events our hosts and colleagues from Japan are faced with due to living and working in such a subduction zone. I would like to express my thanks to Koyama-san for organizing and hosting the 12<sup>th</sup> Directing Board meeting.



The IVS Directing Board after a full day's meeting. (front row) Arthur Niell, Ed Himwich, Chopo Ma, Nancy Vandenberg, Bill Petrachenko, Shigeru Matsuzaka, Yasuhiro Koyama; (back row) Alan Whitney, Wolfgang Schlüter, Axel Nothnagel, Kerry Kingham, Zinovy Malkin, Harald Schub, Patrick Wallace.

### Please Vote

All IVS Associate Members have the privilege and opportunity to vote in the elections for representative positions on the IVS Directing Board. Please visit <http://ivscc.gsfc.nasa.gov/about/org/board/elections> for information.

The voting period will be January 1-15.  
Please cast your vote.

# GOOD LUCK

## Professor James Campbell Retired

– Christoph Steinforth (GIUB), Hayo Hase (BKG)



(top) Professor James Campbell at his retirement celebration. (below) Prof. Kuhlmann presents James with a birthday present from his colleagues at the institute while his wife looks on.

*On the occasion of James Campbell's retirement, Christoph Steinforth and Hayo Hase, both former students of Professor Campbell, attended the retirement party and sent this report. They also transcribed remarks presented at the party by several former students of Professor Campbell who offered their own thoughts about Professor Campbell's inspiration and guidance.*

Professor James Campbell of the University of Bonn celebrated his 65th birthday on July 28th, 2004. At a retirement party at the Geodetic Institute of the University of Bonn Prof. Campbell was honored with celebration speeches by Prof. Hans-Peter Helfrich (University of Bonn dean), Prof. Heiner Kuhlmann (director of the Geodetic Institute of the University of Bonn, GIUB), Prof. Günter Seeber (University of Hannover), Prof. Hermann Drewes (director of the German Geodetic Research Institute, DGFI), and Prof. Harald Schuh (Vienna University of Technology).

James Campbell was born on July 27, 1939, in Rotterdam as a descendent of a Scottish family. He attended

schools in Germany and Luxembourg, and studied physics and geodesy at the University of Bonn until 1965. After one year as visiting scientist at the IGN in Paris, he went to the University of Hannover where in 1971 he made his doctoral thesis about astronomical levelings combined with gravity measurements. He returned as scientific assistant to the University of Bonn, where he presented his "habilitation" (postdoctoral lecture qualification) about "VLBI as a geodetic measuring principle". In 1982 he was appointed a university professor. From 2001 to 2003 he was the executive director of the GIUB.

VLBI techniques became known to geodesists during the 70s. James Campbell founded and led the Bonn VLBI group at the Geodetic Institute. He was one of the driving forces within the Collaborative Research Center on Satellite Geodesy (SFB78) for the construction of the Wettzell 20m radio telescope. In 1988 the state of North Rhine-Westphalia

awarded the Geodetic Institute with four additional positions for top science related to VLBI. This VLBI group permitted a strong German commitment to VLBI and a pool for human resources which have lasted until today. James Campbell initiated several EC-funded geodetic VLBI projects, which gave him the honorable title "Father of European VLBI". He also was one of the founders of the International VLBI Service and held the position of IAG representative on the IVS Directing Board.

James Campbell is known for his 119 scientific publications. He taught satellite geodesy methods including VLBI for more than 30 years and supervised 21 PhD students, some of them still working in the field of VLBI.

### **IVS Analysis Coordinator Axel Nothnagel remembers:**

"James was the one who pulled me into and kept me in geodetic VLBI through a number of favorable circumstances. In 1982 he met George Nicolson, former head of Hartebeesthoek Radio Astronomy Observatory at a VLBI conference at Toulouse, France, who was looking for someone to help establish geodetic VLBI in South Africa. Since I still had good contact with James after my exam at Bonn he convinced me that it would be a good idea to apply for the post. Twenty-two years later I am still in geodetic VLBI for James also helped to organize my transition from South Africa to Bonn in 1988.

In the last 16 years working with James at Bonn, I learned a lot from him, not only science but also politics and diplomacy. Persistently, he pulled together a crowd of European scientists for a joint effort of establishing and maintaining a truly European geodetic VLBI observing and analysis network. For this work, in 1996 and again in 1999 James was awarded invaluable grants from the European Union which secured a number of positions for young researchers and the correlation of the Europe sessions. In addition to this he triggered a lot of ideas and made many things work. I enjoyed it very much having him as my boss in all these years."

### **Bonn Correlator geodetic head Arno Müskens remembers an anecdote:**

"I will confine myself to some perspectives on James's personality, since I guess lots of my VLBI friends and colleagues will tell wonderful stories and anecdotes about James' professional life. So I like to add a little but incisive private story:

*It happened during the Mark III thick tape epoch that I had to rescue several thick tapes from our local Customs office. But I was on my bike and the Institut driver and bus was not available on this day. So I asked James if I could use his car for fetching the tapes. No problem at all and he handed over to me his car keys. Just before I got in the car (Renault R4) he ran after me and cried to me "STOP! Before you start driving - be careful - because the first and the third gears don't work - but I guess you will handle it because you drove the same type car for several years". "Ok for me!" I said and started the*

## Upcoming Meetings...

Pan Ocean Remote Sensing Conference 2004 (PORSEC)  
Concepcion, Chile  
Nov 29-Dec 3, 2004

IVS Directing Board Meeting  
Noto, Italy  
April 20, 2005

IVS Analysis Workshop  
Noto, Italy  
April 21-22, 2005

European VLBI meeting  
Noto, Italy  
April 22-23, 2005

General Assembly of the  
European Geosciences Union  
Vienna, Austria  
Apr. 25-29, 2005

Third IVS Technical Operations  
Workshop, Haystack Observatory  
Westford, MA, USA  
May 9-12, 2005

Fourth e-VLBI workshop  
Sydney, Australia  
July 2005

Fourth IVS General Meeting  
Concepción, Chile  
January 2006

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

car. Before leaving the parking place he knocked on the driver's window. "And sorry I forgot the brakes don't work properly - please use the hand brake in time" he said. However you can imagine that I came back safely, because I didn't want to give the impression to my boss, I was not able to manage this unusual situation, or to damage his car.'

In the passage of our careers, he has been more than my employer, more than my supervisor and occasional confidant, rather a fatherlike figure and visionary.

He is for me considerate, discreet, mediatorial, committed, cooperative and open minded.

He accompanied me a long way along the path of my working life as a mentor and for that I am grateful."

### **Associate Professor Rüdiger Haas from Onsala:**

"I heard the first time about VLBI already before the "Vordiplom" and thus got interested very much in space geodetic methods. I was lucky to get a student position in the VLBI group and started early working with VLBI data analysis. This was very important for the direction of my personal interests in geodesy and my continuation into geodetic research later on. During my time as student in Bonn and later as PhD student I was always extremely impressed with James' thorough and broad knowledge on all questions concerning space geodesy. When I asked him about something he always could answer and always could provide me with literature sources for more intensive study. I was very impressed about James' international contacts and activities. This is of course very essential for a technique like VLBI that builds upon international cooperation. James' international activities and contacts also opened for me the way to a post-doc position in the European TMR project and brought me to Onsala in Sweden. This was an important step and a basis for me on my way to become an Associate Professor at Chalmers University of Technology and lecturer for space geodesy.

James is the "spider in the web" for the European geodetic VLBI activities, and had a very important role as coordinator and integrator of the European geodetic VLBI research. I wish James many nice years in good health and humor and with lots of interesting research without the administrative and teaching burden at the university. I hope and am sure that James being emeritus will contribute with interesting research in the field of VLBI and space geodesy.

### **IVS Directing Board member and Professor Harald Schuh told us:**

"Being one of James' first students I can confirm what was said by all previous speakers. James is an excellent

scientist, a brilliant supervisor, a pleasant boss, and a wonderful person. In the context of James' professional life also Hermann Seeger should be mentioned who was not only his director for many years but also – being a strong manager – a very important partner for James. In the 80s, together they formed such a successful tandem that GIUB today is still one of the leading institutions in geodetic VLBI. Those who know both of them, James and Hermann, might imagine how many funny episodes we remember when talking about "the good old days".

For me, James was a shining example because he always showed how the head of a team should behave: listening to everybody, thoroughly discussing different arguments, then coming to a diplomatic but clear solution. Thank you, James, for the motivation and inspiration we got from working with you."



(top) James Campbell talks to Prof. Torge (his supervisor for his doctorate thesis at University of Hannover). (left) Members of James Campbell's former group at the Institute: (from left to right) Dorothee Fischer, Barbara Goerres, James Campbell, Christoph Steinforth, Axel Notbnagel. (Missing on this picture are the other group members: Arno Mueskens, Markus Vennebusch, Alexandra Hoefler, Alessandra Bertarini.) (below) James Campbell and Hayo Hase deep in conversation at the retirement party.



## 3rd e-VLBI Workshop Held at Makuhari, Japan

—Yasubiro Koyama, Kashima, NICT



67 people from 13 countries from around the world participated in the workshop.

Kashima Space Research Center of the National Institute of Information and Communications Technology (NICT) hosted the 3rd e-VLBI workshop for two days on October 6 and 7, 2004.

It became the first international workshop for us to host since our institute was restructured from Communications Research Laboratory (CRL). CRL was merged with the Telecommunications Advancement Organization of Japan and the NICT was established on April 1, 2004.

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](mailto: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/>.

At the time when the first e-VLBI workshop was held at Haystack Observatory in April 2002, it was determined to hold the workshop once every year. Makuhari Prince Hotel was selected as a venue of the 3rd workshop and 67 people from 13 countries around the world participated in the workshop.

The presentations were broadcast live over the Internet so that anyone could hear and view the presentations and discussions from anywhere connected to the Internet.

The guest room tower of the hotel is known as the tallest building as a single construction used solely by a hotel in Japan, and the rooms were shaken quite a bit when an earthquake (Richter scale 5.7) occurred at 10 minutes before midnight on the first day of the workshop. In addition, a strong typhoon passed over the region just after the workshop and it stopped many planes departing from Narita airport. It

was really fortunate that all participants seemed to have returned home without any problem in spite of these natural extremes.

During the workshop, many up-to-date developments in the fields of high speed network research and e-VLBI were given. Researchers from different fields such as high energy physics and educational research networks also participated in the workshop and presented review talks. As pointed out in many presentations, availabilities of high speed network connections between VLBI observing sites and correlators have improved dramatically, and many successful demonstrations of e-VLBI have been realized compared with the situation we had at the time of the 1st e-VLBI workshop two years ago. It seems there is no doubt that the series of the e-VLBI workshops have stimulated and promoted fast and remarkable developments in the field of e-VLBI and in this sense all three workshops can be viewed as extremely successful. Tasso Tzioumis from ATNF, CSIRO proposed to hold the next e-VLBI workshop in Australia and the proposal was warmly welcomed by all workshop participants. Since Australia has been very active in e-VLBI activities recently, it seems promising that another successful workshop will be held again next year.

(right) An efficient registration desk at the e-VLBI workshop helped make the workshop move smoothly. (below) Participants toast the success of the recent e-VLBI workshop in Japan.



### A quote from Cicero.....

*The contemplation of celestial things will make a man both speak and think more sublimely and magnificently when he descends to human affairs.*

## VLBI Antenna Axis Offsets

—Axel Nothnagel, Geodetic Institute Univ. of Bonn

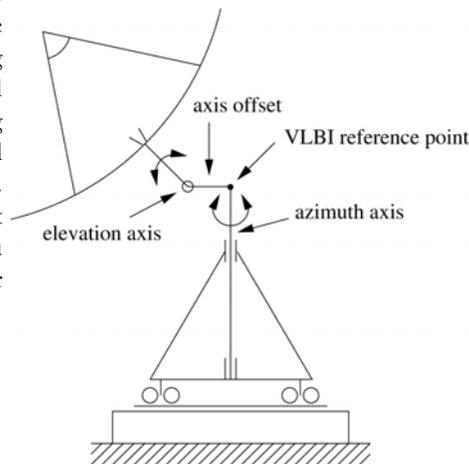
**All observatories are strongly urged to re-determine the antenna axis offset!**

Only in very few cases do the two main axes of a radio telescope really intersect. Mostly, the distance between the two axes, called the VLBI antenna axis offset, is in the range of a few millimeters, with a few exceptions mainly for azimuth-elevation mounts (see figure), up to several meters, mainly for hour-angle-declination or X-Y mounts. The knowledge of the exact axis offset is of extreme importance. Each VLBI delay observation has to be corrected for the axis offset effect and any error in this directly affects the vertical component of a station's position.

At the beginning of precision geodesy with VLBI the axis offsets were taken from antenna construction drawings. Later, axis offsets were also estimated as global parameters from VLBI observations. In the meantime, the axis offsets of a very small number of telescopes have been measured locally with very high accuracy. A few of the results fit the estimates reasonably well but some of them don't at the level of up to 5 mm. Even more important is the fact that the measurements often do not match the values in the drawings.

The consequences of all this are twofold: there is enormous potential for improving the terrestrial reference frame results from VLBI observations, and earth orientation parameters (EOP) as determined by IVS Analysis Centers using different lists of axis offsets suffer from inherent systematic differences.

Currently, all axis offsets measured or estimated reliably are being compiled for consistent use by all IVS Analysis Centers. For more details see the IVS Analysis Coordinator's web page <http://giub.geod.uni-bonn.de/vlbi/IVS-AC>). Compared to the general effort of VLBI observations, processing and analysis, the determination of the axis offsets does require relatively little work using standard surveying equipment and procedures. Please contact the author if you need further advice.



Axis offset of an azimuth-elevation mount (Courtesy Rüdiger Haas)

## Station Timing: Our Friend or Silent Enemy?

—Michael Poirier, MIT Haystack Observatory

Many of us that are involved in field operations have a site specific operational checklist that we use to prevent mistakes during the setup of experiments. One of the most critical sections should be the timing checks. Many clocks and timing signal exist at each site. We must confirm that these critical clocks are synced.

At Westford we have system clock displays for the Field System, Formatter, GPS, Maser, Pointing System and the FS Computer CPU. Some of these devices have 1 pps signals generated from these devices and most sites have counters which measure the 1 pps time difference between the Maser, GPS, and Formatter. This Formatter to GPS or GPS to Formatter offset is recorded within the field system with the fmout procedure. This offset is critical to the correlator for ease of processing the data and should be measured at least at the 1us level.

The actual time displays are critical to quality data acquisition. If the field system time is not correct, the commands from the schedule will be executed at the wrong time. If the formatter is set to the wrong time, the data recorded will not be aligned with the other stations. If the GPS is at the wrong time, you have no easy way to compare your system time to an accurate clock reference. If your pointing computer time is wrong, you may be pointing to the wrong part of the sky looking for a source. If the maser time display is offset, the data monitoring within the maser will not be accurate and some post process troubleshooting data may not be applicable. The least critical time is the FS computer CPU. This I believe will not contribute to bad data although the FS will complain if the time is too far off.

We must make sure that our clocks are synced before all experiments.

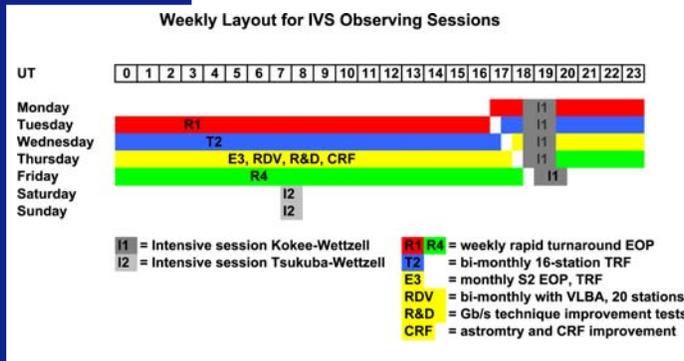
## TOW 2005

This topic leads us into thinking about the next TOW meeting scheduled for May 2005 at MIT Haystack Observatory. This Newsletter is the next to the last one you will receive before the TOW meeting. We are starting to put together the meeting and we need topics for demonstrations and discussions. An idea is to read through your TOW 2003 documents and generate questions or requests based on that material. You can review your present site operations and write down problems or questions you have so that we can try to incorporate these into the curriculum. Organize your ideas and please send them to the TOW 2005 Program Committee (<http://ivscc.gsfc.nasa.gov/meetings/tow2005/>).

## What's New for 2005

*Nancy Vandenberg, NVI, Inc./GSFC for the Observing Program Committee*

The IVS observing plan for 2005, as approved by the Observing Program Committee (OPC), follows the same overall structure as in the previous two years. We continue to follow the general guidelines in the



IVS Working Group 2 report which marked the beginning of the IVS observing program. Several innovations introduced in 2004 – daily UT1 measurements, 16-station TRF sessions, and CRF monitoring – will be continued in 2005. Requests for station participation have been sent to the stations by Cynthia Thomas. Details of the planned sessions and the draft 2005 Master Schedule can be found at <http://ivscc.gsfc.nasa.gov/program>.

The hour-long 1-baseline intensive sessions yield one UT1 measurement daily. Monday through Friday Mark 5 is used on the Kokee-Wetzell baseline, and on Saturday and Sunday K4/K5 is used on the Wetzell-Tsukuba baseline. Testing of e-VLBI began in 2004 and is nearing operational status on both baselines.

The 16-station reference frame sessions were made possible by the efficiency of the Mark 5 correlators, since six or more passes are required to process 16 stations with an 8- or 9-station correlator. The results from the several 16-station sessions conducted in 2004 improved the TRF results, and so the OPC decided to continue the sessions in 2005.

The CRF monitoring program uses a small fraction of the observing time in geodetic sessions. The purpose is to provide a robust data set for astrometric sources that are known to be stable in position and for the ICRF defining sources. Currently the R1 and RDV sessions are monitoring such sources.

As has been true for the past few years, the scarcest resource is station observing days, due to budget restrictions at many agencies that limit the staffing of stations. The impact of Mark 5 systems on the recording and correlating process has been significant, resulting in smoother recording sessions and vastly improved correlator efficiency.

The OPC is considering a CONT05 campaign for October, 2005, if station and disk resources can be found. Requests for station participation and for the needed media will be sent out soon.

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