

# IVS Newsletter

Issue 20, April 2008



## CONT08: An August Continuous VLBI Campaign

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

After a three-year intermission, there will be another continuous VLBI campaign organized this year (CONT08). Similar to the very successful CONT05 campaign, CONT08 will be observed in late summer. However, for scientific reasons the observing period is shifted by about a month so that the actual observations will be taken between August 12 @ 00:00:00 UT and August 26 @ 23:59:59 UT. The observation period

should ensure a high signal level in the atmospheric excitation functions for high temporal resolution Earth rotation investigations. The signal vanishes (zero-crossing) in the season transition months of October and March; these months should therefore be avoided entirely.

ing program, new module purchases are necessary for carrying out the campaign as planned. Several stations/institutions have purchased or will purchase new modules (Medicina, Ny-Ålesund, Onsala, Wettzell, and NASA) to augment the pool with the needed, about three quarters of the full campaign, capacity. If any of the major purchases falls through, it will become necessary to downscale the scope of CONT08, for instance, by reducing the recording rate. A possible fallback plan is to observe two weeks back-to-back, where one week is observed at 512 Mbps and the other at 256 Mbps.

A further difference to the CONT05 campaign will be that all data will be correlated at one correlator: the Washington Correlator will process the entire CONT08 campaign. This will ease the logistical aspects regarding module handling for the correlators, stations, and shipping.

As was done in previous CONT campaigns, the participating stations will conduct extensive testing of their equipment under the direction of Brian Corey and Ed Himwich. The test results are to be examined by the stations themselves as well as by Brian and Ed. The tests will be done in order to ensure that the stations will be at their peak performance for CONT08.

Aligning the CONT08 observing scheme to the other space-geodetic techniques (GPS, SLR, DORIS) will improve the comparison and combination work. For that it is foreseen that for the duration of the CONT08 campaign these techniques will make sure that the best possible observations be taken; i.e., no unnecessary maintenance work or upgrades will be performed at the stations. Furthermore, all sites should be analyzed in the regular analysis of the particular service.

To foster inter-technique studies it is envisioned to prepare a special issue on CONT08 in the Journal of Geodesy. The call for contributions will probably go out about a year after the end of the CONT08 observing, that is in the September 2009 time frame. The detailed aspects of this special issue need still to be discussed.

Further information on the campaign will be posted to the CONT08 Web page <http://ivscc.gsfc.nasa.gov/program/cont08> as it becomes available.



The network of 11 stations that will participate in the CONT08 campaign to be observed from August 12 to August 26, 2008.

entirely.

Currently the logistical preparations for the CONT08 campaign are under way. The CONT08 network will consist of eleven stations (see figure). In contrast to CONT05, it is planned to observe the 15 consecutive days on the basis of UT days, i.e., an observing day will run from 0 UT to 24 UT. In addition, the observing scheme will also be altered so that daily station checks (e.g., pointing) will not necessarily be done at the change of schedules but rather at a convenient, but still well-coordinated time for the stations (i.e., different daily check times for each station). In this way gaps with no observational data can be avoided. Previously, daily check gaps (of 30-min length) resulted in unrealistic peaks in the sub-daily EOP time series derived from the CONT05 campaign data.

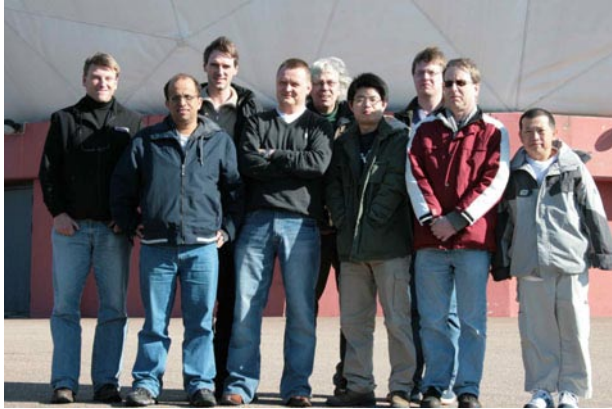
The fifteen days of continuous observations will be observed at a recording rate of 512 Mbps. According to preliminary schedule simulations, this will result in a storage space requirement of about 260 TB for the entire campaign. With the geodetic media pool only being able to support the standard IVS observ-



# Permanent Component

## Onsala Space Observatory, Sweden

*Onsala Space Observatory (OSO) is a radio astronomy facility on the Swedish west coast south of Gothenburg, Sweden. It fulfills several functions within the IVS. Newsletter Editor Hayo Hase interviewed Rüdiger Haas via e-mail to learn more about OSO's various activities and plans for the future.*



*The Onsala crew (left to right): Gunnar Elgered, Michael Lindqvist, Rüdiger Haas, Roger Hammargren, Hans-Georg Scherneck, Tong Ning, Tobias Nilsson, Karl-Åke Johansson, Surat Pramualsakedikul.*

*Rüdiger, how did you come to Sweden? Do you like to be there?*

I came to Chalmers University of Technology and Onsala as post-doc in March 1997, after having received my PhD in late 1996 at the University of Bonn. My first position was funded for 4 years by the European Commission in the Training and Mobility of Researchers (TMR) programme. After this I continued as a researcher and in early 2004 I achieved the Swedish title of a “docent”. Since mid-2004 I am employed as associate professor at Chalmers University of Technology. I like working and living in Sweden very much and Sweden has become my second home.

*What is the relationship between Chalmers University of Technology and Onsala Space Observatory (OSO)?*

The Department of Radio and Space Science at Chalmers University of Technology hosts the Onsala Space Observatory—the Swedish National Facility for Radio Astronomy.

*When and how did OSO get involved into VLBI?*

The Onsala Space Observatory participated in the first ever transatlantic VLBI experiment—combined for both astronomical and geodetic applications—in April 1968 using the first data acquisition system referred to as the Mark I system.

*Who are the players in your VLBI group and what are their functions?*

Onsala is active in geodetic VLBI, mainly within the IVS, and in astronomy VLBI, mainly within the EVN and global mm-VLBI. The common technical basis for the VLBI

work is provided by the observatory and the corresponding maintenance is done by the Onsala lab, headed by Miroslav Pantaleev. In particular, the masers, the time and frequency distribution, the VLBI data acquisition system, and the 20-m telescope are maintained by Karl-Åke Johansson and Leif Helldner. Roger Hammargren is responsible for the Mark 5 data acquisition system and team of operators. The scientific applications of VLBI are carried out by the corresponding research groups.

The GEO-VLBI research is done by the “Space Geodesy and Geodynamics Research Group”, which consists of the senior staff members Hans-Georg Scherneck, Jan Johansson, Gunnar Elgered, Tobias Nilsson, and myself, and our PhD students Surat Pramualsakedikul, Tong Ning, and Susana Garcia Espada. Hans-Georg is associate professor at Chalmers and is working with geophysical modelling and interpretation, e.g. loading phenomena, crustal deformation, strain-rates, gravimetry. Jan Johansson is adjunct professor at Chalmers and works mainly with GNSS and related research. Gunnar is head of the Department of Radio and Space Science for 2/3 of the time. The rest of the time he participates in the teaching and the research work of the research group. I am currently the research group leader and the PI for our geodetic VLBI work. I work mainly with geodetic VLBI data analysis, e.g. earth rotation and effects of atmospheric water vapor on geodetic VLBI. The scientific responsibility for the astronomy VLBI lies with Michael Lindqvist and John Conway.

*Recently Onsala made a number of successful e-VLBI experiments. Can you explain what has been achieved?*

OSO was connected via optical fiber to the international high-speed backbone already in late 2003. This allowed us to perform off-line and real-time e-VLBI experiments in a very early stage. For example, in 2004 we achieved the first ever transatlantic real-time fringes, together with Westford. During the last two years we worked together with our Japanese colleagues in Kashima and Tsukuba to achieve dUT1 results with very low latency. In February 2008, we achieved dUT1 results within 3.5 minutes after the end of a one-hour long dUT1 session. This is the current world record, as far as I know. Our experience with e-VLBI is very positive and we are looking forward to using e-VLBI data transfer to the correlators routinely—at least off-line as so-called e-transfer.

*What are OSO's contributions to the IVS?*

We contribute to the IVS as network station, analysis center, and technical development center. As an IVS Network Station we currently perform about 25 experiments per year, plus additional observations in the IVS CONT campaigns and recently a number of ultra-rapid dUT1 experiments with our Japanese colleagues. As IVS Analysis Center we focus on a number of phenomena that are relevant for geodetic VLBI and other space geodetic and geophysical techniques, such as

earth rotation, crustal loading due to ocean and atmosphere, and atmospheric water vapor. We do both modeling work and data analysis. As IVS Technology Development Center we mainly work on the improvement of ground-based microwave radiometry. In 2007 we developed a new S/X receiver for the 20-m radio telescope that has dual-polarization for X-band.

*Do you have plans to realize VLBI2010 at Onsala?*

We have a strong interest in VLBI2010 and want to be part of the future VLBI system. This means that we plan on upgrading our VLBI equipment to be compatible with VLBI2010. Currently it is very hard to say whether we will be able to also build a new VLBI2010 telescope at the observatory. In case we can get the necessary grants, we will of course try to do so.

*The Swedish Eleven-Feed development of Prof. Kildal seems to be crucial for the VLBI2010 antennas due to its phase stability over a wide frequency range (1 to 11 GHz or even higher). Is there a connection between Prof. Kildal's group and the VLBI activities at OSO?*

The collaboration with Per-Simon Kildal has been going on since he arrived at Chalmers in the late eighties. Several of the antenna feeds of the Onsala antennas have been designed by staff and thesis workers of his group. For example, our present S/X-feed including the dichroic surface originates from a collaboration between our PhD student Kenneth Jaldahag and Per-Simon. Recently we have been in contact with Per-Simon concerning the VLBI2010 feed development, and discussed the possibility to test the corresponding prototypes in a cooled environment and on a telescope.

*Do you have plans to complement geodetic VLBI operations with other devices?*

There are several complementing techniques at the observatory for many years, and we plan to install even more. For more than a decade, Onsala is also an IGS network station. There are several GNSS monuments at Onsala, used both for routine IGS observations and for research projects. Since the 1980ies the microwave radiometer "Astrid" is operating almost continuously at Onsala, and since the late 1990ies a second microwave radiometer, "Konrad", is operated at Onsala. There is also a reference point for absolute gravity observations at the observatory that is occupied regularly by several research groups from Sweden, Finland, Norway, and Germany. Last year we started a project to install additionally a superconducting gravimeter at the observatory. The building to host the gravimeter is under construction now. In connection with the superconducting gravimeter we have plans to install seismometers and a tide gauge at the observatory, too. The multi-sensor instrumentation shall allow us to give important contributions to GGOS and its Nordic realization, NGOS. Together with the SP (Swedish Technical Research Institute) we also operate a time and frequency lab at Onsala, which includes two H-masers, in the near future a Cesium clock, and a UTC generator. We work on techniques for time transfer via optical fiber.



*Are there plans in place on how the Global Geodetic Observing System (GGOS) can be realized at Onsala?*

Our plans to contribute to GGOS and NGOS are to have multi-sensor space geodetic and geodetic equipment at the observatory and to analyze the observational data in a consistent and homogeneous way. We aim at using the results in a holistic way and to analyze and combine the results in order to exploit the techniques specific advantages.

*How important is the IVS for your VLBI group?*

Our involvement in the IVS is one of the main drivers for the work in the Space Geodesy and Geodynamics Group. We continuously get new research ideas on how to improve the space geodetic analysis. For the observatory as such it is positive to be involved in IVS. However, the IVS as an international organization could strengthen its demand for observing time at Onsala for geodetic VLBI. In particular, it would be helpful for our VLBI2010 plans if the IVS officially supported these activities and encouraged us to follow these ideas.

*As an analyst you have seen and processed many VLBI experiments. In your view, what features are most desirable for VLBI analysis?*

From my point of view it would be beneficial to some extent to improve automatization of correlation and standard data analysis in order to achieve first results in particular for earth orientation and rotation quicker than today. The observational data should of course be available in a standard data format, independent of post-processing software packages and platforms. It would also be positive to have a wider variety of independent post-processing software packages than today. Some of the existing software packages probably need a renovation and re-structuring. An interesting aspect is of course to further develop multi-technique software packages that use the data on the level of observations.

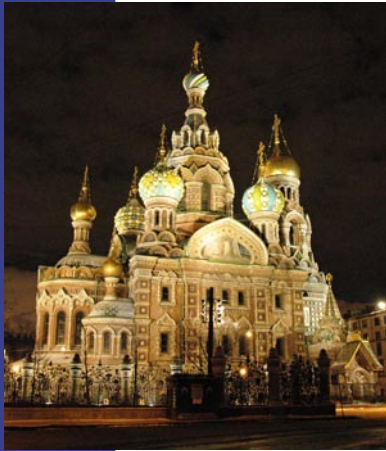
*(above) Inside view of Onsala's 20m antenna. (below) Co-located techniques at Onsala: WVR, VLBI and GPS.*





## Fifth IVS General Meeting Held in St. Petersburg

– Ryuichi Ichikawa, Kashima Space Research Center NICT



Church of Our Savior on the Spilled Blood at night.

*The fifth IVS General Meeting was held in St. Petersburg, Russia from March 3-6, 2008. Prof. Andrey Finkelstein of the Institute of Applied Astronomy (IAA) and his colleagues organized a marvellous meeting. In spite of winter season in Russia, it was a fruitful occasion of discussing many issues for more than 130 participants. I would like to report my personal experience.*



(top) Andrey Finkelstein opening the General Meeting at the icebreaker reception with a toast. (below) Participants at the reception.

St. Petersburg is located in the delta of the Neva River flowing into the Baltic Sea. The city was the capital of Russia until the government moved to Moscow after the Russian Revolution of 1917 and is also known as the birthplace of the revolution. Before the dissolution of the Soviet Union in 1991, I could not imagine that I would visit the city in the future. I have to confess that my knowledge about Russia was limited to the world depicted in the 007 movies or in the espionage novels by authors such as John le Carré and Brian Freemantle. When I arrived at the St. Petersburg International Airport, I found my biased imagination about Russia was completely wrong. The building of Pulkovo 2 airport was clean and nice. The Russian beer, which I tasted for the first time, was very good. It was surely a great pity that Koyama-san and I could not attend the icebreaker party due to our late arrival time at around 8 pm.

On Monday morning, the Fifth IVS General Meeting started with short welcome addresses by the St. Petersburg Minister of Science and Education Alexander Viktorov, the director of IAA Andrey Finkelstein, and IVS Chair Harald Schuh. After the welcome addresses the first scientific session “VLBI – A Vital Player in



Global Observing Systems” followed. Dirk Behrend summarized the IVS activities of the last two years such as the Intensive sessions, meetings, and publications. Harald Schuh demonstrated the contributions by VLBI to the Global Geodetic Observing System (GGOS) and the activities related to VLBI2010 such as new stations, a broadband feed, simula-

tions, e-VLBI, and rapid determination of UT1-UTC and software correlators. In addition, he introduced the 15-day continuous VLBI campaign “CONT08”, which is planned for the second half of August 2008. Markus Rothacher explained the important role of VLBI for the precise determination of earth orientation parameters by combining with GNSS techniques in GGOS. Another topic, surveying of VLBI-compact extragalactic radio sources by Yuri Kovalev, is also important in order to expand VLBI capability widely.

In Session 2 “Network Stations, Operation Centers, Correlators”, I was very impressed by the talk given by Kerry Kingham. He pointed out some equipment problems that can cause experiment failures such as missing channels and spurious signal in phase calibration. Although this topic seems to be minor, I think it is essential in order to achieve good experiments. The Twin Telescope project of BKG Germany presented by Hayo Hase was also impressive. Its ring focus design looked very sophisticated. But also the East Asian activities in China, Korea, and Japan are amazing; e.g., operational quasi-real-time correlation processing for tracking the Chinese lunar probe “Chang'E-1”, a plan to establish an integrated geodetic facility including GNSS and SLR by the Korea Astronomy and Space science Institute (KASI), and ultra-rapid UT1 measurements using e-VLBI data transfer between Europe and Japan. In Session 3, the paper given by Robert Heinkelmann was very useful. In case of no in-situ met data, a numerical weather model is efficient to reduce the surface meteorological effects on VLBI measurements.

The second day of the meeting was scheduled with two sessions: Session 4 “Interpretation of VLBI Results in Geodesy, Astrometry and Geophysics” and Session 5 “Progress in Technology Development and the Next Generation VLBI System”. Since both sessions had many papers (19 and 18 papers, respectively), the second half of Session 5 was held on the final day. The paper given by George Krasinsky was very interesting. He demonstrated that VLBI data are accurate enough to monitor the secular variation of the Earth’s ellipticity. Another interesting paper was given by Oleg Titov. He concluded that geodetic VLBI has the capability of better measuring the universe than any other astronomical technique. In addition both the new source catalog of X/Ka band presented by Christopher Jacobs and the geodetic experiments using K-band sources presented by Takaaki Jike will be important to avoid S-band RFI problems and to reduce ionospheric errors. In the evening of the second day, we had the poster sessions in the room adjacent to the lecture hall. 48 very interesting posters complemented the oral sessions.

In Session 5, many cutting-edge technologies in various fields were presented. I was very impressed by the results of atmospheric simulations done by Tobias Nilsson, which are based on the refractivity structure constant  $C_n$ . A broad-

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band feed installation on a 5-m antenna and the detection of first fringes presented by Arthur Niell was very helpful, because we at NICT are also developing a compact VLBI system with the same feed. We introduced our compact VLBI system, which is called “MARBLE (Multiple Antenna Radio-interferometry of Baseline Length Evaluation)”, in the same session. In addition, Koyama-san’s paper, which demonstrated the ultra-rapid UT1-UTC determination within 3 minutes and 45 seconds after the end of the Intensive-type session using e-VLBI, was welcomed.

In the evening of the final day, we had a banquet with delicious Russian food and Vodka at “The Palace of Scientists”. It was surprising for us that this place of historical heritage was ordinarily used as a banquet hall. We enjoyed another wonderful dinner, which was nicely flavored by many grateful, warm, and jokey speeches from the participants.

On March 6th, the LOC invited us to an excursion to Svetloe Observatory, which is located about 70 km northwest of St. Petersburg. The site was very beautiful with a powder snow cover everywhere. It seemed that the 32-m diameter antenna was smoothly operated by an experienced staff.

My first visit to Russia was great fun. Before this trip, I was slightly afraid of encountering some trouble, for instance, with the entry and departure formalities. These worries were absolutely groundless. All procedures were smooth, the hotel was very nice, the food was delicious, and the city was beautiful except for air pollution caused by dust due to studded tires. Whenever I tried to read directions or to order dinner at a restaurant, I got confused by the Cyrillic letters. However, Russian people in the city helped us kindly. We would like to express our deep gratitude to the LOC and the entire staff at IAA. And, we are looking forward to the sixth IVS General Meeting, which will be held in Hobart, Tasmania, Australia in 2010.



*(top) Weimin Zheng presenting his paper. (right) Hideo Hanada and author Ryuichi Ichikawa at the banquet in “The Palace of Scientists”. (below) The 32-m radio telescope at Svetloe Observatory*

*(top) Welcome address by IVS Chair Harald Schub. (below) The banquet was accompanied by classical piano music.*





## GGOS Holds Unified Analysis Workshop

– Dan MacMillan, NVI Inc./GSFC

From December 5–7, 2007 representatives from the geodetic measurement services gathered in Monterey, California for the first GGOS (Global Geodetic Observing System) Unified Analysis Workshop (UAW) in order to discuss the combination and integration of the different space and in situ geodetic techniques. It was an opportunity for experts from all the techniques to discuss these issues in the same room rather than only at their respective analysis centers. The techniques represented were VLBI, GNSS, DORIS, SLR/LLR, gravimetry, and altimetry. A goal of the meeting was to identify inconsistencies and systematic effects that plague the combination of results from each of the techniques.

Answering questions related to the water cycle, climate, global change, and geohazards requires information about mass transports and their dynamics in the Earth system from the three basic geodetic quantities: geometry (Earth's figure), gravity, and Earth rotation. GGOS of the IAG (International Association of Geodesy) has a mission to integrate the techniques and models to obtain long-term reliability of geodetic products with the goal of understanding geodynamic and global change processes. The success of this combination will depend on accounting for biases between techniques, handling parameters that are common to more than one technique, and developing rigorous combination strategies.

The workshop consisted of sessions on 1) product generation of each of the services, 2) assessment of technique-specific systematic biases affecting the co-location on the ground and on satellites, 3) inclusion of parameters common to more than one technique and defining common standards for these parameters, 4) improvement of rigorous strategies for combination of geodetic techniques, 5) development of new products from inter-technique combinations, and 6) creation of a GGOS data portal and the corresponding meta data flow. You can find the workshop program with links to presentations at:

<http://www.iers.org/MainDisp.csl?pid=66-1100207>.

As expected many issues were discussed and at the end a list of over 30 action items (AI) was put together. Several of these

AI have relevance for the IVS. E.g., it is planned to extend the SINEX format (parameterization) to a SINEX-2 format.

For the next ITRF generation all techniques should include polar motion rates in the SINEX files and IVS should add the quasar coordinates. Further, the modeling should be standardized to use the same troposphere mapping functions and a priori dry troposphere delays. The IVS Analysis Coordinator, Axel Nothnagel, will look into the standardization of the algorithms and formulas for the computation of the reference temperature field for the determination of VLBI telescope thermal expansion.

The roughly 30 participants of the workshop found the discussion very useful and agreed on repeating it every two years. The next UAW will likely be held in conjunction with the 2009 AGU Fall Meeting.



*The beautiful California coast line at Monterey shows nature at work.*

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/>.

### Upcoming Meetings...

FIG/IAG Joint Symposium Lisbon, Portugal May 12-15, 2008	37th COSPAR Scientific Assembly Montreal, Canada July 13-20, 2008
Joint Assembly 2008 Ft. Lauderdale, FL., USA May 27-30, 2008	Journées 2008 Dresden, Germany September 22-24, 2008
7th International e-VLBI Workshop Shanghai, China June 16-17, 2008	9th EVN Symposium Bologna Italy September 23-26, 2008
AOGS 2008 Busan, Korea June 16-20, 2008	AGU Fall Meeting San Francisco, USA December 15-19, 2008

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

## News from the Directing Board

– Dirk Behrend, NVI Inc./GSFC

The 19th Directing Board meeting was held at the Institute of Applied Astronomy of the Russian Academy of Sciences in St. Petersburg, Russia on March 7–8, 2008 directly following the General Meeting and Analysis Workshop. IVS Chair Harald Schuh greeted the present board members and welcomed Shigeru Matsuzaka-san who participated as observer due to Network Representative Yoshihiro Fukuzaki-san's illness. The board decided to augment the Terms of Reference with a passage stating that if a member of the board is unable to fulfill his/her elected position, the board should appoint a substitute person to fill the position until the next official elections (which need not coincide with the end of the actual term). The position will then be re-elected for a full term. Following this procedure, we would like to welcome Kazuhiro Takashima-san, appointed as Fukuzaki-san's substitute as Network Representative until February 2009. We would like to extend our sympathy to Fukuzaki-san and wish him a quick and full recovery. The board also appointed the election committee for the December/January elections; the committee consists of Alan Whitney (chair), Hayo Hase, and Dirk Behrend.

The Max-Planck-Institute for Radioastronomy (MPIfR) applied to become a member organization of IVS. Until the beginning of 2008, MPIfR's status had been that of an affiliated organization. The board unanimously approved the proposal. We are very pleased to welcome MPIfR as a full member.

John Gipson (as guest for his presentation to the board) reported about the activities of Working Group 4 on "VLBI Data Structures", which was formed at the previous board meeting. John gave a presentation at the General Meeting. There was a first face-to-face working group meeting on the Monday of the General Meeting week. The next steps will be to develop a strawman proposal for the data structure and discuss it within the WG and beyond. It is planned to have monthly teleconferences. Splinter meetings are foreseen for the 2008 AGU Fall Meeting in San Francisco and the EVGA meeting in Bordeaux. It is planned to finish the design in about two years, i.e., by the next IVS General Meeting.

The Observing Program Committee (OPC) is planning a continuous VLBI campaign in August (CONT08). The network has been finalized and consists of eleven stations. With the planned observing rate of 512 Mbps, the purchase of additional Mark 5 modules is mandatory. Further details are covered in the lead article of this newsletter (see Page 1).

Inspired by the great success at the sister services (e.g., ILRS and IDS), the IVS will also establish Combination Centers, whose tasks will include the quality control and timely combination of the session-based results of the Operational Analysis Centers. They will disseminate the combined Earth Orientation Parameters (EOP) as official IVS

products and will generate the official IVS input to any ITRF activities. Combination centers will be required to make a commitment to delivering EOP throughout the year in a timely fashion to the IERS for inclusion in IERS operational products. In addition, scientific supervision should guide the activities for a continuous development of state-of-the-art procedures in close cooperation with the IVS Analysis Coordinator. A call for proposals is being prepared and will be sent out by the middle of May. In conjunction with this call, also a call for proposals for further Operational Analysis Centers will be sent out. Additional Analysis Centers will strengthen the quality and reliability of the IVS products.

The International Astronomical Union (IAU) has launched 2009 as the International Year of Astronomy (IYA2009) marking the 400th anniversary of the first astronomical observation through a telescope. The IVS wants to support the activities with a special astrometric observing session involving as many stations as possible. This session should be covered in the local media in order to help increase the scientific awareness among the general public. The details need to be worked out. The board tasked the OPC with the organization of this special session.

The 19th Board meeting took place in the pleasant environs of the Institute of Applied Astronomy. We would like to thank Andrey Finkelstein and Nadia Shuygina and all helping hands at IAA for the excellent organization and the kind support. The notes of the meeting are available on the board page of the IVS Web site at <http://ivscc.gsfc.nasa.gov/about/org/board/>.



*Members of the board during the visit to Svetloe Observatory.*



*Part of the board during the meeting (clockwise from left: Kerry Kingham, Alan Whitney, Xingzhong Zhang, Andrey Finkelstein, Arthur Niell, Shigeru Matsuzaka, Hayo Hase, and Chopo Ma).*

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## March Retreat Advances GGOS

– Dirk Behrend, NVI Inc./GSFC



(Top) Participants at the 2008 GGOS Retreat. (below) GGOS chair Markus Rothacher (standing) during one of the plenary sessions.



Bertinoro, Italy was the venue of the 2008 GGOS (Global Geodetic Observing System) Retreat. About 25 scientists assembled from March 25–28, 2008 in the University of Bologna Congress and Residential Centre, which is located about 80 km southeast of

Bologna on a remote, quiet hill. It was an ideal setting to completely disconnect from the day-to-day work and to concentrate on the task at hand.

The retreat was focused on the implementation of the GGOS strategy as described in the GGOS2020 Reference Document with particular emphasis on the organizational structure. To that end, the GGOS2020 document was reviewed (the final document should be available in a few months after a review by external stakeholders) and future structural elements were discussed. The latter were

first covered in breakout sessions with White Paper presentations and then discussed in the plenary. Following the general discussion in the plenary, a second set of breakout sessions discussed in detail the tasks of the future components and drafts for calls for participation were prepared.

Several people were tasked with finalizing the draft calls for participation in the weeks following the retreat. After approval through the IAG (International Association of Geodesy), the calls will be distributed to the community. The new components will be the Coordination Office (CO) and three bureaus: Bureau for Networks and Communication (BNC), Bureau for Satellite and Space Missions (BSSM), and Bureau for Standards and Conventions (BSC). You may expect to see the calls in late summer or early fall.

Smaller items that were being discussed were a revision of the vision and mission statements of GGOS and the organization of a series of smaller stakeholder events in conjunction with already scheduled meetings and workshops.

All in all, it was a very productive meeting and we have to thank Susanna Zerbini for the excellent organization. We may take Susanna's kind offer of having a future meeting of the GGOS community in Bertinoro.

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