European VLBI Network Newsletter

Number 21

September 2008

Contents

1. Message from the Chairman of the EVN Board of Directors

For obvious reasons, I'm particularly happy about the news reported in this issue of our Newsletter on the first participation of the Yebes 40-m antenna in the EVN observing session at 22 GHz on May 30, 2008. The Yebes observatory enjoyed of the cooperation of different nodes of the Network (in particular JIVE and the Max-Planck-Institute in Bonn). The data obtained during the first minutes of the observations were quickly transferred to Dwingeloo and Bonn, and fringes were promptly obtained at both correlators. I do believe that these particular observations illustrate very well the strength of our Network to be well coordinated and extremely cooperative. This observation clearly was a great milestone both for Yebes and the EVN. I look now forward to extending the participation of the Yebes antenna in EVN observations at the other frequency bands in which the antenna is being equipped (2, 5, 6 and 8 GHz).

This Newsletter also reports on many technical improvements and achievements of the EVN. In particular, the EVN continues with real-time VLBI development as the network connectivity at all EVN stations continues to improve. As reported in this Newsletter, additional MERLIN antennas are being incorporated into the e-EVN significantly increasing the capabilities of the real-time array. On the other hand, at the last meeting of the EVN CBD in Bordeaux, it was approved to move towards upgrading the EVN to work at 4 Gigabits per second (Gbps). In this regard, it should be underlined the recent achievement reached during the seventh e-VLBI Workshop held in Shanghai on June 17th 2008, when the engineers at the Helsinki University of Technology TKK/Metsahovi radio-observatory made a world record in data transfer by achieving 8 Gbps over the common Internet (the transferred data was a telescope radio signal sampled in real-time).

Nevertheless, it should be noted that in order to make the e-EVN a competitive instrument, not only the real-time data transfer is important, but also a new concept and logistics of the Network are

needed. In this respect, the recent tests of EVN dynamical scheduling reported in this Newsletter open a new era of major flexibility for the Network.

The new call for proposals included in this Newsletter integrates the request of observing time for the "standard EVN" sessions (disk recording) with those for the real-time "e-EVN" sessions. This is a further demonstration that the EVN is moving firmly towards the operation in real-time, while keeping the same or even better performance than that obtained with the traditional VLBI methods of observation.

Some new very interesting scientific results obtained at the EVN are also highlighted in this issue, such as the radio detection at 1.6 GHz of the gamma ray source 3EGJ2020+4017 (IGR J2018+4043), in preparation for further observations with GLAST. Also of very high interest were the results presented at the 4th workshop on Compact Steep Spectrum and Gigahertz Peaked spectrum Radio Sources which was held in Riccione last May.

After 9 years of serving as at-large member in the EVN Programme Committee (PC), Patrick Charlot had announced, owing to his new commitments at the directionship of the Bordeaux Observatory, his wish to leave the Committee. At its last meeting (in Bordeaux!) the EVN CBD unanimously thanked Patrick for his excellent work at the PC, in particular during the last 6 years when he served as PC Chair, and wished him well for the challenges at his new position. Tiziana Venturi has been appointed as new chair of the PC. The CBD also sent its best wishes of success to Tiziana at this position which is indeed crucial in order to optimize the scientific return of our Network.

I would like to take this opportunity to remind how the European Framework Programmes (FP) are providing a wonderful opportunity for the EVN institutes to strengthen both the links among us and our links with other institutions. The results from FP6 RadioNet (coordinated by Dr. P. Diamond), a project that is now reaching its end, have been extremely fruitful. We are now looking forward to the starting of a new RadioNet in FP7 (now under the coordination by Dr. M. Garrett) which appears to be very promising.

At the time of writing these lines, we all look now forward to meeting at the 9th EVN Symposium. The conference, which will be kindly hosted by our IRA (INAF) colleagues in Bologna on September 23-26, 2008, has a very exciting scientific programme. I warmly encourage all VLBI-friend astronomers, in particular EVN users, to attend the Symposium to report and discuss their most recent results.

Rafael Bachiller, OAN-IGN, Spain

2. Call for EVN Proposals - Deadline October 1st 2008

ALL EVN, GLOBAL, and e-VLBI PROPOSALS must now be submitted

with the ONLINE PROPOSAL SUBMISSION tool Northstar.

Email submission is no longer accepted

Detailed Call for Proposals

(This text is also available on the web at http://www.ira.inaf.it/evn_doc/call.txt)

Observing proposals are invited for the EVN, a VLBI network of radio telescopes spread throughout Europe and beyond, operated by an international Consortium of institutes (http://www.evlbi.org/).

The observations may be conducted with disk recording (standard EVN) or in real-time (e-VLBI).

The EVN is open to all astronomers. **Use of the Network by astronomers not specialized in the VLBI technique is encouraged.**

The Joint Institute for VLBI in Europe (JIVE) can provide support and advice on project preparation, scheduling, correlation and analysis. See EVN User Support at http://www.jive.nl.

Standard EVN Observing Sessions in 2007-2008 (disk recording)

2009 Session 1 Feb 26 – Mar 19 18/21cm, 6cm, 5cm, 7mm

2009 Session 2 May 28 – Jun 18 18/21cm, 6cm, ... (7mm)

Proposals received by 1 October 2008 will be considered for scheduling in Session 1, 2009 or later. Finalization of the planned observing wavelengths will depend on proposal pressure. Other wavelengths which may be scheduled in 2008-2009 are 90cm, 50cm, 30cm, 1.3cm, and S/X.

e-VLBI Observing Sessions in 2008-2009 (real-time)

2008 Dec 4 – Dec 5 (start at 13 UTC)	18/21cm, 6cm, 5cm, 1.3cm
2009 Jan 22 – Jan 23 (start at 13 UTC)	18/21cm, 6cm, 5cm, 1.3cm
2009 Feb 10 – Feb 11 (start at 13 UTC)	18/21cm, 6cm, 5cm, 1.3cm
2009 Mar 24 – Mar 25 (start at 13 UTC)	18/21cm, 6cm, 5cm, 1.3cm
2009 Apr 21 – Apr 22 (start at 13 UTC)	18/21cm, 6cm, 5cm, 1.3cm
2009 May 19 – May 20 (start at 13 UTC)	18/21cm, 6cm, 5cm, 1.3cm

Minor changes are still possible in the 2009 calendar.

There are three e-VLBI observation classes: general e-VLBI proposals; triggered e-VLBI proposals; short observations. General and triggered e-VLBI proposals must be submitted by the October 1 deadline to be considered for scheduling in the above e-VLBI sessions; requests for short observations may be submitted up to three weeks prior to any e-VLBI session.

Continuum and spectral line observations can be carried out.

See http://www.ira.inaf.it/evn_doc/guidelines.html for details concerning the e-VLBI observation classes and the observing modes.

Features for the next regular EVN and e-VLBI sessions

- Arecibo and Shanghai are now part of the e-VLBI array. Please see http://www.evlbi.org/evlbi/e-vlbi_status.html for the current e-VLBI array and for the availability of different eVLBI stations per observing band and for the dates of the e-VLBI observing sessions in 2009.

MERLIN is normally available for joint EVN+MERLIN observations in all standard sessions, for any EVN wavelengths which MERLIN supports (18/21cm, 6/5cm, 1.3cm). During the e-MERLIN construction in 2009 only an incomplete MERLIN array may be available due to limited resources. For updated information please consult the web at http://www.merlin.ac.uk//evn+merlin.html.

Large projects

Most proposals request 12-48hrs observing time. The EVN Program Committee (PC) also encourages larger projects (>48 hrs); these will be subject to more detailed scrutiny, and the EVN PC may, in some cases, attach conditions on the release of the data.

How to submit

The on-line proposal submission tool Northstar now replaces the old Latex-email way of submission for all EVN and Global proposals; EMAIL PROPOSAL SUBMISSION IS NOT POSSIBLE ANYMORE. Global proposals will be forwarded to NRAO automatically and do not need to be submitted to NRAO separately.

To use Northstar, people should register (at http://proposal.jive.nl, only for the first proposal submission), enter the information about the investigators and the technical specifications of the proposed observations (equivalent to that previously in the coversheet) using the on-line forms, and upload a scientific justification in pdf or ps format. The scientific justification should be limited to 2 pages in length. Up to 2 additional pages with diagrams may be included. The deadline for submission is 23:59:59 UTC on 1 October 2008.

Additional information

Further information on Global VLBI, EVN+MERLIN and e-VLBI observations, and guidelines for proposal submission are available at: http://www.ira.inaf.it/evn_doc/guidelines.html

The EVN User Guide (http://www.evlbi.org/user_guide/user_guide.html) describes the network and provides general information on its capabilities.

The current antenna capabilities can be found in the status tables. For the standard EVN see http://www.evlbi.org/user_guide/EVNstatus.txt. For the e-VLBI array see http://www.evlbi.org/evlbi/e-vlbi_status.html

The On-line VLBI catalogue (http://db.ira.inaf.it/evn/) lists sources observed by the EVN and Global VLBI.

Tiziana Venturi - Chairperson of the EVN Program Committee

3. EVN Scientific Highlights

- **The intriguing gamma-ray source 3EG J2020+4017 / IGR J2018+4043**

The enigmatic gamma-ray source 3EG J2020+4017, the brightest steady state unidentified EGRET source, was discovered back in 1981 in the field of the Gamma-Cygni supernova remnant (SNR G78.2+2.1) with the COS B satellite. Several studies covering most of the electromagnetic spectrum have been carried out since then searching for the origin of this high-energy emission.

Using the INTEGRAL/ISGRI instrument, Bykov et al. (2004) discovered the hard X-ray source IGR J2018+4043 in the field of the SNR and suggested that the EGRET and ISGRI sources could be the same object. Further observations of IGR J2018+4043 carried out with Swift XRT (Kennea et al. 2006, ATeL#788) revealed a point-like source consistent with the ISGRI source position and it was suggested to be an AGN or a Galactic X-ray binary. Later on, based on the analysis of Archival optical, infrared and radio data, an absorbed extended (~10 arcsec) counterpart was discovered for this point source. This emission is positionally coincident with the IR galaxy 2MASX J20183871+4041003.

On April 28 2008, Longo et al. (ATeL#1492) reported the detection by the AGILE mission of significant and variable gamma-ray emission (with photon energies above 100 MeV) from a source in the Cygnus region, positionally compatible with 3EG J2020+4017 and suggested that a possible counterpart within the ~1 degree AGILE error box can be the galaxy 2MASX J20183871+4041003. This detection stimulated further investigations: Ajello et al. (2008, ATeL#1497) reported the presence of a Swift/BAT source in the error box of the AGILE source, Halpern (2008, ATel#1498) argued that there is no evidence of current blazar activity from the candidate point source based on infrared I-band images, and Dubner et al. (2008, ATel#1518) discovered a source exactly at the position of the IGR J2018+4043/2MASX J20183871+4041003 source based on 20 cm and 6 cm VLA-C observations. On May 27 2008, Giuliani et al. (ATeL#1547) informed a rebrightening of the variable AGILE source.

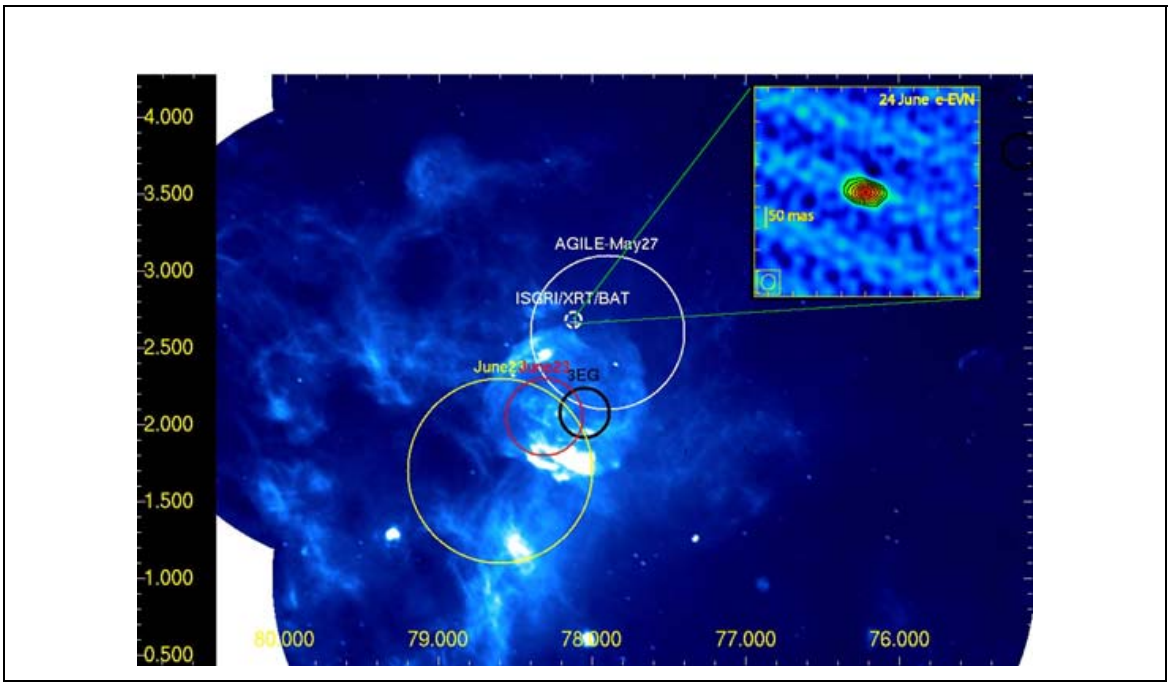
Cheung carried out new VLA observations of the radio source discovered by Dubner et al. using in this case the array in the D-configuration, concluding that the radio source is unpolarized and not variable, making it unlikely a blazar or X-ray binary origin. This lack

of variability was later confirmed in the X-ray range by Pandel et al. (2008, ATeL#1595) based on XMM-Newton observations.

On June 23 2008, the AGILE team reported a possible re-brightening of the gamma-ray source beginning on June 20 and also the detection of a slightly shifted gamma-ray point source based on the integration of several months of data. It has to be noted that the positions reported by AGILE in the successive communications are inconsistent with each other.

Despite the uncertainty in the exact location of the AGILE source, because of the lack of other bright hard X-ray sources in a ~1 degree vicinity of 3EG J2020+4017, one may conclude that IGR J2018+4043, 3EG J2020+4017 and the new AGILE source are the same object. In this direction, Trejo et al. (2008, ATeL#1597) carried out the highest resolution radio observations of the candidate counterpart at 1.6 GHz, using 7 antennas of the e-EVN network on June 24 2008. These observations showed that the source has a compact, but partially resolved structure, consistent with AGN activity in the host. Further observations are planned at 5 GHz to reveal the detailed structure and minimize the effect of scatter-broadening which likely affect the data. The observed AGN activity indicates that our target is a good candidate counterpart to the peculiar variable gamma-ray source, but the final answer will be given by GLAST next year.

References: Bykov, A. M. et al. 2004, A&A, 427, L21; Swanenburg,B.N. et al. 1981, ApJ, 243, L69



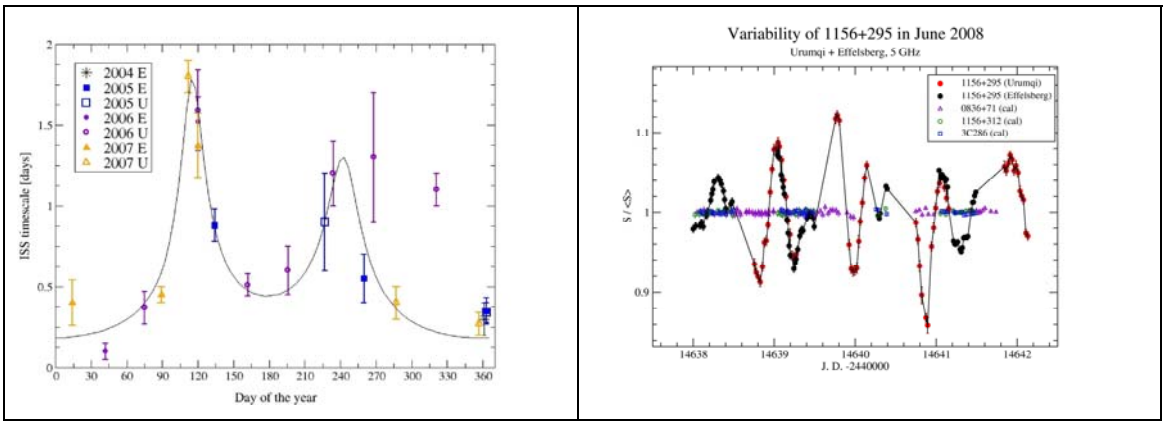
Elsa Giacani and Gloria Dubner, for a bigger collaboration.

- **Monitoring of rapid radio variability in compact radio sources with the Urumqi 25m telescope**

IntraDay Variability (IDV) is currently being interpreted as result from at least two effects: (i) interstellar scintillation caused by the ionized interstellar medium (ISM) located along line of sight and/or (ii) source intrinsic (physical) variability. Since January 2006, a couple of radio sources have been observed with the Urumqi telescope at 5 GHz of 3-4 days scheduled every 4-8 weeks. As an example, we show the result of rapid flux density variations of the quasar J1128+592.

An anisotropic scattering model is fitted to the J1128+592 data of 2004-2007. According to this model, a slow-down of the variability was expected for spring 2008 (around DOY 120). The new data, however, now reveal a much faster variability at this time. At present it is unclear, whether this is due to a change of the intrinsic source size or caused by short time scale variations of the interstellar medium, i.e. a variation of the electron density and/or fluctuation index. In the latter case, variations in the ISM must appear on timescales of the order of 1 year or less. A VLBI monitoring performed in parallel to the IDV observations should provide further constraints to this problem.

An even more extreme example of a rapidly variable radio source is shown for J1156+295, which only recently was discovered in the VLBI data of the 2cm survey (Mojave). The figure shows a combined data set from a coordinated experiment, where Urumqi and Effelsberg observed together. Rapid intraday variations are seen with amplitudes of more than 20 percent on time scales as short as 4 hrs.



X. Liu (Urumqi Radio Observatory), T.P. Krichbaum (Max-Planck Institut für Radioastronomie)

- **4th Workshop on CSS and GPS Radio Sources**

The 4th workshop on Compact Steep Spectrum and GigaHertz Peaked spectrum Radio Sources was held in Riccione (FC) in the week 26-29 May 2008. The need of the VLBI radio astronomical community to meet and discuss the nature of CSS sources started in 1990, when our understanding of their nature was still very poor.

From that time, the VLBI community working on this subject met regularly every 6 years, with the goal of sharing results and defining the state of the art of the knowledge.

A lot has happened since the first meetings. First of all the study of CSS and GPS sources is no longer limited to the radio band. Infrared, optical, and X-ray observations have considerably improved our understanding, and are now essential investigation tools.

Even though it seems fairly well established that CSS and GPS sources are young, as confirmed by the estimates on their radiative and kinematic ages, the properties of the interstellar medium of their hosts raise a lot of interest, and the possible role of confinement is still under study. Over the past few years the number of CSS and GPS samples has considerably increased. This of course is important, however attention should be kept high in order to avoid confusion and mix up of very different astrophysical situation.

Despite an overall better understanding of the observational properties of this class of sources and their role in the radio source evolutionary scenario, some theoretical questions are still unsolved. In particular, it is difficult to evaluate the role of the intergalactic medium in the evolution of such sources.

There seems to be room for a Fifth workshop in the series, most likely in six years from now.

The meeting has been very successful, with more than 50 participants coming from all over the world (all five continents were represented), who have kept the discussion very lively the entire workshop through. A large number of participants were either PhD students or young postdocs.

Contributions to the workshop were given by the Istituto Nazionale di Astrofisica (INAF), by the University of Bologna and by RadioNet.

Tiziana Venturi (IRA-INAF, Italy)

- **The 9th European VLBI Network Symposium on "The role of VLBI in the Golden Age for Radio Astronomy"**

The Istituto di Radioastronomia (INAF) on behalf of the European VLBI Consortium, will host the "9th European VLBI Network Symposium on The role of VLBI in the Golden Age for Radio Astronomy" and the EVN Users Meeting on September 23-26 2008. The Symposium will be held in Bologna (Italy) at the Conference Centre of the Consiglio Nazionale delle Ricerche and Istituto Nazionale di Astrofisica Campus, where the Istituto di Radioastronomia is located.

The purpose of this conference is to report on the very latest VLBI and e-VLBI results, including both recent scientific and technical developments in an era during which many new powerful radio facilities, e.g. e-MERLIN, e-VLA, LOFAR, ALMA, SKA, etc. are coming along. The meeting will have an informal character and includes reviews, contributed talks, and posters.

The list of topics includes AGNs and jet physics, Starburst Galaxies, VLBI surveys, gravitational lenses, masers, supernovae and their remnants, active stars, transients, new developments in hardware and software techniques. During the conference, also the *EVN Users Meeting* will be held.

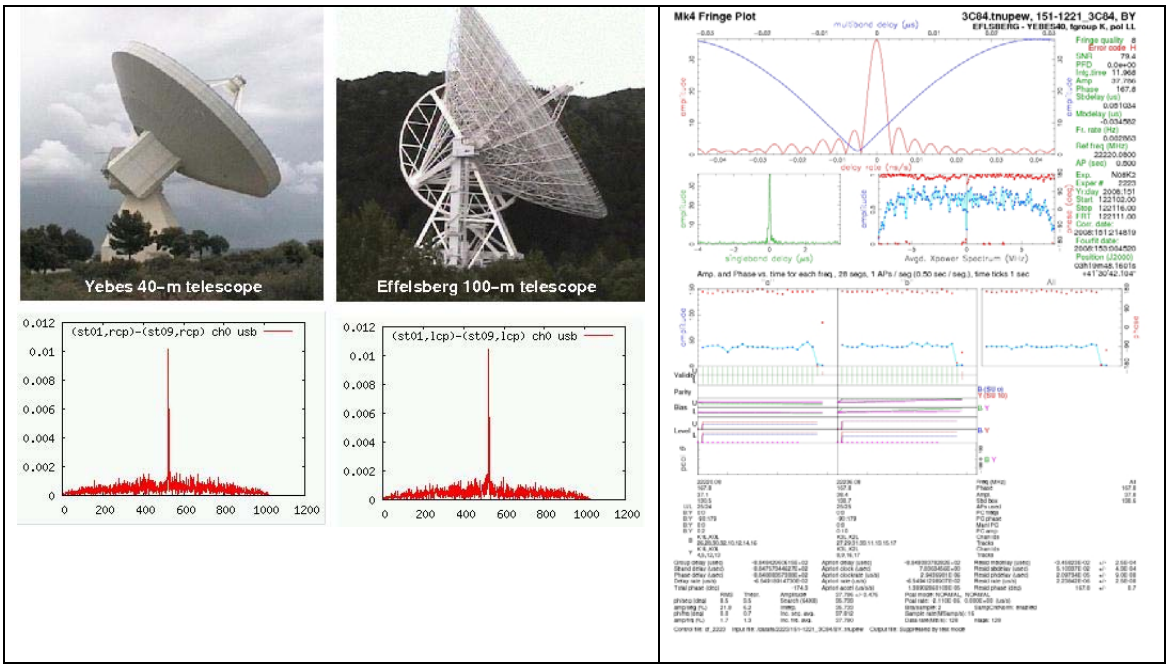
The Symposium is sponsored by INAF and RadioNet. For details, check the web: http://www.ira.inaf.it/meetings/evn9/

4. EVN Technical Development and Operations

- **The new OAN 40-meter radiotelescope at Yebes (Spain) joins the EVN**

The recently constructed 40 meter radiotelescope of the National Astronomical Observatory (National Geographical Institute, Ministerio de Fomento, Spain) in Yebes has performed its first astronomical VLBI observation at the last session of the EVN. The observations were preformed at K-band (22 GHz), and successful first fringes were obtained on May 30 2008 both at the EVN correlator at JIVE, and at the MPIfR correlator in Bonn.

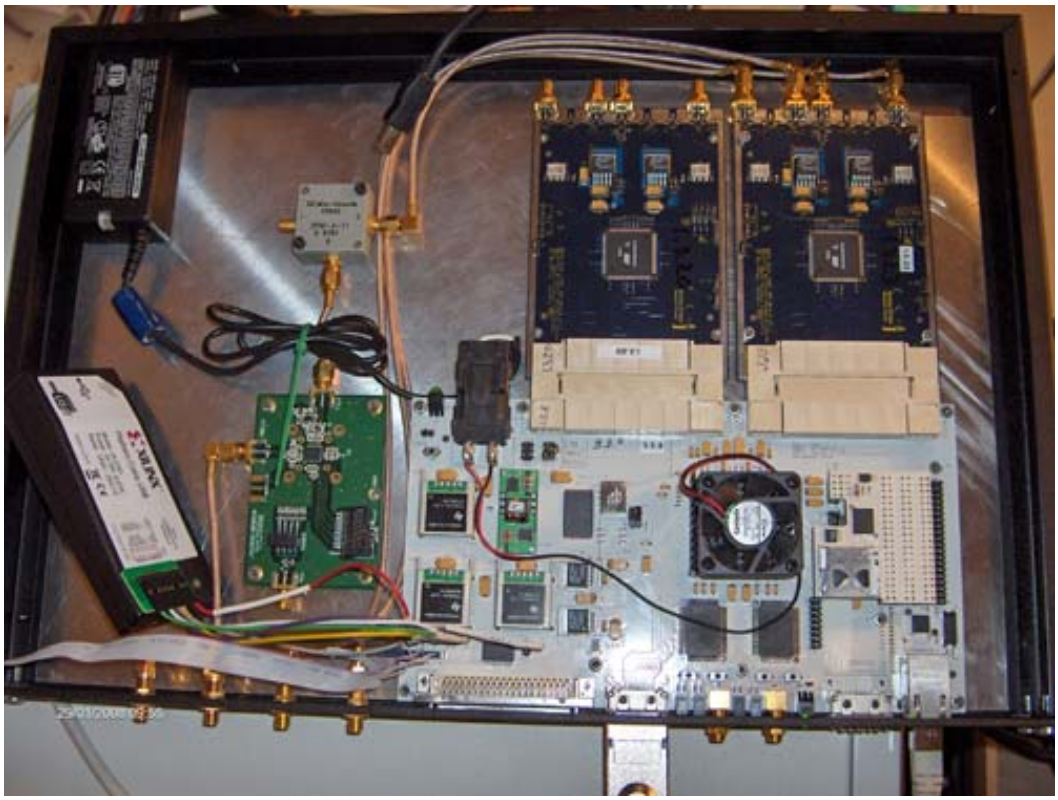
This is an important achievement for OAN and for the EVN. Yebes 40-m telescope will soon observe also at S/X bands (after September 2008), and C bands (5 and 6 GHz), enhancing the sensitivity and capability of the network at those frequencies.



Plots courtesy of Stefanie Mühle (JIVE) and Dave Graham (MPIfR).

- **TKK / Metsähovi radio observatory made a world record in transferring radio signal over internet**

The EXPReS project engineers at the Helsinki University of Technology TKK/Metsähovi radio observatory made a world record in data transfer and achieved eight gigabits per second (Gbps) over the common Internet during the seventh eVLBI Workshop in Shanghai, China June 17th 2008. The transferred data was a telescope radio signal sampled in real-time.



The equipment was based on the iBOB (Internet Break-out Board) developed at the University of Berkeley. It is an FPGA-based processing board widely used at Berkeley and other wireless communication or radio astronomical facilities like NRAO or the SKA project.

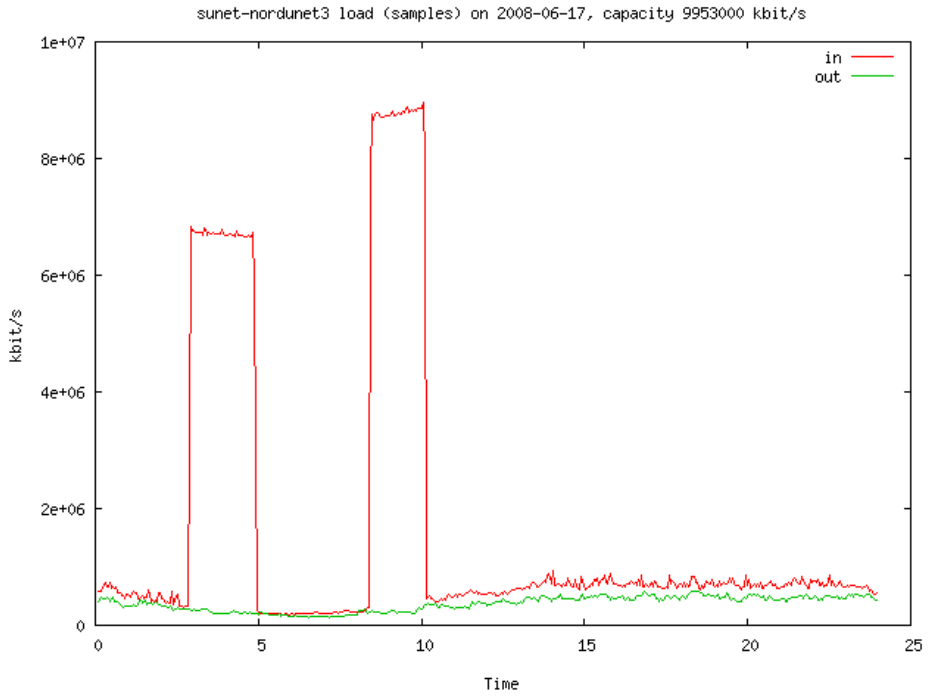
In the EXPReS project radio signal is transferred via network in real-time and it has enabled Metsähovi to collaborate with Jodrell Bank and Onsala. A streaming software locally developed at Metsähovi was programmed onto the iBOB. Jodrell Bank had helped with the iBOB

development environment and this allowed us to create our own designs faster.

Data was streamed from Metsähovi, Finland to Onsala, Sweden. No light-paths or other special arrangements were necessary. The Nordic academic network infrastructure (the Finnish Funet, Swedish SUNET and NORDUnet which combines the two) was utilized in the experiment.

The effect of the demonstration on the SUNET network can be seen in this figure; astronomers succeeded in increasing the whole academic traffic between Finland and Sweden eightfold.

In our first demonstration the antenna signal was transferred at 6.4 Gbps. Later we achieved 8 Gbps and filled the Finland-Sweden 10Gbps link to more than 90% capacity. The networking people of Funet, SUNET and NORDUnet have done an amazing job, no packetloss or errors could be detected. In the bottom of the graph you can see the normal level of the foreign traffic of the SUNET network on the test day.



The achieved 8 Gbps data transfer rate is an important milestone for eVLBI as the currently typical rate in European VLBI is 512 Mbps and maximum that has been achieved before is little below one Gbps. Increasing the rate eightfold is an important breakthrough, the sensitivity of the VLBI instrument increases 2.8-fold.

These gigabit transfer rates exceed the maximum transfer rates that are common in personal or academic use. The new fast and powerful transfer methods demanded by eVLBI have been specifically developed in Metsähovi within the EXPReS project and are ideally suited for spin-off applications like HDTV streaming.

TKK and Funet have been pioneers in implementing fast Internet connections. In 2006 the Metsähovi radio observatory was the first radio telescope in the world to attain a 10 Gbps Internet connection. The data tranfer experiment between the telescopes became possible in Summer 2008 when the OptoSUNET connection to Onsala was completed. The Funet network service of CSC, the Swedish SUNET and Nordic NORDUnet made it possible to perform the demostration that touches the theoretical maximum limits of networks with a very short warning notice of a couple of days.

This work has received financial support from the European Commission (DG-INFSO), within the Sixth Framework Programme (Integrated Infrastructure Iniative contract number 026642, EXPReS).

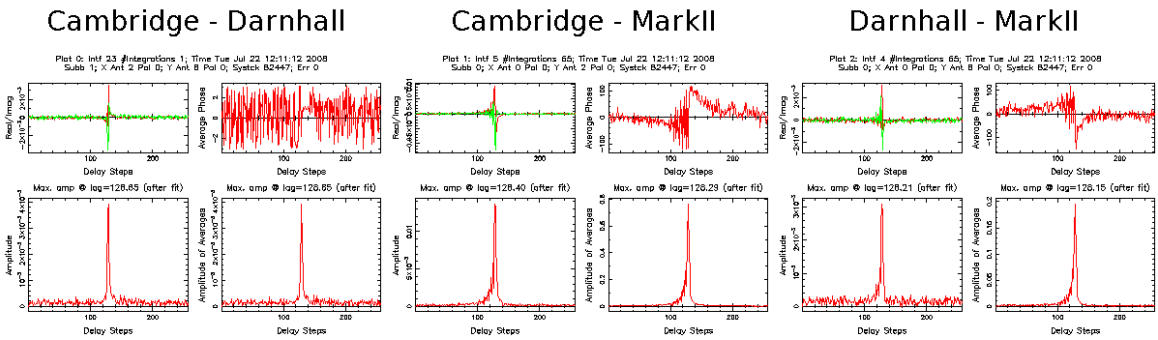
Jouko Ritakari, Jan Wagner, Guifré Molera, Minttu Uunila and Ari Mujunen (TKK/Metsähovi Radio Observatory); and Simon Casey (Onsala Space Observatory).

▪ More Merlin telescopes in e-VLBI

On July 22nd we performed a special test involving the Merlin telescopes at Cambridge, Darnhall and Jodrell Bank (MkII). In the current Merlin network, the 'outstations' are connected to Jodrell Bank by microwave links that have about 128Mb/s throughput. Paul Burgess from JBO connected the links from both Darnhall and Cambridge to the VLBA terminal. The VLBA terminal has 4 IF inputs, so each IF received data for one polarization from either Darnhall or Cambridge. The IF sampled data from both telescopes is then run through the formatter and Mark5 and transmitted to JIVE.

A similar setup has been used in the past for disk-based VLBI where the data from multiple Merlin telescopes are recorded to the same diskpack. These are then sent to JIVE where they are duplicated and played simultaneously to be correlated. When using real-time VLBI, the data must be somehow sent to multiple receiving Mark5s at JIVE simultaneously. In the experiment of the 22nd of July we achieved this by using the 'port monitoring' functionality of the central JIVE switch/router to 'snoop' on all the networking traffic towards one

Mark5 and send duplicates to a second Mark5. With this setup we were able to achieve fringes between all three stations at the same time (see image).



After this initial success, Harro Verkouter included IP Multicast functionality in the jivemark5a e-VLBI software. We also upgraded the central JIVE switch/router to support Multicast, and used this network protocol to perform the packet duplication, this time without having to undertake major changes to the networking at JIVE. We ran a follow-up experiment during the e-VLBI session of Sept 9th to successfully demonstrate this setup and also achieved the first real-time fringes to the Knockin station at Merlin.

Having the shorter Merlin baselines available significantly improves the sensitivity of the e-EVN to larger scale structures, and JBO and JIVE are cooperating to include more Merlin telescopes simultaneously in the future.

Paul Boven (JIVE).

▪ First 1024Mb/s e-VLBI data transfer

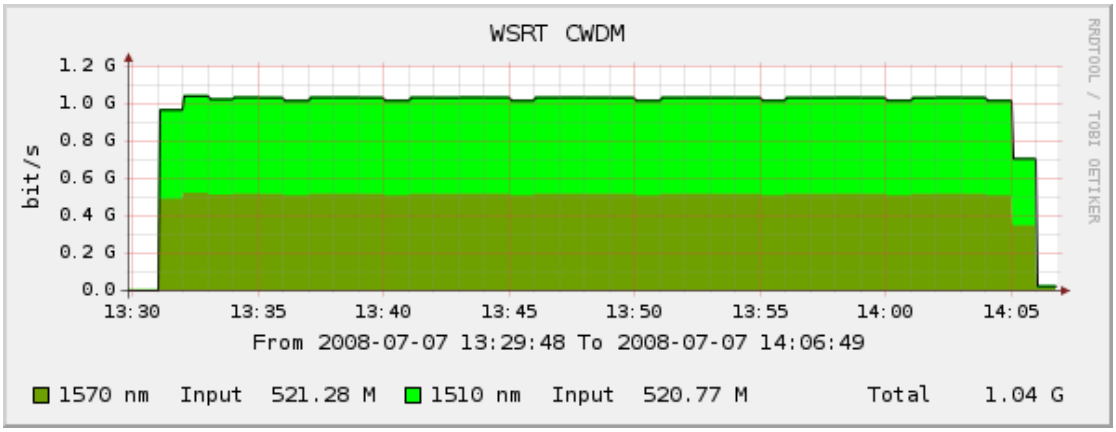
On July the 7th we succeeded in transferring formatter data at a rate of 1024Mb/s from the WSRT to JIVE. The formatter at WSRT was configured for 16 tracks, 2 bit/track, 32MS/s. The WSRT Mark5A is running the standard Debian Sarge distribution (with SMP support) and the only significant change to it is the addition of an extra 1Gb/s networking card.

As 1024Mb/s simply won't fit through a 1Gb/s Ethernet connection, we are using the Linux 'Ethernet bonding' driver to create a virtual network interface that consists of two 1Gb/s Ethernet cards. Traffic sent to this virtual interface will be transmitted over both physical interfaces in a round-robin fashion so that even at 1024Mb/s, each physical interface only transmits 512Mb/s of the traffic.

We have recently upgraded the 34.4km dark fiber between WSRT and JIVE to use multiple wavelengths (CWDM), with each wavelength able to carry 1Gb/s. Two of these wavelengths are used to bring both 1Gb/s Ethernet links to JIVE where they are connected to our central switch/router.

From our switch/router, there is a 10Gb/s Ethernet link to one of our Mark5 servers. This server is already running Debian Etch in order to support the 10Gb/s interface, and a pre-release version of SDK8.1. We've recompiled Harro's jive5a to link against this pre-release SDK on Etch.

The test ran for 30 minutes and only 17 packets were lost altogether. We had steady green leds all the time on the receiving SU and once we had things running, it was once again quite 'uneventful'. The image shows the traffic on the two optical wavelengths we used.



Of course, one telescope does not make a fringe, so please consider this an invitation to join us in producing the first 1024Mb/s e-EVN fringes.

As several of the EVN telescopes now have more than 1Gb/s of connectivity to JIVE, we hope that this first demonstration will inspire you to upgrade your Mark5 to support 1024Mb/s e-VLBI, either by installing a 10Gb/s card or a second 1Gb/s card.

Paul Boven (JIVE)

▪ Successful dynamical scheduling tests at the EVN

The EXPReS team at JIVE is pleased to announce that on Thursday 28 August a successful test was made of dynamic scheduling, which involved switching between the sources DA193 and 4C39.25 during an e-VLBI run. The switch was made at Torun and Westerbork (in single dish mode), with Jodrell remaining on the first source. Fringes were obtained to all three telescopes before, and again between Tr and Wb after the switch.

Two schedule files were prepared in advance of the test, each containing both sources in the $SOURCE block but referencing only one source in the observation schedule. The schedule file for observing DA193 was processed using log2vex to create a full vex file as in normal operations. At the time of the switch between sources a composite vex file was developed by merging scans from the schedule file for 4C39.25 into this vex file using a new tool developed at JIVE, such that the new vex file accurately represented the history of the observation. The additional clock information in the full vex file is ignored by drudg in creating a snap file for the stations, but it is necessary for correlation.

This updated vex file was then copied to and 'drudg'ed at the stations to create a new snap file, without modifying the existing proc file, and the field systems were then updated with the new schedule via the inject_snap command. All of this was done by 'remote control' using a Python script running at JIVE - no new software was required at the field systems. The correlation job was restarted at JIVE with the new vex file, and fringes between Torun and Westerbork were observed at the start of the following scan.

This first attempt at EVN dynamic scheduling shows that in principle on-the-fly schedule changes are feasible with any station using the standard Field System - with the caveat that the observing setup remains the same. This is an important milestone towards the goal of developing the EVN into a rapid response instrument which allows flexible scheduling of Target of Opportunity requests.

Des Small and Zsolt Paragi (JIVE)

▪ Progress on the SFXC software correlator

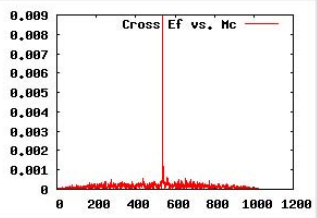
At JIVE we're currently involved in two projects to develop the SFXC software correlator that was developed for tracking the Huygens probe into a distributed correlator usable for "normal" astronomy. One is the NWO-funded SCARIe project, the other is the FABRIC JRA which is part of EXPReS.

Since May 2007, SFXC has been used to produce fringe plots for the FTP fringe tests. Since then we've spent quite a bit of effort to make the correlator run faster and deal with all the different modes our support scientists come up with. The whole process has also been streamlined by transferring the data directly to the machine used to run the software correlator and adding a script that automatically generates a web page with results/feedback after the correlation finishes.

This summer, the software that translates the output of the EVN hardware correlator into an aips++ Measurement Set has been adapted such that it understands the output of SFXC too. This allows us to use all the tools developed for analysis of the results of the hardware correlator. Since software to translate a Measurement Set into FITS already exists, data correlated with SFXC can now be loaded into AIPS. We expect to have a first image in the near future.

Earlier this year, the SCARIe project has been approached by the GEANT2 AutoBAHN team with the question if the software correlator would be a a good application for their Bandwidth-on-Demand facility. The AutoBAHN system allows one to dynamically allocate network bandwidth between computer systems across Europe and beyond. Something that makes sense for the EVN since out telescopes aren't doing VLBI year-round. Over the last few months we've been working hard to set up a demonstration that will happen at the GLIF workshop in Seattle in October and Supercomputing '08 in November.

	Auto correlation				Cross correlation					
	Ef	Nt	Mc	On	Ef-Nt	Ef-Mc	Ef-On	Nt-Mc	Nt-On	Mc-On
CH01, 2203.99 MHz, USB, Rcp	A	A	A	A	34.02	45.62	17.38	20.74	10.95	12.62
CH02, 2219.99 MHz, USB, Rcp	A	A	A	A	30.6	53.39	13.23	26.08	13.67	12.88
CH03, 2243.99 MHz, USB, Rcp	A	A	A	A	29.94	19.99	16.44	13.75	10.98	4.753
CH04, 2283.99 MHz, USB, Rcp	A	A	A	A	25.51	53.06	14.29	23.27	12.13	9.903
CH05, 2299.99 MHz, USB, Rcp	A	A	A	A	35.51	4.39	13.7	2.677	13.71	3.064
CH06, 2331.99 MHz, USB, Rcp	A	A	A	A	2.304	41.2	11.97	2.685	2.646	12.37
CH07, 8211.99 MHz, LSB, Rcp	A	A	A	A	86.87	144.1	37.35	26.65	5.897	10.25
CH08, 8211.99 MHz, USB, Rcp	A	A	A	A	112.5	208.6	46.89	33.62	6.784	12.25
CH09, 8227.99 MHz, USB, Rcp	A	A	A	A	105.7	209.4	41.66	33.51	5.963	12.1
CH10, 8251.99 MHz, USB, Rcp	A	A	A	A	2.694	4.214	2.609	31.76	5.37	12.23
CH11, 8315.99 MHz, USB, Rcp	A	A	A	A	85.97	201	38.35	32.83	8.808	14.01
CH12, 8427.99 MHz, USB, Rcp	A	A	A	A	103.9	192	42.19	38.02	7.186	10.66
CH13, 8499.99 MHz, USB, Rcp	A	A	A	A	92.58	199.3	42.48	37.24	6.661	13.43
CH14, 8539.99 MHz, USB, Rcp	A	A	A	A	80.98	201.6	44.96	28.93	8.184	14.69
CH15, 8579.99 MHz, LSB, Rcp	A	A	A	A	33.49	141.8	35.61	8.895	3.097	12.05
CH16, 8579.99 MHz, USB, Rcp	A	A	A	A	11.14	182.4	42.42	3.811	3.607	14.92



Mark Kettenis (JIVE)

- **7th International e-VLBI Workshop at Shanghai Astronomical Observatory (16-17 June 2008)**

The 7th International e-VLBI Workshop was held in Shanghai, China, on 16-17 June 2008. It was organized by the Shanghai Astronomical Observatory (SHAO) of the Chinese Academy of Sciences (CAS) and generously sponsored by Express Production Real-time e-VLBI Service (EXPReS), CAS and the National Natural Science Foundation of China (NSFC). The workshop web is available at http://www.shao.ac.cn/eVLBI2008/

The workshop gathered 87 participants working on both radio astronomy and network science in 11 countries around the world. 27 oral presentations and six posters were presented on topics covering the status of e-VLBI, on-going projects in e-VLBI facilities around the world, latest scientific outcomes using high data rate and e-VLBI technology development.

Two panel discussions took place following the presentation sessions each day: internet connection and e-VLBI technology on June 16, and a standard for e-VLBI data format and transfer protocols was lively discussed on June 17. The astronomers reached a consensus to standardize the e-VLBI data format and transfer protocol, and a sub-group was set up to work on the task.

Two live demos were also given, demonstrating e-VLBI research on scientific and engineering work respectively. The e-CVN demo on June 16 involved the Chinese VLBI Network consisting of four telescopes (Shanghai 25m, Urumqi 25m, Beijing 50m and Kunming 40m) and the software/hardware correlators at SHAO. It demonstrated VLBI satellite tracking in near real-time mode. The e-APT demo on June 17 was carried out with Shanghai 25m (SHAO), Kashima 34m (NICT), Parkes 64m (ATNF), Mopra 22m (ATNF), ATCA 5x22m (ATNF) and DiFX software correlator at Parkes. The CSTNET (China), AARNet (Australia), JGN2plus (Japan) and CENIC (USA) provided the high-speed network involved. For this demo, data were streamed from Kashima, Parkes, Mopra and ATCA at a rate of 512Mbps. Shanghai could only work with a data rate of 256Mbps due to a suspected problem in DiFX software, although the network connection from Shanghai to Parkes correlator worked fine at 512 Mbps. This reason is being investigated. The antennas, networks and correlator ran successfully during the 12hr observations. Before the end of the demo, an image of one of the calibrator sources (an AGN) was produced and displayed. The Shanghai telescope will be able to work at 512Mbps and will participate in e-EVN experiments in October 2008.

Overall the workshop provided an opportunity to broaden international and national cooperation in e-VLBI activities and to strengthen the cooperation between the network scientists and radio astronomers. Additional workshop photos are available at http://www.shao.ac.cn/eVLBI2008/photo/photo.html.

Tao An (SHAO, China)

- **8th International e-VLBI Workshop at Madrid Astronomical Observatory (22-26 June 2009)**

The Centro Nacional de Informacion Geografica - Instituto Geografico Nacional (CNIG-IGN) of Spain, in cooperation with the EXPReS Project, is pleased to host the “Science and Technology of Long Baseline Real-Time Interferometry / 8th International e-VLBI Workshop”, to be held on 22-26 June 2009 at the premises of the National Astronomical Observatory in Madrid, Spain. Please save these dates on your calendar.

The multi-day meeting will be split into two parts. Half will focus on the technologies and engineering developments that have made e-VLBI possible, with the other half focusing on the scientific findings and results. Papers will be collected and published online by the Proceedings of Science (PoS).

Additional details regarding the meeting will be made available on the web pages http://www.oan.es/expres09/ over the coming months.

- **EVN Scheduler's Report from the last observing session**

2008 Session 2: 30 May - 18 June
Wavelengths: 1.3cm, 18cm, 6cm, 5cm

This session proved something of a nightmare to schedule, given the number of well-rated projects requiring additional, non-EVN telescopes. There were 5 global projects scheduled requiring 8 separate observations. Of these, the GBT was needed for 4 observations, Arecibo for 6, phased-VLA-27 for 2, phased-eVLA for 4 and Robledo for 1. MERLIN was required for some projects at both 18 and 6cm. The VLBA correlator was used for only 1 project, the rest being processed at the EVN correlator at JIVE. In addition, and as for the previous session, both the Seshan (Shanghai) and Nanshan (Urumqi) telescopes were needed for ~2 days per week for tracking the Chinese Lunar Explorer space mission CHANG'E, providing an additional constraint on the scheduling of projects.

A total of 22 user observations were scheduled. For the first time the new Yebes 40m antenna (Ys) took part in the 1.3cm section of the session, observing user project EB037C and the network monitor run.

A special, additional, test observation at 1.3cm was also scheduled at some telescopes in order to explore the EVN performance at higher frequencies at K-band. Another "first" was the participation of the phased-eVLA (using a subset of eVLA antennas with receivers capable of observing at 6.1 GHz) in 4 observations together with Arecibo for project GB064, 2 also with the GBT. All eligible projects at 1.3cm and 5cm were scheduled. All projects with grades 1.5 or better were scheduled at 18 and 6cm, except for one for which no suitable GST interval was available at the GBT. (This has subsequently been scheduled in Session 3.)

Richard Porcas (EVN Scheduler)

5. EVN Staff matters

- **Job vacancies at EVN institutes**

  - THE JOINT INSTITUTE FOR VLBI IN EUROPE (JIVE) is seeking candidates for SENIOR STAFF MEMBER/project leader astronomical processing to be located at JIVE, Dwingeloo, The Netherlands. Deadline: **15 October 2008.**

    The Joint Institute for VLBI in Europe (JIVE) operates the central data processor (correlator) of the European VLBI Network (EVN). It is the focal point of EVN network and user support, providing various tools that facilitate access to and processing of the data product. JIVE is involved in a number of programmes to advance the future scientific capabilities of VLBI, including the development of e-VLBI and new correlator initiatives. Enhancements of the user facilities include further development of the archive portal, the proposal and scheduling tools, as well as data reduction software (ParselTongue). JIVE is also actively involved in projects related to the definition of the SKA. JIVE is located in Dwingeloo, in the Netherlands, at the headquarters of ASTRON, which is the host institute for JIVE. Further information regarding JIVE and the EVN can be obtained from www.jive.nl and www.evlbi.org.
    We invite applications for a senior staff position. The responsibilities of this position could include:
    o Take the lead on an international project on radio-astronomy data reduction software
    o Carry out VLBI-related astronomical research
    o Supervise a small team of scientific programmers

working on algorithm development as well as operational tools
o Participate in international projects dealing with astronomical computing or radio-astronomy initiatives

The position requires a Ph.D. in astronomy or another relevant field. The position calls for an affinity with astronomical computing, including radio-astronomical data reduction tools. The successful applicant has thorough knowledge of radio-astronomy techniques, preferably VLBI, with a track record as an active radio-astronomer. Experience in supervising a small team, possessing good communication skills and experience with managing software projects is an advantage.

Candidates who fulfill part of the above requirements and have the ambition to develop further in order to fit the above profile are also encouraged to apply. Applicants of any nationality are eligible for this position.

The appointment is offered for a one-year trial period, after which time the position would become permanent. The appointee will be in the formal employ of the Netherlands Organization for Scientific Research (NWO). The position carries a competitive salary plus an excellent package of secondary benefits, including relocation expenses.

Please send your application to:

Ms Diana Verweij Joint Institute for VLBI in Europe
Postbus 2 7990 AA Dwingeloo The Netherlands
personnel@astron.nl

Applications should include a CV, together with three letters of reference, which may be sent separately. All application materials should arrive **by 15 October 2008**, mentioning ref. No JIVE2008/06. Responses are preferred by e-mail. Further information can be obtained from Dr. Huib van Langevelde (langevelde@jive.nl, +31-521-596515).

▪ Staff changes at EVN institutes

At JIVE, the open operator position has been taken up by **Bert Harms**, who previously had experience operating the Westerbork array. **Nico Kruithof** has left the position in the SCARIe project, where he worked on distributed software correlation. This position has recently been taken up by **Aard Keimpema** who joins us from Groningen University. Finally, we expect **Yang Jun** to complete the support team at JIVE starting November 1.

Michael Nolan has been appointed the Interim Director of the Arecibo Observatory after **Robert Kerr**, the previous Arecibo Director, resigned in late August. On June 1st, **Don Campbell** became the new Director of NAIC after **Robert Brown** stepped down of that position.

María Rioja has temporarily left OAN (Spain) to become a research fellow at the University of Western Australia (UWA), located in Perth, and will be working in the recently formed International Radio Astronomy Research Center (IRARC) for the SKA project.

Two new PhD students have joined the MPIfR group in Bonn: **Frank Schinzel**, formerly at University of New Mexico, started in September, working with Andrei Lobanov and Anton Zensus. **Mar Mezcua**, formerly at University of La
Laguna in Tenerife, and more recently an Erasmus student at University of Gottingen, also started at the MPIfR in September, working with Andrei Lobanov. **Yi Liu**, from Shanghai Observatory, joined the group in June, working for a year as a postdoc with Thomas Krichbaum on high frequency VLBI analysis.

Anupreeta More received her PhD from Bonn University in June, with a thesis entitled "A Tale of Two Wide Separation Gravitational Lenses", and is staying at MPIfR until November this year on a postdoc position. **Violette Impellizzeri** received her PhD from Bonn University in September with a thesis entitled "Molecular absorption in the cores of AGN: On the unified scheme", and will take up a postdoc position at NRAO in Charlottesville later this year.

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