IVS Newsletter

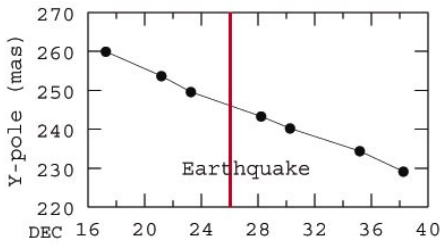
Issue 11, April 2005

Could We Have Detected the Sumatra Earthquake with VLBI?

–Dan MacMillan, NVI Inc./GSFC

The magnitude 9.3 earthquake off the coast of Sumatra on December 26, 2004 was the second largest earthquake in a century and might have been large enough to be detectable in Earth orientation parameter data. VLBI only observed 24-hour sessions around the time of the earthquake as shown in the Figure. It would have been possible to make the detection with continuous VLBI measurements to the extent that investigators are able to do so with continuous GPS observations, which have precision comparable to VLBI.

Ben Chao and Richard Gross in an EOS article (Jan. 4, 2005) estimated the size of the effect by modeling the mass displacement of the subducting slab. Their calculation of the coseismic change yielded a decrease in length of day of 2.68 μs and a shift in the mean North pole of about 2.5 cm (or 0.82 mas). The shift in the mean North pole—which refers to the Earth's figure (symmetry) axis and not to the instantaneous rotation axis—is nearly large enough to observe.



Y polar motion as observed with 24-hour VLBI sessions around the time of the Sumatra earthquake.

VLBI polar motion estimates refer to motion of the rotation pole. A shift in the mean North pole of 0.82 mas corresponds to a shift in polar motion rate of only 0.012 mas/day, which will be difficult to detect since the polar motion rate uncertainty is at least 0.1 mas/day. In the Figure the shift in rate would appear as a kink in the polar motion curve.

In order to detect shifts due to the earthquake, one needs to account for changes in the angular momentum due to variations of the mass distribution of the atmosphere and oceans that are about 100 times larger than the predicted effect of the Sumatra earthquake. If the atmosphere and ocean contributions can be removed from the observations, then it may be possible to detect the earthquake.

In a conversation, Richard Gross said that the effect on Earth orientation may have been larger than his estimates published in EOS since they were based on a magnitude 9.0 earthquake. The more recent magnitude of 9.3 would double the predicted polar motion excitation. Accounting for the larger earthquake magnitude, postseismic effects, earthquake moment release over a finite region rather than a point, and possible tsunami effects would increase the predicted change in Earth orientation and thereby make it easier to detect the earthquake.

Chopo Ma Elected New IERS Chair

Dr. Chopo Ma, newly elected IERS Chair.

Chopo Ma, the IERS representative on the IVS Directing Board, has been elected chair of the International Earth Rotation and Reference Systems Service (IERS) and started his four-year term at the beginning of 2005. The IERS is responsible to the International Union of Geodesy and Geophysics and the International Astronomical Union for the ITRF, the ICRF, and the Earth orientation parameters that transform between the two frames at each instant.

Dr. Ma received a bachelor's degree in chemistry and physics from Harvard and a doctorate from the University of Maryland for work in VLBI applied to polar motion, relativity and geodesy. He has been part of the Goddard VLBI group since its formation in 1974. He is active in VLBI astrometry and led the analysis that culminated in the replacement of the stellar optical celestial reference frame by the extragalactic VLBI reference frame in 1998.

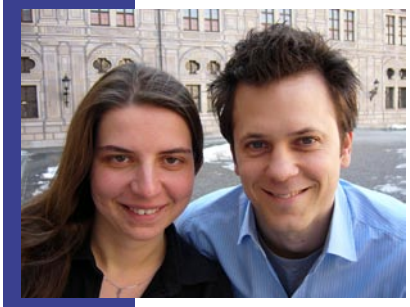
Dr. Ma anticipates that the immediate future of the IERS will be quite challenging. A new ITRF is to be made in 2005 using a method radically different from ITRF2000. The IVS is one of the space geodesy services contributing combined time series for this work. A pilot project is in place to make rigorous combinations for IERS products, initially TRF and EOP. Dr. Ma will be working closely with the various space geodesy services and IERS components with the goals of carrying forward the current work effectively and preparing for the evolution of IERS products and external relationships.

PERMANENT COMPONENT

German Geodetic Research Institute, Munich, Germany

The German Geodetic Research Institute (Deutsches Geodätisches Forschungsinstitut, DGFI) is one of the Analysis Centers of the IVS. H. Hase interviewed the director Hermann Drewes and VLBI analysis lead Volker Tesmer by e-mail to learn more about the institute and its future plans.

(above) Hermann Drewes, Director of DGFI in his office. (below) Manuela Krügel and Volker Tesmer in front of the DGFI building.



Q. Hermann, what exactly is DGFI?

The German Geodetic Research Institute is an autonomous and independent institution located in Munich. It was founded by the German Geodetic Commission (Deutsche Geodätische Kommission, DGK) at the Bavarian Academy of Sciences and started its function officially on January 1, 1952. Its basic budget is financed by the State of Bavaria and it is supervised by the DGK.

Q. What are the current activities of DGFI?

The work of DGFI covers all fields of geodesy. It is primarily dedicated to fundamental research, i.e., the study of methods and approaches for the measurement and mapping of the Earth's surface. The research program for the next years stands under the general theme "Geodetic Research for Observation and Analysis of the System Earth". This includes the modeling of space geodetic observations for geometric and gravimetric parameter estimation, the analysis and modeling of results, as well as the participation in national and international research projects and functions in international bodies. DGFI is active in the major scientific services of the International Association of Geodesy (IAG): In the International Earth Rotation and Reference Systems Service (IERS) it is one of the three ITRS Combination Centers (ITRF) and a Combination Research Center (CRC). In the International GPS Service (IGS) it acts as the Regional Network Associate Analysis Center for the Geocentric Reference System for the Americas (RNAAC-SIRGAS). In the International Laser Ranging Service (ILRS) it is one of the two Global Data Centers (EDC: EUROLAS Data Centre), a Global Analysis Center, and a Combination Center. In the International VLBI Service for Geodesy and Astrometry it serves as an Analysis Center.

Q. What is the importance of VLBI among all the activities at DGFI?

We are doing geodetic research for observing and analyzing the System Earth. This includes in particular the research on global change and geodynamics. It is impossible to study long-term global change and geodynamic processes without VLBI. The signals we are looking for are so small, change in time so slowly, and extend in space so widely that the highest precision, long-term stability and global reference is required. This is guaranteed by VLBI and therefore it plays a major role in the activities of DGFI.

Q. Hermann, you are the President of IAG Commission 1 "Reference Frames". How do you see the role of VLBI in this field?

VLBI is one of the important techniques for the establishment and maintenance of geodetic reference frames. The consistency between the celestial and terrestrial reference frames and the connecting Earth orientation parameters can only be achieved by VLBI. One reason for the inconsistency of the different ITRF realizations in the past (1988 to 2000) is the missing consistency between the time variable terrestrial coordinates (velocities) and the Earth rotation parameters. You may attribute any constant part of the global velocity field from one part to the other. Only VLBI guarantees the long-term consistency between them.

Q. Hermann, you are the secretary of the steering committee of the IAG Project GGOS. What is GGOS?

GGOS is IAG's Global Geodetic Observing System. It integrates different techniques, different models and different approaches in order to achieve better consistency, long-term reliability and understanding of geodetic, geodynamic and global change processes. It provides the scientific and infrastructure basis for all the global change research in Earth sciences.

GGOS aims at ensuring the consistency between the different geodetic constants and parameters, homogenizing and improving the geodetic models, maintaining the stability of geometric and gravimetric reference frames, and focusing on all aspects to ensure the consistency of geometric and gravimetric products. The representation of geodesy is done by memberships and participation in international organizations in order to make our science more visible in the future. We expect a great benefit for geodesy from these activities.

The home of DGFI in the center of Munich.

Q. What implications has GGOS for the IVS and for an IVS VLBI network station?

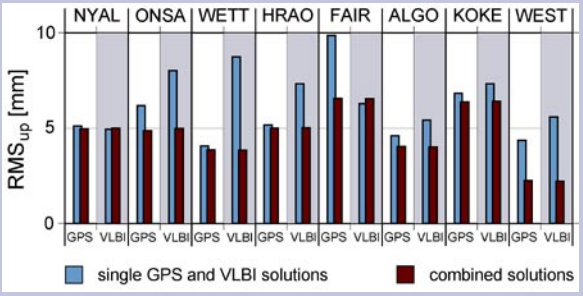
GGOS requires the full participation and integration of the services. In the "geometric" observations, the terrestrial station network is a fundamental issue, a backbone of the system. The VLBI network has fulfilled the highest requirements, i.e., continuity, homogeneity, and precision, for more than twenty years. It guarantees the consistency and long-term stability of all geometric and kinematic parameters: Celestial Reference Frame, Earth Orientation Parameters, Terrestrial Reference Frame. We follow with great concern the discussions about the maintenance of the global VLBI network. There is no doubt that there is a need of more VLBI stations, in particular in the southern hemisphere in order to improve the homogeneity and reliability. A dismantling of VLBI stations would cause serious problems for space geodesy. The geodetic community is confident that there will be no reduction but rather an expansion of the VLBI network in the future – for the benefit of geodesy and geoscientific research.

Q. Volker, what are your duties at DGFI?

I am responsible for the VLBI activities at our institute, mostly software development and data analysis. Furthermore, I contribute to the group that combines data of different space geodetic techniques. At DGFI we also have GPS and SLR groups in which I will intensify my efforts in the future. Hopefully this will help to better understand problems in combined solutions.

Q. Who else is part of the VLBI group at DGFI?

Besides myself the VLBI group consists of our director, Hermann Drewes, and Manuela Krügel who is doing most of the work related to the combination of VLBI data with other techniques.



The figure compares repeatabilities of daily GPS and VLBI heights using the data of the CONT02 campaign, estimated in single solutions as well as in a rigorously combined solution. It reflects the potential of the combined solution approach to stabilize VLBI as well as GPS. The GPS analysis was performed at the Technical University of Munich with Bernese, the VLBI analysis at DGFI with OCCAM. For this, both software packages were prepared in very close cooperation to have identical a priori models and parameterizations.

Q. What kind of impact does GGOS have on the future analysis of VLBI data?

The space geodetic techniques have numerous common parameters and/or influencing variables. GGOS can uncover systematic differences between solutions of different space geodetic techniques and analysis groups which will improve our ability to interpret the results. As all techniques have certain strengths and weaknesses but none of them can determine the whole set of parameters of interest alone, combining homogeneously treated observations of the different techniques will stabilize the results.

In contrast to other techniques, it is very easy to reprocess VLBI solutions and VLBI analysts are generally used to deal with scientific goals. That's why I do not expect any severe changes due to GGOS from an analyst's point of view, except that it will be preferable to automate the analysis of sessions to a larger extent.

In my opinion, the biggest impact GGOS will have on geodetic VLBI will be that the realization of e-VLBI will be accelerated. Maybe it would also be helpful to change from sessions starting in the afternoon to sessions from midnight to midnight, UT.

Q. What are the features that a new software package for VLBI analysis should have?

It is always useful to have software written in a modular way. Besides that, the aspects to be emphasized during the design phase will depend on the intended usage. The software OCCAM, that we use at DGFI for example, is mostly written in old but simple FORTRAN. It is quite handy and manageable, which implies that if you want to compute non-standard solutions, you have to change the code yourself. Several groups are using and developing OCCAM (Oleg Titov leads the user group), which helps to have the code controlled by more than one brain and pair of eyes.

Q. What does VLBI mean to you personally?

The extremely high precision of its observations as well as its very straightforward celestial reference frame was a breeding ground for many scientific findings. Furthermore, the full set of VLBI data available at the IVS server can easily be reprocessed in one or two days, providing 100% homogeneous results. This makes VLBI very elegant and aesthetic.

From a very personal point of view, VLBI was my entry to geodesy during my university years: before I started to work with VLBI (as a student here at DGFI working with Harald Schuh), I had the idea of becoming a musician, not a scientist... But right from the start, I felt very much welcome in the VLBI community and several of my VLBI mates have become real friends.

More info can be found at http://www.dgfi.badw.de

NEWS...

First GGOS Workshop Held in Potsdam

–Dirk Behrend, NVI Inc./GSFC

The GeoForschungsZentrum (GFZ) Potsdam, Germany, hosted the First Global Geodetic Observing System (GGOS) Workshop on the Telegrafenberg hill on March 1-2. The two-day event drew more than 30 participants to the former residence city of the Prussian kings which also has a long tradition in geodesy and gravitation research. A winter-white surrounding was a beautiful setting to discuss the contribution of the international geodetic community to studying the System Earth.

(above) Meeting participants at the first GGOS Workshop. (below) GGOS Chairman Christoph Reigber discussing the agenda.

Recent natural disasters have demonstrated our helplessness as well as limited understanding of our planet's complex system. Gaining deeper insight into the processes and interactions of this system is one of the most urgent challenges for our society. In order to monitor changes in the System Earth and processes causing natural disasters, a unified global Earth observing system needs to be established. Efforts for unifying certain aspects of the observing system include the US INDIGO (Inter-service Data Integration for Geodetic Operations) and the European GAGOS (Geodetic and Geohazard Observing Systems) projects.

The International Association of Geodesy (IAG) recognized the need for a global observing system and installed the project GGOS during the XXIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Sapporo, Japan, July 2003. It is foreseen that GGOS will become a member of the United Nations' Integrated Global Observing Strategy (IGOS) and applies for the theme "Dynamic Earth" in the IGOS Partnership (IGOS-P). IGOS-P, in turn, is a participating organization in the Global Earth Observation System of Systems (GEOSS), the executive arm of the Group of Earth Observations (GEO) which is an intergovernmental group of currently 55 countries and the European Commission.

After a two-year definition phase (2003-2005), during which the final structure and the science plan will be developed, GGOS will become operational. The approval of the final GGOS structure is planned for the 2005 IAG Scientific Assembly in Cairns, Australia. The GGOS workshop in Potsdam reviewed the goals and current structure and summarized the developments since the Sapporo meeting. The different Working Groups (WG) reported on their findings and current status. There are currently seven WGs with several of them having representatives from the IVS.

The IVS together with the other IAG services will play a vital role in monitoring and understanding the System Earth. The foremost task will be to provide a stable, highly accurate reference frame for all other observing systems and monitoring activities. In this way, the services will contribute to mitigate geohazards such as earthquakes, volcanoes, land slides, sea level rise, floods, storms, global warming, and tsunamis. Still, this can only be achieved through an integrated observing system (such as GGOS) and not a flood of individual, inconsistent products. Thus, in the long run, the main contribution of the services cannot only be the raw data collection and the data integration and combination (products), but also a consistent modeling and interpretation of the Earth's processes and interactions.

A GGOS web site is under construction and can be accessed at the URL: http://www.ggos.org/

Having fun in the snow (left to right): Markus Rothacher, Ruth Neilan, and Angelyn Moore.

Vocabulary

GAGOS	*Geodetic and Geohazard Observing Systems*
GEO	*Group on Earth Observations*
GEOSS	*Global Earth Observation System of Systems*
GGOS	*Global Geodetic Observing System*
IAG	*International Association of Geodesy*
IGOS	*Integrated Global Observing Strategy*
IGOS-P	*Integrated Global Observing Strategy Partnership*
INDIGO	*Inter-service Data Integration for Geodetic Operations*
IUGG	*International Union of Geodesy and Geophysics*

IVS Technical Operations Workshop 2005

–Rich Strand, NVI/Alaska

One of the most fundamental concepts for a successful organization is a well trained staff. Data reduction and the scientific analysis is all based on the original content of the data collection. Recognizing this, the IVS and other host organizations have held a comprehensive workshop every few years for the technical staff that operate and maintain radio observatories around the world.

The Third IVS Technical Operations Workshop will be held at MIT Haystack Observatory May 9-12 in Westford, MA, USA. A TOW 2005 Program Committee was formed that did the basic class layout and structure. The TOW program is being adjusted and sorted to fit the time format and assign teachers after reviewing the feedback from the IVS general membership. The final version will be available on the IVSCC web site for students to make their class selections beginning in early April. The local organizing committee has the task to assemble all the material into the TOW 2005 manual and prepare to host the event.

The TOW has been successful in the past in training station staff and is a valuable aid in improving station performance. The program is developed for session observers that operate and maintain the necessary electronics for IVS data acquisition. Some classes are very technical and others cover the basic fundamentals of day by day operations. All stations should take advantage of this excellent program by sending students to TOW that would best benefit from the training.

The TOW is always looking for new students and if this will be your first visit to the IVS workshop then you will have a very interesting week. Our hope is each and every student will receive all necessary class room instruction, workshop hands on, and interesting science overview with the VLBI history to make you part of the IVS team. You will receive a comprehensive workbook with all class room notes, advice and guidance from experts, and evening discussions with station staff from around the world.

TOW 2005 will be a very busy week for the students and teachers, but it also offers the chance to meet old friends and make new ones in the IVS community. We start with a Sunday evening "icebreaker" and by the end of the week the TOW attendees are now all friends ready to travel back to their countries of origin to participate as a well trained organization for the IVS and their science staff.

A meeting web page has been set up under the URL http://ivscc.gsfc.nasa.gov/meetings/tow2005/.

Pre-checks Checklist: The Road to Success!

– Mike Poirier, MIT Haystack Observatory

Once again the TOW meeting is almost upon us. The main focus of the TOW has been improving the quality of data that we record at our stations. This all starts with the basic pre-check procedure. You will learn at the TOW that every station should use a checklist with all the system tests that will ensure a successful data acquisition. It should not be guesswork whether or not you have started an experiment recording good data.

You should include within your list any system check that can be completed within the limited amount of time each of us have prior to all experiments. These checks should prove to you that each part of your system is functioning correctly.

I first make sure that I have all the experiment files drudged. I should have all the media that I will need to complete each experiment. I will write to that media in the format of the experiment so to confirm that the system is recording normally. I setup all my hardware with the actual experiment procedures so that I can confirm all the settings. Before each experiment I measure each VC for frequency, correct patching, and confirm it has stable phase cal. I confirm that all my clocks are correct and synced properly and I also record my formatter-to-GPS offset onto the checklist. I then go on to the antenna pointing checks part of the list. I point the antenna to a nominal source and run procedures to confirm our system sensitivity is normal. I then run my cable cal procedure and confirm its operation. I then send out an e-mail that contains my pointing and timing information along with a confirmation that my station is ready for the experiment.

I realize that all stations have differences within the systems, but the systems function similarly. If we consistently use a pre-check checklist, we will minimize data loss and improve our overall data quality. We can discover problems within our systems and repair them before an experiment. Nothing is more frustrating then hearing from the correlator that your station has no data due to a simple failure which would have been seen by using a checklist.

Upcoming Meetings...

Sixth IVS Analysis Workshop
Noto, Italy
Apr. 21-22, 2005

17th Working Meeting on European VLBI for Geodesy and Astrometry
Noto, Italy
April 22-23, 2005

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

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

APSG Workshop 2005 Geodynamics and Natural Hazards Hongkong
June 15-17, 2005

Second Asia Oceania Geoscience Society Annual Meeting, Singapore
June 20-24, 2005

Fourth e-VLBI Workshop,
Sydney, Australia
July 12-15, 2005

Fourth IVS General Meeting
Universidad de Concepción
Concepción, Chile
January 9-13, 2006

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

News...

New Directing Board Members Elected

–Kerry Kingham, USNO

Every two years, approximately one-third of the IVS Directing Board is up for election. In 2004, it was the Analysis and Data Centers' Representative, the Technology Development Centers' Representative and the three At Large positions that were up for election.

An Election Committee, consisting of Shigeru Matsuzaka, Nancy Vandenberg and with myself as chair, was set up by the IVS Directing Board to oversee the process. Assisted by Dirk Behrend at the IVS Coordinating Center, a solicitation for nominations was prepared and sent out. We waited for the nominations to pour in... We waited for the nominations to pour in... We finally stopped waiting and sent out a series of increasingly pleading emails attempting to get someone to submit a nomination. Finally, we decided that we were going to have to extend the deadline in an attempt to get some nominations. No sooner had we done this, then the nominations started to pour in. Ironically, all but a few of the nominations were actually submitted before the original deadline. The IVS members, being typical scientists, never submit anything until the deadline!

Despite the late start, the IVS ended up with a large and varied set of candidates for all of the positions: 11 members ran for at least one position. There were four candidates for the Analysis and Data Centers Representative, two for the Technology Developement Centers Representative and nine candidates for the At Large positions (some were also candidates for the two Representative positions). The candidates well represented the varied geographical, technical, and scientific interests that compose the IVS.

Under the Terms of Reference, the Associate Members vote for the Centers' Representative and then the Directing Board chooses the At Large Representatives. 113 of the 252 eligible Associate Members voted (46%).

Bill Petrachenko was elected as the Representative for the Technology Development Centers, and Arthur Niell was elected as the Representative for the Analysis and Data Centers.

Subsequent to the election for the Centers' representatives, the Directing Board, under the leadership of chair Wolfgang Schlüter, elected Yasuhiro Koyama, Zinovy Malkin, and Franco Mantovani to round out the Directing Board.

I would like to thank all of the candidates who ran, for their interest and investment in the IVS. Their activism is encouraging for the future of our organization.

Tom Clark Received Gold Medal

Andrey Finkelstein (left) congratulating Tom Clark (right) during the award ceremony at the IAA.

The Institute of Applied Astronomy (IAA) of the Russian Academy of Sciences awarded a Gold Medal to Dr. Thomas A. Clark for his lifetime contributions to the development of Very Long Baseline Interferometry. IAA's director, Professor Andrey Finkelstein, presented the medal during a ceremony held on February 10th at the IAA in St. Petersburg. This was the first time the medal was presented to a non-Russian scientist.

Tom began the VLBI program at NASA Goddard Spaceflight Center in 1968. He directed the program for over 30 years until his retirement in 2001. Since that time, he has been the Chief Scientist at Syntonics LLC in Columbia. His hobbies include amateur radio (W3IWI), photography, travel and his supercharged Mini Cooper.

Tom traveled to St. Petersburg with his wife Elizabeth as guests of the IAA. After receiving the IAA medal, Tom presented a lecture entitled "Building the Geodetic VLBI Network — Some Personal Recollections" with his friend Alexei Zaitzev acting as translator. This lecture included a number of photographs from the early days of VLBI. Tom will give a modified version of this lecture at this year's Technical Operations Workshop.

Tom Clark with his award certificate.

CONT05 – A Fortunate Fortnight in September

–Dirk Behrend and Cynthia Thomas, NVI Inc./GSFC

CONT05 is a 15-day campaign of continuous VLBI sessions, planned for observing in the time period from Monday September 12 to Tuesday September 27. The CONT05 sessions will continue the extremely successful series of continuous VLBI campaigns CONT94 (January 1994), CONT95 (August 1995), CONT96 (fall 1996), and CONT02 (October 2002). The CONT campaigns have been among the most successful and visible data acquisition periods, because they provided a highly concentrated period of VLBI data that is used by numerous analysis groups for studies of inter-technique comparisons, searches for geophysical signals, and technique improvement.

With a foreseen network size of 12 stations (see map), CONT05 will exceed the CONT02 8-station net by 50%. To support such a large net, however, sufficient disk media need to be available. Preliminary simulations with the intended observation rate of 256 Mbit/s showed that around 70 D-sized modules (2000 GB) will be needed to sustain the full network. This is only possible through augmenting the current disk pool by additional media purchases. Some purchases have already occured, other are planned for the immediate future. If one of the planned purchases falls through, the network size will need to be reduced accordingly.

In order to make sure the stations are in good operating condition before CONT05, a set of tests will be developed for each station to perform. These tests will be based on similar tests that were done for previous CONT experiments, the last of which was three years ago. The schedule will be a standard geodetic schedule which achieves simulated EOP results of at least as good as 40 µas for pole position and 1.5 µs for UT1.

Geographical distribution of the 12 CONT05 stations.

The detailed observing schedule for CONT05 will be generated using the automatic scheduling algorithms of the NASA sked program. We will investigate the best combination of scheduling parameters, minimum SNR levels, sourcelist, and flux models. The "best" solution will be determined as a compromise between the optimum simulated formal errors, number of observations, number of scans per hour, sky coverage, and robustness.

A web page for the CONT05 is under construction at http://ivscc.gsfc.nasa.gov/program/cont05.html. We would like to thank all stations for taking on the extra observation burden of the CONT effort.

IVS Contest....

Ever have one of these days?

1. Can you name these people?
2. Can you guess when and where the pictures were taken?
3. Can you come up with an appropriate caption?

Win a hammer for your station or VLBI group by entering the contest!
Please send your answers to "ivs-news@ivscc.gsfc.nasa.gov" by June 15, 2005.
The winner will be announced in the next Newsletter and will be awarded the IVS Hammer.

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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ANALYSIS...

Towards the Redetermination of the ICRF

–Chopo Ma, NASA and John Gipson, NVI Inc./GSFC

The data and analysis for the International Celestial Reference Frame (ICRF) were completed in 1995. In the succeeding decade the observations and analysis both improved significantly, so work is beginning that should ultimately lead to a redetermination of the ICRF. The process will take several years.

Many ICRF defining sources and other astrometric sources were observed infrequently or minimally after the ICRF was finished, and southern sources were generally poorly observed. In February 2004 the IVS began a program to systematically monitor 307 sources. These include the non-geodetic ICRF defining sources as well as astrometric sources identified by Martine Feissel-Vernier as stable or potentially stable. The goal of this monitoring program is to observe each source at least twice a year using a small part of the time of the geodetic networks.

Prior to the start of the program approximately 160 sources out of 307 had not been successfully observed in the preceding twelve months. By December 2004 this number had shrunk to five. The data gathered by the source monitoring program should permit the selection of better defining sources for the redetermined ICRF.

In parallel to improving the astrometric data set work is beginning to coordinate the IVS Analysis Centers for the ICRF redetermination. The first step in February 2005 was the generation of source catalogues in a configuration similar to the 1995 ICRF analysis, i.e., source positions as global parameters and station positions are arc parameters. There are currently 11 IVS Analysis Centers from seven countries participating.

The catalogues will be compared by the IVS Analysis Centers at JPL, Paris Observatory, USNO, and IAA. Results will be discussed at the IVS Analysis Workshop in Noto. Over the next several years it is anticipated that many test catalogues will be made, compared, and analyzed to identify systematic errors, to try methods for treating source position instabilities, to determine the real size of position errors, and to decide on the analysis configuration for the final result.

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