European VLBI Network Newsletter

Number 19

January 2008

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1. Call for Proposals - Deadline 1 February 2008

ALL EVN and GLOBAL PROPOSALS must now be submitted

with the ONLINE PROPOSAL SUBMISSION tool Northstar.

Email submission is no longer accepted

Detailed Call for Proposals

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 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.

EVN Observing Sessions in 2007-2008

2008 Session 1	Feb 28 – Mar 20	18/21cm, 6cm, 5cm, S/X, 1.3cm
2008 Session 2	May 29 – Jun 19	18/21cm, 6cm, 1.3cm, 7mm
2008 Session 3	Oct 16 – Nov 06	18/21cm, 6cm, + ...

Proposals received by 1 February 2008 will be considered for scheduling in Session 2, 2008 or later. Finalization of the planned observing wavelengths will depend on proposal pressure. Other wavelengths which may be scheduled in 2008 are 90cm, 50cm, and 30cm.

Special features for Sessions in 2008

- **Proposals at 1.3cm and 7 mm are encouraged** as these frequencies are likely to be available in Session 2/2008.
- In addition, e-VLBI observing opportunities with a recording rate of 512 Mb/s and at least a 6-station array are available during additional 24-hour slots in April, May, and June 2008. See the e-VLBI Call for Proposals for further details.
- Target of Opportunity (ToO) proposals in response to a high-priority unanticipated astronomical event may be submitted at any time for observations at any time, inside or outside scheduled EVN sessions. See the EVN ToO policy (http://www.evlbi.org/proposals/too.nov07.pdf) for a description of the procedures to apply for such ToO observing time.
- MERLIN is now available for joint EVN+MERLIN observations in all sessions, for any EVN wavelengths which MERLIN supports (18/21cm, 6/5cm, 1.3cm). However, limited resources during e-MERLIN construction mean that joint EVN+MERLIN will be scheduled at no more than two of these bands (usually 18/21cm and 5/6cm) in any one session.

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 February 2008.

Additional information

The detailed Call for Proposals (http://www.obs.u-bordeaux1.fr/vlbi/EVN/call-long.html) has further information on Global VLBI, EVN+MERLIN and guidelines for proposal submission.

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

The EVN Status Table (http://www.mpifr-bonn.mpg.de/EVN/EVNstatus.txt) gives current antenna capabilities.

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

Patrick Charlot - Chairman of the EVN Program Committee

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

This issue of the EVN Newsletter informs about new successes of the EVN working in e-VLBI mode. On 22 December 2007, five telescopes of the array (Cambridge, Jodrell Bank, Medicina, Torun, and Westerbork) were able to produce fringes at a data rate as high as 1 Gbps . Although this was a first test and more work is needed before this mode is fully operational, it is clear that the sensitivity of the EVN in e-VLBI mode is approaching that of the disk recording mode, and this is specially true as more EVN radiotelescopes are being connected by e-VLBI. We should congratulate the full EXPReS team for this new success.

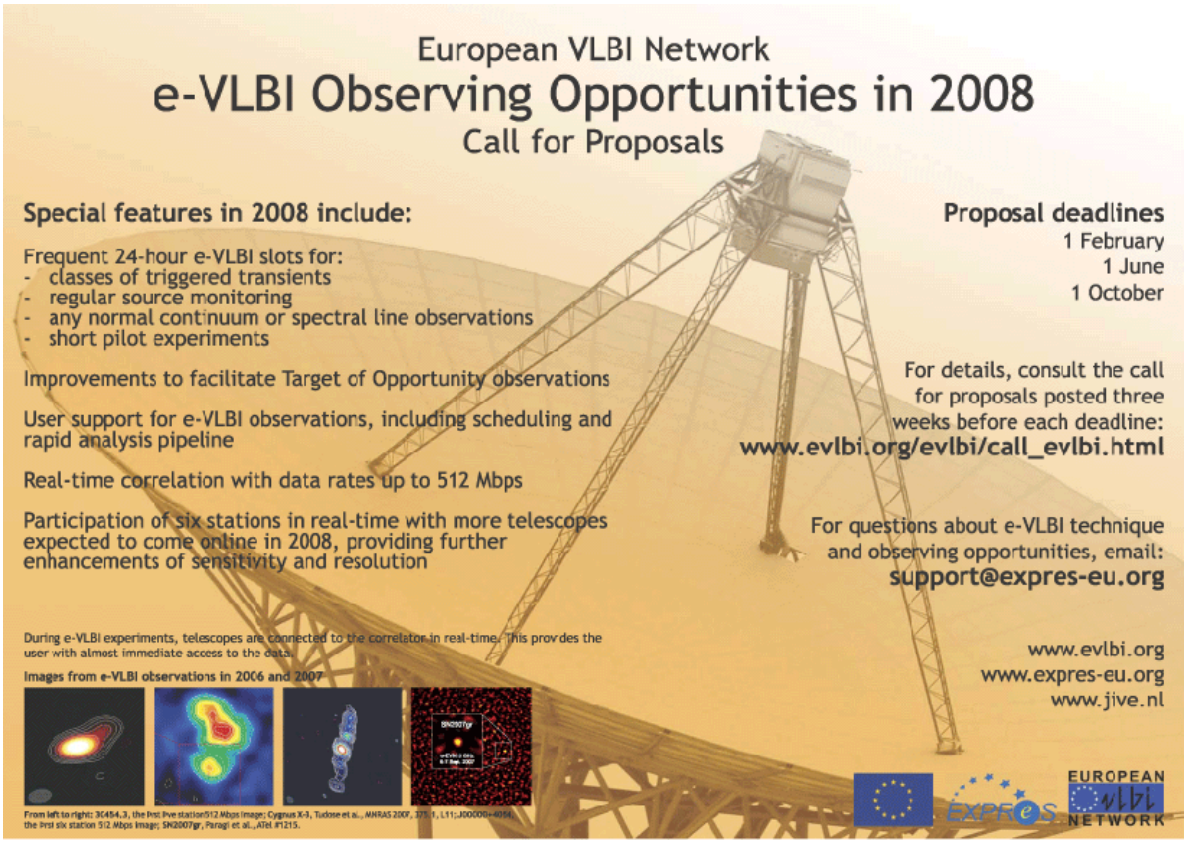
At the view of the progresses being done in e-VLBI, the EVN Board of Directors decided to announce special e-VLBI observing opportunities at the new Call for EVN Proposals attached to this Newsletter.

Also included in this Newsletter are some exciting scientific highlights from VLBI observations. It is noteworthy that VLBI is now providing outstanding results both in galactic and extragalactic science, in particular on star formation studies. The science vision document for the EVN for the horizon of 2015 summarizes the interest of the EVN science, and it is already the reference for the future of the network. As discussed by the EVN directors at their last meeting in Madrid, this document should provide the basis for a new EVN roadmap.

The preparation for the new European Framework Programme (FP7) proposals is progressing very well. In the coming months we will produce a new RadioNet proposal which is intricately linked to the EVN activities.

All the issues mentioned here will constitute central discussions at the next meeting of the Consortium Board of Directors to be held in Bordeaux on April 24. Moreover, the next EVN Symposium which will be held in Bologna on 23-27 September, 2008, will provide an excellent opportunity to review the scientific output and to prospect the future of the EVN.

Rafael Bachiller, OAN-IGN



Download the poster advertising e-VLBI observing opportunities with the EVN from:

http://www.expres-eu.org/DOCS/EVN_CFP2008_A3.pdf

3. e-VLBI capability at the EVN and call for e-VLBI proposals

The European VLBI Network will issue three calls for proposals in 2008 with special features: frequent 24-hour e-VLBI slots; improvements to facilitate Target of Opportunity observations; user support for e-VLBI observations, including scheduling and rapid analysis pipeline; real-time correlation with data rates up to 512 Mbps; and participation of six stations in real-time with more telescopes expected to come online in 2008. Proposal deadlines are 1 February, 1 June and 1 October. For details, consult the call for proposals posted three weeks before each deadline. For questions about e-VLBI technique and observing opportunities, email support@expres.eu.org.

CALL FOR EVN e-VLBI SCIENCE PROPOSALS - DEADLINE 1st FEBRUARY 2008

Proposals for EVN eVLBI observations are invited for submission. New features include;

- 512Mbit/s bit rate from at least a six station array at most EVN observing bands, lower bit rates for spectral line observations are also supported.
- Proposals for any science goal, not just rapid response science can be made. Combination with disk based observations in standard sessions is possible for denser time monitoring of variable sources.
- Additionally a special class of 'triggered' e-VLBI proposal is defined in which a pre-approved project can be activated within 24 hours of a scheduled eVLBI run based on a trigger criterion being met.
- eVLBI can also be used for EVN Target-of-Opportunity (ToO) observations set up at short notice on any date. Such proposals can be submitted at any time in response to a high priority unanticipated astronomical event. For details see the EVN ToO policy at http://www.evlbi.org/proposals/too.nov07.pdf

Scheduled e-VLBI runs for which observations can be proposed for the February 1st EVN deadline are;

Run start	Run end
Tue 8 Apr 13:00 UTC	Wed 9 Apr 13:00 UTC
Tue 20 May 13:00 UTC	Wed 21 May 13:00 UTC
Tue 24 Jun 13:00 UTC*	Wed 25 Jun 13:00 UTC*

(Note * indicates a provisional date to be confirmed). In the second half of 2008 eVLBI runs are likely to scheduled at approximately the same rate of one every 6 weeks between disk sessions. Participating EVN antennas include Wb14 (tied array, except 5cm), Tr, On, Mh, Mc, Jb2, Cm and (for some runs for limited UT times and bitrate) Ar. Wavelength bands covered are 18/21cm, 6cm, 5cm and 1.3cm. Please see http://www.evlbi.org/evlbi/e-vlbi_status.html for the availability of different eVLBI stations per observing band. Note that because of on-going engineering work participation of Jb2 and Cm cannot be guaranteed and/or they may be replaced by other MERLIN telescopes.

TECHNICAL DETAILS

CONTINUUM OBSERVATIONS - will be run at the highest possible reliable bit rate. Based on recent experience it is expected that **512 Mbit/s** is very likely to be achieved (however Cm is presently limited to 128 Mbit/s of useful data by its microwave link, and Ar to the same total bitrate by its link). Continuum observations can be proposed for only one of the available frequency bands in any given 24hr session.

SPECTRAL LINE OBSERVATIONS - can be carried out at recording rates between a minimum of 32 Mbit/s and a maximum of 512Mbit/s. For two-bit, dual-polarization observations, the lower limit implies at least 4 channels of 4 Msample/sec sampling (Nyquist channel bandwidth = 2MHz; with oversampling possible down to spanned channel bandwidths of 0.5MHz). Observations may be proposed for the 18cm/21cm, 5cm and 1cm bands. Note that only standard and short observation proposal types (see below for definitions) are allowed for spectral line observations. *Triggered spectral line proposals will **not** be accepted.*

e-VLBI OBSERVATION CLASSES

eVLBI proposals submitted for the use of eVLBI on the fixed dates defined above fall into the three classes defined below. Time within the first two classes will only be allocated in response to proposals submitted for the standard EVN proposal deadlines of 1st Feb, 1st June and 1st Oct. PI's should make clear in the proposal text which class of observation is being requested.

1) General e-VLBI proposals

Any proposal requesting e-VLBI observing time during one or several e-VLBI sessions, excluding triggered response science (see below). General eVLBI proposals can be any scientific purpose and do not need to be justified based on the rapid data delivery of eVLBI. Proposals for source monitoring may also request complementary observing time during regular EVN sessions using disk recording. Note that the eVLBI portion of monitoring proposals cannot be guaranteed in every requested run as they may be overridden by higher rated, triggered e-VLBI proposals (see below). General eVLBI proposals can be either continuum or spectral line. Scheduling will be done by JIVE staff using the technical information included in the proposal; it is therefore vital that all technical aspects are fully specified in the proposal.

2) Triggered e-VLBI proposals

A proposal to be scheduled during an e-VLBI run only if a specific triggering criterion is met. Accurate source coordinates need only be included in the trigger request, not the original proposal. Only continuum observations can be proposed for within this class. Triggered proposals must include a precise and justified triggering criterion and a minimum number and configuration of telescopes required.

PIs of successful proposals in this class will be informed after proposal review that their trigger requests will be accepted. Such trigger requests should be sent by e-mail to the EVN PC Chair (Patrick Charlot, at charlot@obs.u-bordeaux1.fr) with copies to the EVN Scheduler (Richard Porcas, porcas@mpifr-bonn.mpg.de) and JIVE/EXPReS (Bob Campbell, campbell@jive.nl, Zsolt Paragi zparagi@jive.nl). These trigger requests must be received no later than 0800 UT the day before the eVLBI run. The email should provide evidence that the trigger criterion in the original proposal has been met and give the exact GST range and source position requested. All requested technical parameters must match those in the original proposal. The PC Chairman will evaluate the trigger request (and decide on priorities if more than one conflicting trigger request is received) and will inform the PI by 1700 UT whether their experiment is to be observed. The experiment will then be scheduled by JIVE staff in accordance with the instructions given in the original proposal.

3) Short e-VLBI observations

Short e-VLBI observations may be requested for checking calibrator or target source compactness in preparation for a larger VLBI observation or proposal. These projects are limited to less than 2 hours in length. Such requests may be submitted up to three weeks prior to the start of any e-VLBI run directly to the EVN PC Chairman. There is no need to submit a full proposal via Northstar but the email to the Chairman must clearly indicate the purposes and observing details of the proposed observation including all information needed for scheduling (including position information of targets and calibrators).

PROPOSAL DETAILS

Proposals requesting observing time for the above runs should be submitted by the 1 February 2008 deadline. Proposals can be made for any length of time within the above advertised slots up to 24 hours in length. Short time requests (defined above) of up to 2 hours in length can be submitted directly to the PC Chairman up to three weeks before each run. Proprietary rights on all eVLBI data are the standard ones of one year after data distribution (see archive policy at http://www.evlbi.org/user_guide/archive_policy.html). All standard and triggered proposals must use the Northstar online submission tool (see details below).

Because detailed scheduling of eVLBI runs will be done by JIVE staff all eVLBI proposals must include the observing frequency, the requested GST range, the minimum bit rate and a minimum number and configuration of telescopes required. It is essential that standard proposals also include accurate target and calibrator positions. For triggered proposals as much information as possible should be given about potential targets and their calibrators, which will ease in evaluating the technical feasibility of the proposed observations. The technical details of all proposals should be discussed with JIVE staff prior to submission to ensure proper and efficient scheduling (contact mailto:campbell@jive.nl).

HOW TO SUBMIT

The on-line proposal submission tool Northstar replaces the old Latex-email way of submission for proposals which involving the EVN, including proposals for e-VLBI runs (an exception to this at present are ToO proposals which are submitted by email according to the procedure described at http://www.evlbi.org/proposals/too.nov07.pdf).

To use Northstar, proposers should register at http://proposal.jive.nl (only for the first proposal submission), complete the technical information on-line (equivalent to that previously in the cover-sheet) and upload a scientific justification in pdf or ps format. Standard page limitations apply and will be enforced. If advice is needed about submitting via Northstar please contact Cormac Reynolds (reynolds@jive.nl) or other JIVE staff. **The deadline for submission of standard and triggered proposals is 23:59:59 UTC on 1st February 2008.**

ACKNOWLEDGEMENT

The continuing development of e-VLBI within the EVN is made possible via the EXPReS project funded by the EC FP6 IST Integrated infrastructure initiative contract #026642 - with a goal to achieve 1 Gbit/s e-VLBI real time data transfer and correlation.

John Conway - Chairman EVN eVSAG (eVLBI Science Advisory Group)

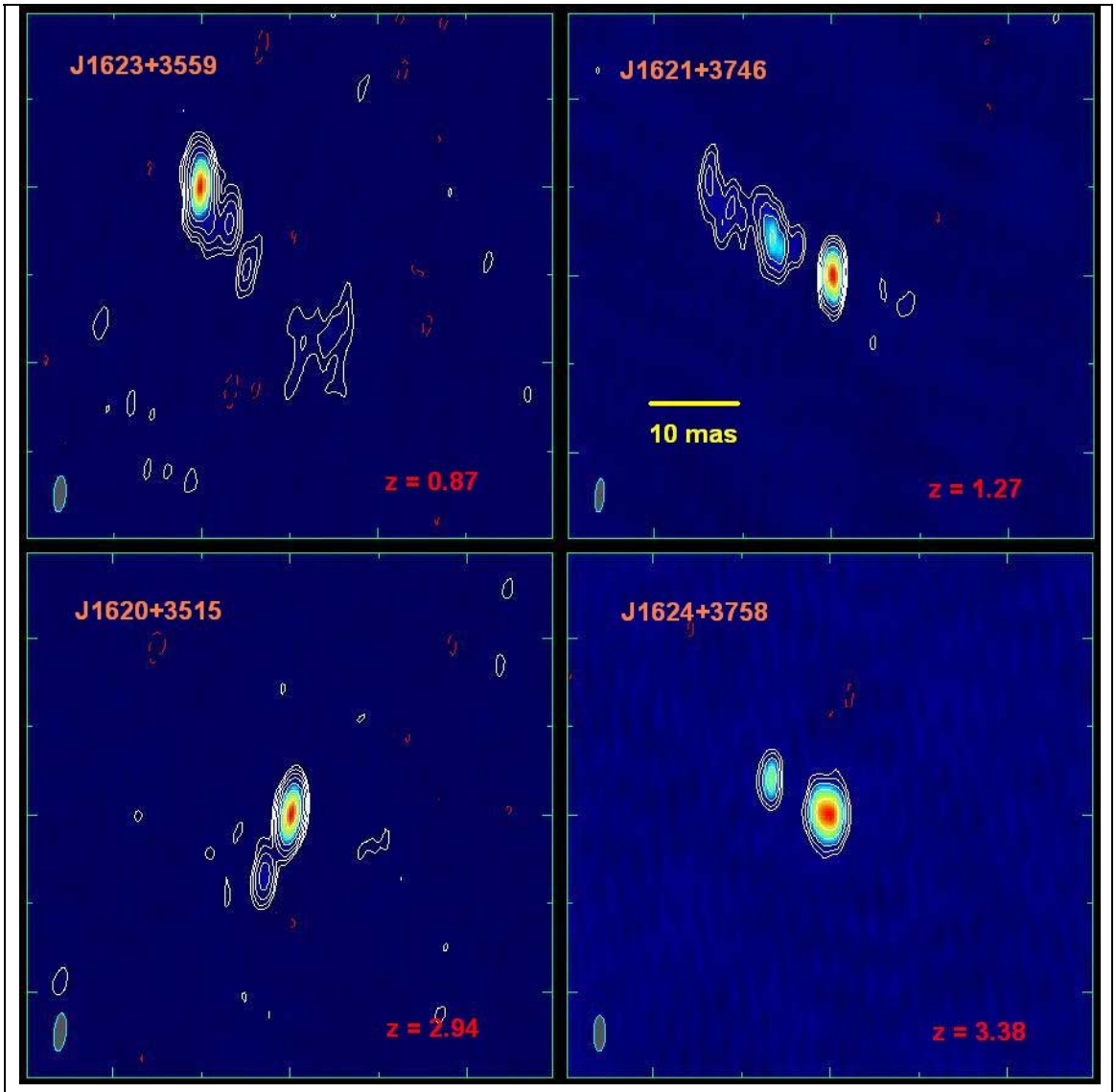
4. EVN Scientific Hightlights

- ## An efficient way to image SDSS quasars with VLBI

The Deep Extragalactic VLBI-Optical Survey (DEVOS) aims at constructing a sample of compact radio sources up to two orders of magnitude fainter than those usually studied with VLBI. Recent 5-GHz phase-referencing observations with 8 antennas of the EVN (EF016, 2 March 2007) targeted 26 radio sources within two adjacent 2-deg radius fields around the compact calibrators J1616+3621 and J1623+3909. The recording data rate was 1 Gbit/s, the project lasted for 6 hours.

Optical identifications of the quasars were ensured by selecting them from the Sloan Digital Sky Survey (SDSS). Twenty-two of the target sources (85%) that are unresolved both in SDSS (i.e. optical quasars) and in the VLA Faint Images of the Radio Sky at Twenty-centimeters (FIRST) survey catalogue (<5", >20 mJy) have been successfully detected with the EVN. Most of them have never been imaged with VLBI. (Two other VLBI detections are probably chance positional coincidences with SDSS quasars.) Therefore we found an efficient way to identify potential VLBI targets with mas-scale compact radio structures at >1 mJy flux density level, based on available optical and lower-resolution radio catalogue data.

S. Frey (FOMI SGO), L.I. Gurvits, Z. Paragi (JIVE), L. Mosoni (Konkoly Obs.), M.A. Garrett (ASTRON), S.T. Garrington (JBO)



Images of four quasars with core-jet morphologies in a wide range of redshifts are shown here as an illustration. Peak brightnesses (from the top left corner) are 83.5, 13.5, 27.5 and 8.6 mJy/beam. Typical 3-sigma lowest image contours were 0.3 mJy/beam in the survey. The details of the observations as well as the results and notes on some individual quasars are published in the journal Astronomy and Astrophysics, Vol. 477, pp. 781-787 (January 2008).

- ## Structure of W3(OH) from 6 GHz OH masers observations with the EVN

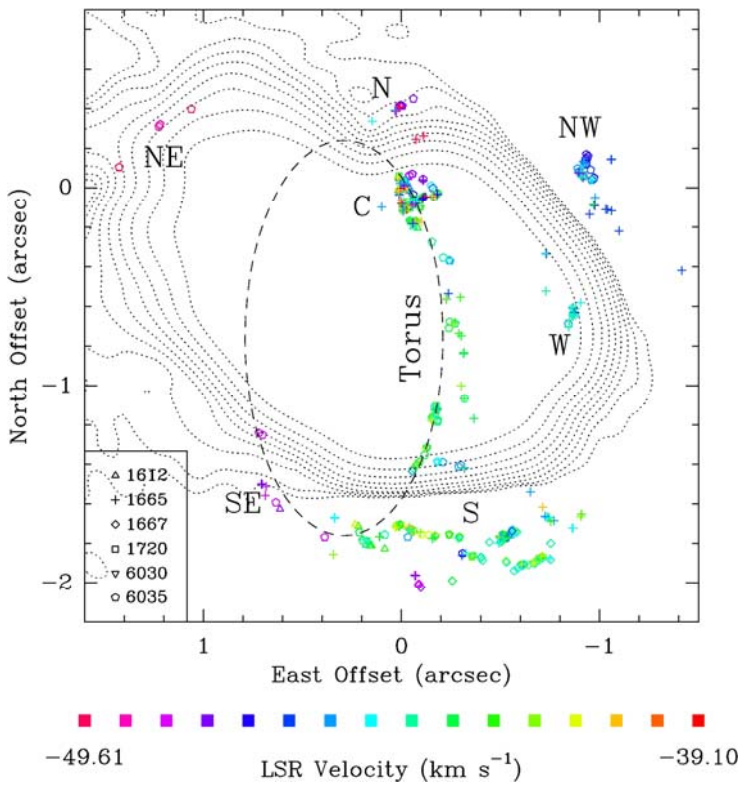
W3(OH) is a nearby well-studied massive star-forming region with many bright masers. We observed the rotationally-excited 6030 and 6035 MHz OH masers with the EVN at

very high spectral resolution (0.024 km/s) in order to understand the large-scale morphology of W3(OH) and small-scale maser substructure. Thanks to the high sensitivity and angular resolution afforded by the EVN, we were able to detect 292 distinct maser features and identify 117 Zeeman pairs, each providing a local measurement of the magnetic field around W3(OH).

Many of the brightest 6030 and 6035 MHz masers trace the inner edge of a rotating molecular toroidal structure with a density gradient falling off sharply to the east. The excited-state masers, which can trace denser and warmer material, make it much easier to unravel this structure than would ground-state masers alone, and the EVN is the only instrument that can map the 6030 and 6035 MHz masers in W3(OH) with sufficient angular resolution. Magnetic fields in the southeast and northeast have reversed polarity compared to the dominant direction indicated by the OH masers in the western half of W3(OH). The northeastern masers, seen only in the 6035 MHz transition, are blueshifted compared to the systemic velocity of the H II region and the rest of the OH masers and are likely associated with a champagne flow in the ionized emission.

Many masers show position shifts across their line width, suggesting that OH masers are not simply pointlike structures even at the resolution of the EVN. Masers in the 6030 MHz transition almost always spatially overlap brighter 6035 MHz masers with identical LSR velocities, magnetic fields, and velocity gradients, indicating that the conditions that produce 6030 MHz masers are strongly favorable for 6035 MHz maser production as well. The large range in conditions probed by different maser clusters in W3(OH) make it a promising laboratory for understanding massive star formation and maser phenomena.

This work is published in Fish & Sjouwerman (2007, ApJ, 668, 331).



Vincent L. Fish (MIT Haystack Observatory) and Loránt O. Sjouwerman (NRAO)

- **First VLBI polarization images of Methanol Masers using the LBA**

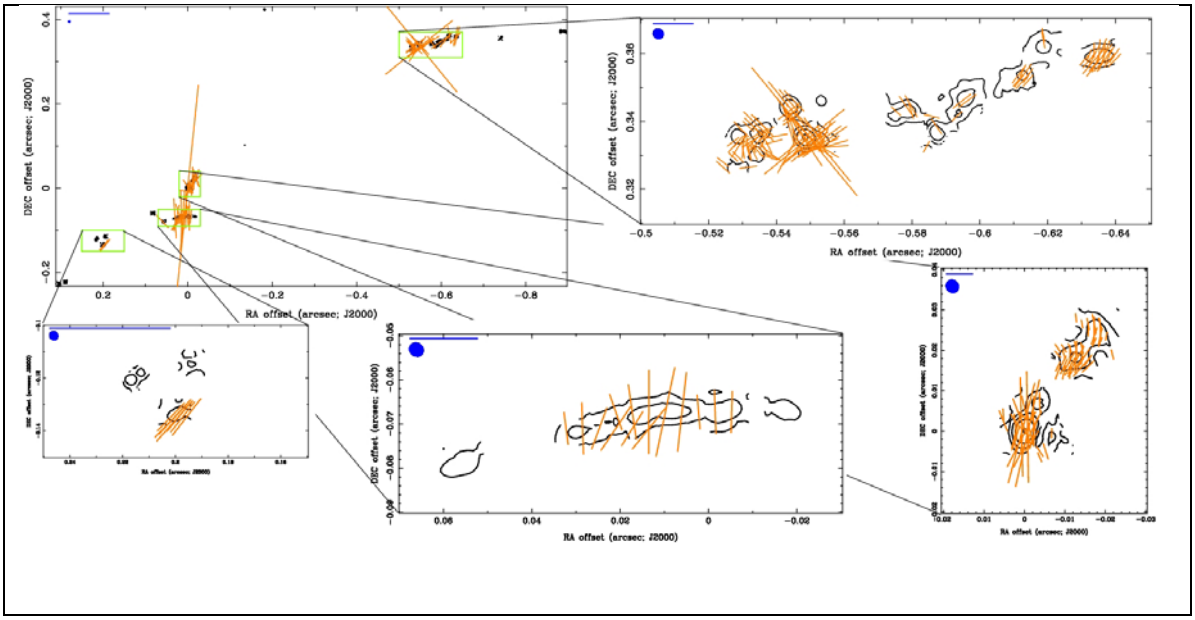
As recorded in previous newsletters we have been developing the code needed to form polarization images from data collected with the new Nasmyth optical system at the 40-m radiotelescope in Yebes (Spain). As a side product the similar corrections needed for the 26m in Hobart (part of the Australian Long Baseline Array - LBA) were included. This has allowed us to analyze LBA test data collected in a fit of enthusiasm & optimism in 2001.

With the new code we are able to image the linear polarization intensity and direction for the galactic methanol maser G339.8-1.26. We find for the majority of the emission that the fractional linear polarization is of the order of 5%, that fields are not highly ordered and tend to follow the major axis of emission region. The full details can be found in Dodson, A&A, 2008 (in press).

Methanol maser polarization, and the interpretation of that to find the underlying magnetic field, has the potential to discriminate between the two models of their production: in outflows, or in disks. The former would be expected to have the fields lying along the emission, the latter perpendicular to the emission. Long baseline observations are necessary to separate the different components, otherwise the details become blended. As such this is an ideal demonstration experiment for the application of VLBI polarization imaging.

Our observations, of a single source, indicate that the outflow model is more consistent with the data. However as this conclusion is drawn from a single source more observations are clearly needed. The EVN is the only Northern instrument which can observe in full polarization at 6.7 GHz (the VLBA does not cover this transition and the JVN does not have dual polarization). Therefore *we encourage users of the EVN to follow up on these results on sources visible in the Northern sky*.

R. Dodson (OAN, Spain)



- # Search for candidate radio sources for the link with the future GAIA frame: results from initial EVN observations

The European space astrometry mission GAIA, to be launched by 2011, will survey about one billion stars in our Galaxy and 500 000 Quasi Stellar Objects (QSOs), brighter than magnitude 20. Unlike Hipparcos, GAIA will construct a dense optical celestial reference frame directly in the visible, based on the QSOs with the most accurate positions. For consistency between the optical and radio positions, it will be important to align the GAIA frame and the International Celestial Reference Frame (ICRF) with the highest accuracy. However, it is found that only 10 % of the current ICRF sources (~ 70 sources) are suitable to establish this link, either because they are not bright enough at optical wavelengths or because they have significant extended radio emission which precludes reaching the highest astrometric accuracy. In order to improve the situation, we have initiated a VLBI survey dedicated to finding additional high-quality radio sources for aligning the two frames.

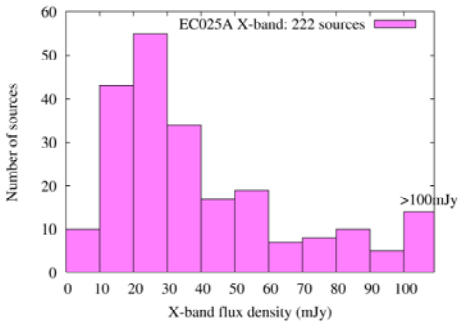
The sample of sources selected for this survey consists of about 450 targets, as weak as 20 mJy in the radio band and with optical magnitude V brighter than 18 (to ensure very accurate positions with GAIA). The targets were selected by cross-correlating optical and radio catalogues (Véron & Véron 2006 and NVSS, respectively), excluding known ICRF and VCS (VLBA Calibrator Survey) sources and with a declination limit of -10° for possible observing with northern VLBI arrays. Initial observation of these targets was carried out in June and October 2007 with a network comprising 4 EVN telescopes (Effelsberg, Medicina, Noto, Onsala) recording at 1024 Mb/s (experiments EC025A and EC025B). The goal of these observations was to determine the VLBI source detectability and to demonstrate the feasibility of observing such weak sources with a geodetic-style S/X mode.

We report here on the results of EC025A which observed 224 such targets, most of which also belong to the CLASS catalogue. Our results indicate excellent detection rates of 99 % at X band (222 sources detected) and 95 % at S band (211 sources detected). The mean correlated flux densities have a median value of 32 mJy at X band and 55 mJy at S band (Figure 1). We compared the X-band flux density distribution for the sources observed in EC025A with the flux distribution in the ICRF and VCS catalogues. This comparison shows that the sources in EC025A are on average 20 times weaker than the ICRF sources and 7 times weaker than the VCS sources (Figure 2). The spectral index α of the 211 radio sources detected at both frequencies was also estimated; its median value is -0.3 and most of the sources have $\alpha > -0.5$, hence confirming that these sources must be core-dominated.

The next stage for this project, to be carried out with the global VLBI network, will consist in imaging all the detected sources (in both EC025A and EC025B) to identify those that have the most compact VLBI structures. Such compact (and optically-bright) sources will be prime candidates for the GAIA link. The ultimate goal will be to measure their astrometric positions with the highest possible accuracy.

G. Bourda [1], P. Charlot [1], R. Porcas [2] & S. Garrington [3]

(1) Laboratoire d'Astrophysique de Bordeaux, Université Bordeaux 1 - CNRS, France; (2) Max-Planck-Institut für Radioastronomie, Bonn, Germany; (3) Jodrell Bank Observatory, UK



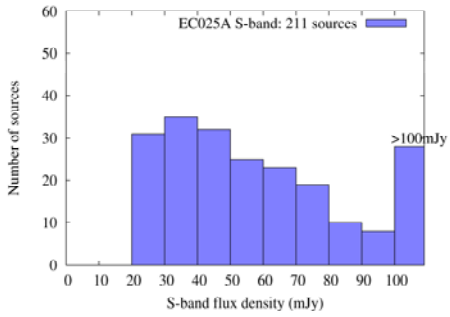


Figure 1: Mean correlated flux density distribution (units in mJy), at X band and S band, for the sources detected in our initial experiment EC025A (June 2007).

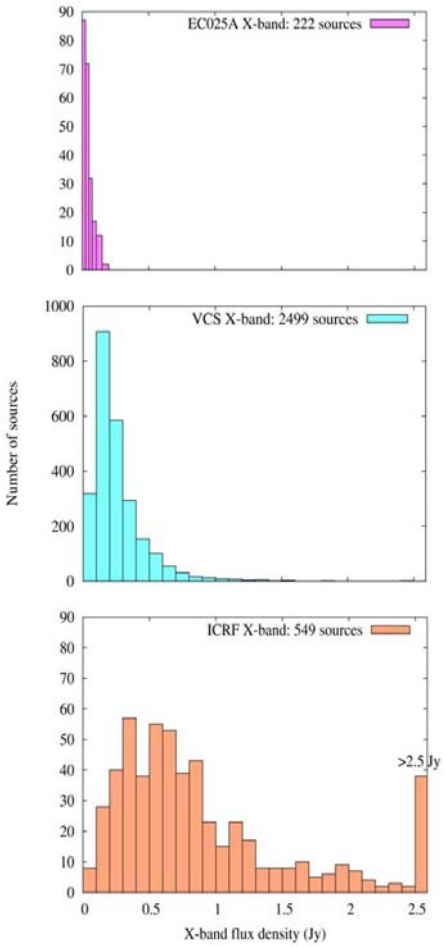


Figure 2: Comparison of the X-band flux density distribution (units in Jy) for the sources detected in EC025A and those from the VCS and ICRF catalogues.

5. EVN Technical Development and Operations

▪ e-EVN produces 1 Gbps fringes

The observing bandwidth for the e-EVN has been limited by the maximum sustainable data rate of 256 Mbps, and 512 Mbps for a subset of telescopes. This, together with the limited number of telescopes in the array, significantly limited the sensitivity in e-VLBI observations, compared to disk recording. There have been heroic efforts by the JIVE EXPReS team to improve on the Mark5A software to make the best use of the total data bandwidth of 1 Gbps. The new software uses a variant of the UDP data transfer protocol. By the end of 2007 there have been promising results at 512 Mbps with an increasing number of telescopes. The last challenge was to extend observations to 1024 Mbps, equivalent to the current maximum data rate in disk observations.

This test was carried out on 11 December 2007, with the Cambridge, Jodrell Bank, Medicina, Torun and Westerbork telescopes at 5 GHz. Initially, 512 Mbps observations went smoothly. To achieve near 1024 Mbps data rate over a 1 Gbps connection, 10% of the data had to be discarded from all telescopes (slightly more in the case of Medicina); at the receiving end dummy data were inserted to make up for the missing packets. The test was a tremendous success with excellent data from 5 telescopes -Onsala could not participate towards the end of the run (see figure). Further work is required before this mode can be made operational. But it is not too early to say that the e-EVN is approaching the sensitivity of disk recording observations, especially with the telescopes expected to join the array in early 2008.

Zsolt Paragi, for the JIVE EXPReS team

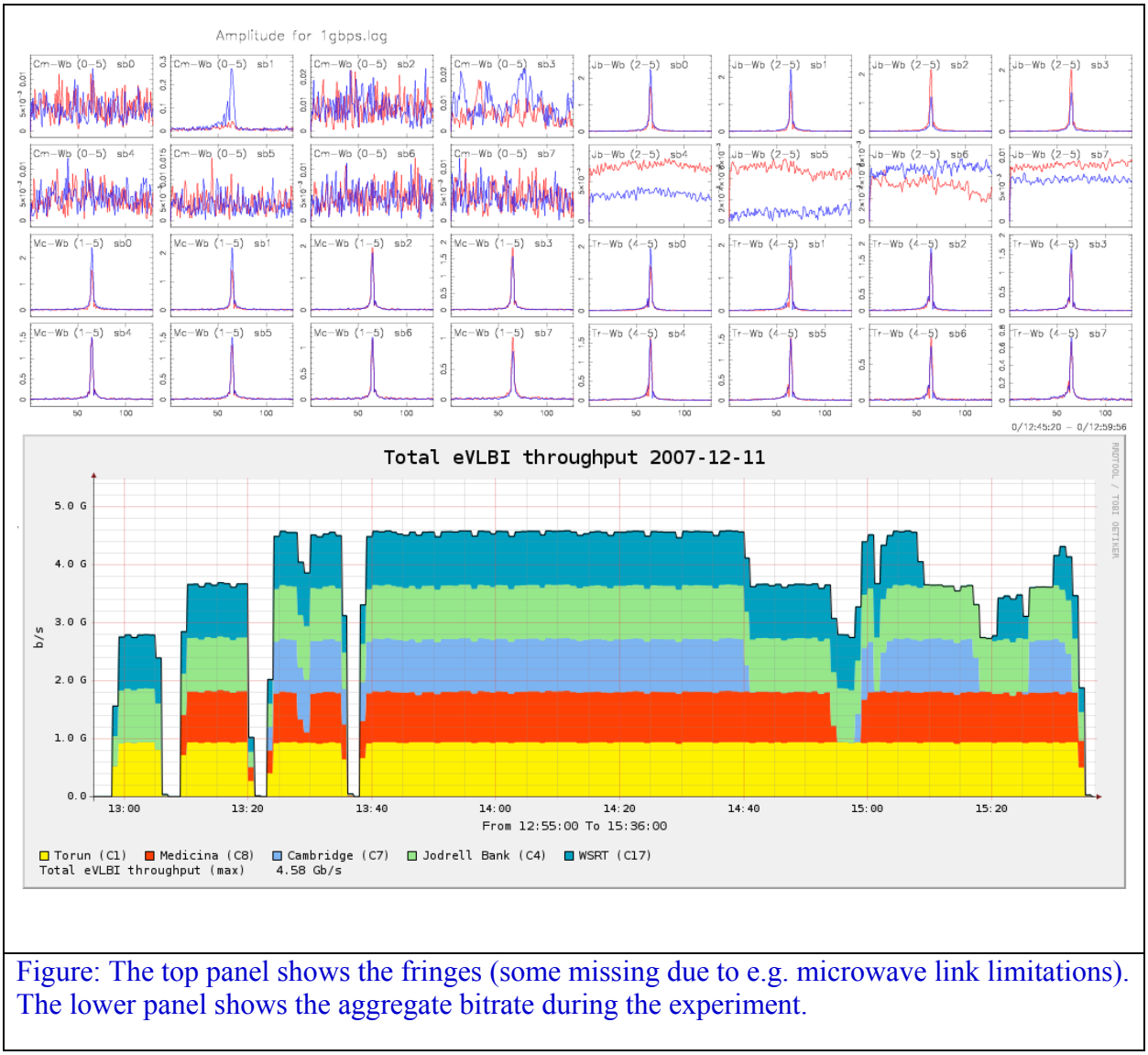


Figure: The top panel shows the fringes (some missing due to e.g. microwave link limitations). The lower panel shows the aggregate bitrate during the experiment.

- # Progress on the European DBBC project

Terminals arriving to the stations

On November 5, 2007 a geodetic version of DBBC arrived in Wettzell. The Wettzell DBBC system behaves 4 Ifs and 14 equivalent base band converters. In the same month it was installed and integrated with the other VLBI equipment. Recording of its output is realised with a MK5B+ system. Europe90 observation has been done for testing the equipment. Fringes have been found on all the channels and data analysis in underway.

The DBBC system for Irbene (Latvia) has been completed and in the first days of February it will be transferred by Latvian colleagues in their station. The Irbene DBBC is a reduced version having two Ifs and 2 Core1 boards. As soon as Irbene funds will able to upgrade the system few Core2 boards will be added to achieve a complete architecture. At present the system will allow to perform the first observations and tests of the antenna and the 6 cm receiver.

A system similar to the Irbene one has been delivered to the Arcetri Observatory. Main purpose is to use it as a development system for FPGA configurations devoted to the realization of spectrometer, pulsar, total power, polarimetry back-end. Arcetri team is part of a FPGA team established to support firmware development on the DBBC platform.

Two additional DBBC systems are almost ready and equipped with 4 IFs sections, but waiting for the production of the new Core2 boards. Such terminal for Tigo and O'Higgins will be equipped with four Core2 boards each and will achieve the functionality of 16 equivalent bbcs.

Other complete systems are under contstruction for Yebes, Noto, Medicina and SRT, and in particular the Medicina unit is expected to support the multibeam 22GHz receiver (7 feeds x 2 polarization x 2 GHz bwd/ea) for VLBI and single dish applications.

DBBC.2

The first ADB2 board prototype has been completed and is available for the first test. The board offers several operation modes with demultiplexing in two or four bus. •Maximum sampling clock is 2.2 GHz, maximum signal frequency to be sampled is 3.5 GHz, 10-bit representation. A board ADB2 can feed as piggy-back element a FiLa10G, giving the possibility to place the sampling element in the receiver site, connecting the DBBC throw optical fibers.

The new processing unit Core2 board, in the V5 version is expected in the end of January for the first tests. •The board is compatible with ADB1 and ADB2 and support a minimal equivalent of four Core1 functionality. A piggy-back element can be adopted for additional functionality, like memory bank for pulsar de-dispersion, memory corner or other needs where a significant memory addition is to be adopted. The memory piggy-back is under development.

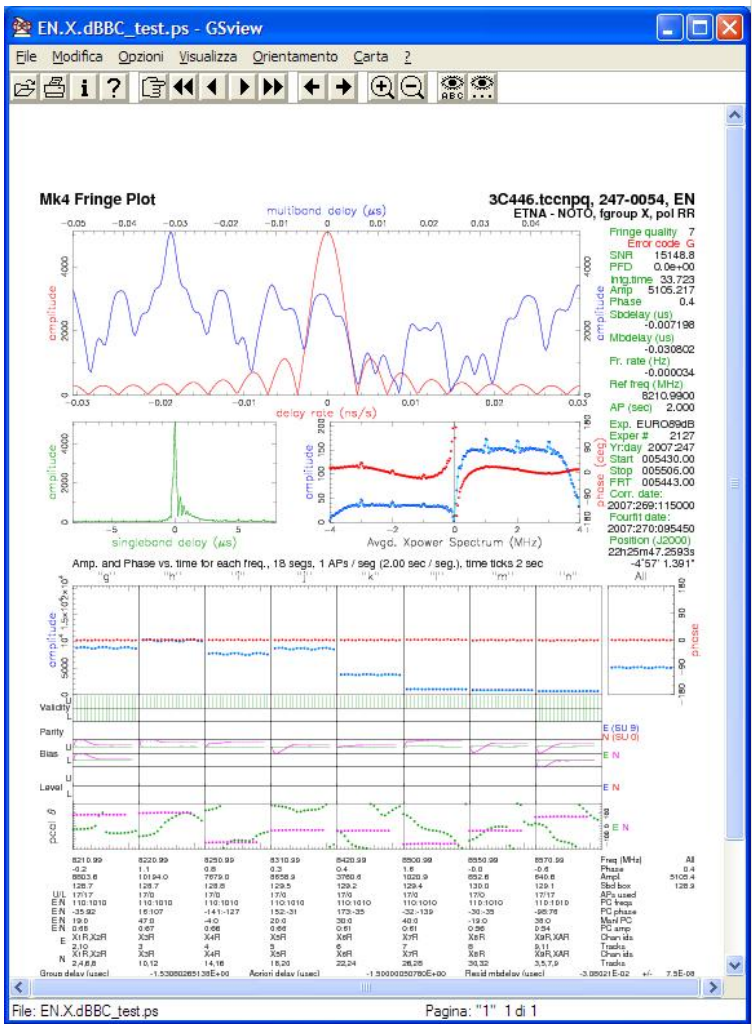
A multiband fixed tuning configuration is in development and expected in March 08, to be used in alternative to the standard base band converter configurations.

The FiLa10G board's realization started and the first prototype of the board is expected in two-three months. It can be used as piggy-back board of any ADB2 sampler, giving the possibility to transmit and receive in the same time an high data rate of 20 Gbps + 20 Gbps. The bidirectional functionality can be required for instance when a RFI mitigation is needed to be realized in a remote position with respect to the sampling and processing site. With the typical sampling frequency of 2.048 MHz and the full 10-bit data representation, a double optical fiber set meets the full requirement. Two transceivers can be used, with the possibility to populate the board even with one transceiver only. One board can even support the data tx-rx of 2x2 VSI connections and in such case it can still be used as p-b element of a ADB2 or as stand alone element. Indeed the configurations files can be also loaded by the on board stand alone flash memory. The entire triangle connectivity HSI/HSIR -VSI in/VSI out - Optical Fibres is supported.

Observation, Documentation and more

The Europe89 was observed for 12 hours in September using 8 bbc equivalent in X band and 3 bbc equivalent in S band: fringes have been detected in all the sub-bands (fringe plot in the figure). Euro90 observed 24 hours at Wettzell with all the standard number of subchannels. A technique for compensate fractional frequency offset is under evaluation.

The digital system use requires to optimize or to equalize the IF flatness in band: a new version of Conditioning Module is under development to optimise this aspect, but a good equalized band is expected from the receiver. Additional observation test will be realised with the Wz unit and all the other terminals that will be available in the time.



Dedicated web pages have been added in the Noto Internet server with information about the DBBC system. A document series is in preparation and it started to be available in these pages, so as a page with the News.

The integration with the Field System is now under development and expected in the coming weeks. It is realized in a first time as a collection of station commands, as the software structure the DBBC is able to recognize. The gain information in the different part of the instrument are recorded in a log that can be available under a specific FS command request for calibration purposes.

Gino Tuccari (IRA-INAF, Italy)

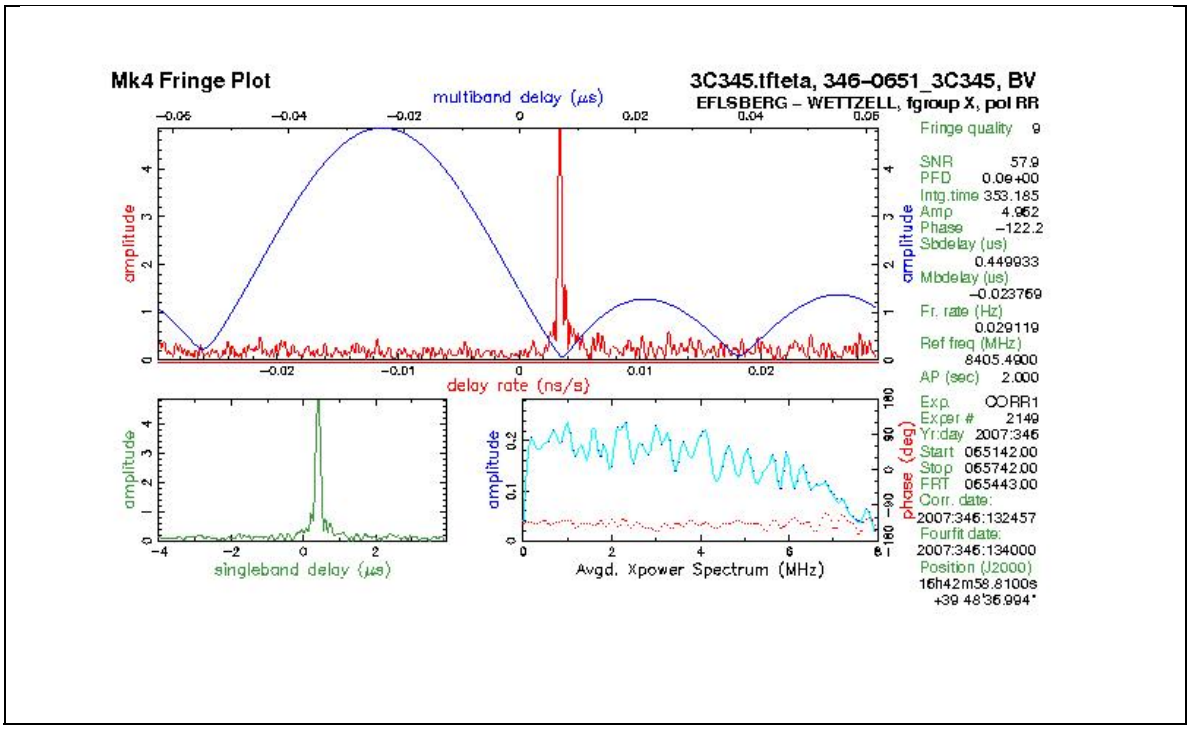
- ## First light and first fringes on the Effelsberg high speed data line

The Effelsberg telescope is now connected with a 10 Gb data line to the Max Planck Institute for Radioastronomy (MPIfR) in Bonn. Starting from the middle of January 2008 the MPIfR in turn will be connected via a new 1 Gbit line dedicated for e-VLBI to the European research network Géant. The first e-VLBI tests of Effelsberg with JIVE are expected for the end of January. They will initially be limited in bitrate due to the 1 Gbit connection. About 6 to 8 weeks later a 10 Gbit point to point connection from the MPIfR to Groningen/Dwingeloo will be made available by the German Research Network (DFN).

A first e-VLBI test using Effelsberg, Wettzell and Medicina was made on December 12 and good fringes were found at the Bonn correlator only a few hours later (see figure). The Effelsberg data was sent to the correlator via the new high speed data line; the data from Medicina and Wettzell arrived via Internet and a 1 Gbit test line to the correlator in Bonn.

The Effelsberg 100m telescope is situated in the Eifel mountain range about 40 km outside of Bonn. Like many other radio telescopes it is located in an isolated rural area with low population density. When e-VLBI was investigated as a future option for the EVN it was realised that high speed data connectivity is typically not available in areas where radio telescopes can be found, e.g., Effelsberg, because there are too few customers to make laying fiber economic.

For the Max Planck Institute which operates the Effelsberg telescope the only possible solution seemed to have our own fiber laid. So a 2 M€ proposal was submitted to the Max Planck Society (MPG) in 2005 for a direct fiber connection between the institute and the telescope. Financial and political support came via a proposal to the EU which was also submitted in 2005. The EU granted an additional 210 k€ towards the project (contract No. 026642). The MPG provisionally accepted the proposal and the project to construct the high-speed data line between Effelsberg and Bonn was started, after the proposal had passed through a few committees which have to be involved in projects of this size. The path had to be defined in detail, land owners had to agree, the work had to be put out to tender and finally digging began in April 2007. On October 19th the fibre reached the institute building in Bonn and on the 29th there was first light on the fibre. In the end the MPG paid 100% of the total cost of the project of 1.4 M€. The EU funding was partially relocated to finance the connection to Géant and Dwingeloo.



Walter Alef (Max-Planck Institut für Radioastronomie, Bonn)

- ## EVN Scheduler's Report from the Last Observing Session

2007 Session 3: 18 Oct - 6 Nov

Wavelengths: 18/21cm, 7mm, 13/3.6cm, 5cm, 6cm

This session contained only a small number of user projects (10) because both Urumqi and Shanghai were unavailable (they were needed for tracking the Chinese Lunar Explorer space mission Chang'E). The resulting block schedule was rather inefficient but all projects not requiring Urumqi or Shanghai were scheduled. A total of 5 observing bands was scheduled: 18/21cm (2 projects), 7mm (1 project), 13/3.6cm (1 project), 5cm (2 projects) and 6cm (2 projects). There were 6 global projects (4 using the GBT, available for the first time after track repairs) and 4 EVN-only. Arecibo was scheduled for 1 project, but delays to painting resulted in it being withdrawn shortly before the session (October 4). The DSN 70m antenna at Robledo was made available for 1 project at S/X band. One of the eVLA antennas was used for the first time at 6.7 GHz, together with the EVN, for a methanol astrometry experiment. A Target of Opportunity proposal was received on 25 September, requesting observations at 6cm of sn2007gr. After rapid review, and approval, it proved possible to schedule this after the end of the currently scheduled projects but within the block time originally reserved for session 3. This project also requested and was granted time on the GBT.

Richard Porcas (EVN Scheduler)

- ## Meeting of the EVN Technical Operations Group (TOG) at Yebes on November 12th 2007

The EVN TOG held a meeting on November 12th 2007 at the Visitor's Center of the National Astronomical Observatory (OAN) at Yebes, Spain. Approximately 40 people attended the meeting.

Among other "hot topics", future 4 Gbit/s data acquisition was discussed. A subgroup led by Michael Lindquist and Walter Alef will deliver a strategy paper to the EVN CBD.

Reports and presentations from the meeting are available on the web at http://www.mpifr-bonn.mpg.de/div/vlbicor/tog_chair/togreps07/.

- ## One hundred telescopes in 30 years at the Bonn correlator

Visitors to the Bonn VLBI correlator are always proudly shown our gallery of telescope photographs, displayed in individual frames on the wall outside the correlator room. When the collection was started, sometime in the early 1980's, we aimed to make a complete collection of all telescopes whose signals have been processed on one of our correlators. Membership in this illustrious group is, of course, dependent on finding fringes! In a recent bid to update the collection I made a careful count and, yes, correlation of one of the most recent experiments has brought our collection up to 100 telescopes.

Our first correlator (MK2) started operation 30 years ago in early 1978, just after I arrived at the MPIfR on a 2-year postdoc, and the first experiment processed was named JODE: Jodrell, Onsala, Dwingeloo, Effelsberg. This was an ad hoc all-European run which predated the formal start of the EVN in 1980, and was recorded on 1" magnetic tape using IVC studio video recorders. At that time MPI staff were mainly doing VLBI experiments using the Effelsberg telescope together with the 5 "standard" telescopes of the US VLBI Network: Haystack, Green Bank 140ft, OVRO-130ft, Iowa (18m) and Fort Davis (25m). Some of our earliest photographs of these antennas are beginning to fade and, at least in the case of the Iowa telescope, the subject no longer exists.

VLBI activities have grown considerably since those early days and expansion of the Bonn correlator centre has reflected that growth. Our MK3 correlator started operation at the end of 1982, and subsequently the MPI formed a fruitful partnership with the Bonn University Geodetic Institute, resulting in the start of geodetic VLBI correlation in Bonn. (The term "geodetic" is used very loosely to also cover studies of Earth rotation, polar motion and the Terrestrial and Celestial Reference Frames.) Strange (and small) telescopes unknown to astronomers began to claim admittance to our collection (Mohave 12m; Yellowknife 9m) and photographs have sometimes been difficult to obtain. But they do boost the numbers !

From 1980 until around 2000 (when production correlation started at JIVE) the Bonn MK2 and MK3 correlators provided the cornerstone of EVN operations for both EVN

and Global experiments, with new telescopes arriving almost every year (Medicina, Noto, Torun, Urumqi, Seshan,..). The ten new VLBA 25m telescopes gradually came online, replacing the operation of some of the older telescopes at the same sites. VLBI at 3mm commenced, requiring photographs of telescopes (and arrays) at exotic mountain sites (Pico Veleta, SEST, Plateau de Bure).

Although most EVN observations are now processed at JIVE, the Bonn MK4 correlator, operational since 2000, continues to be busy with both astronomical and geodetic observations, including the Global 3mm VLBI Array sessions, some EVN astrometric experiments, a number of special "ad hoc" projects and, of course, geodetic runs performed under the auspices of the IVS (recently requiring us to obtain pictures of the 3 dishes of the Russian QUASAR network at Svetloe, Zelenchukskaya and Badari).

So, let us examine some interesting specimens in the collection.

The largest antenna is, of course, the 305m Arecibo telescope. The smallest is the 5m dish at GGAO in Greenbelt, Maryland, USA, but the old 6m telescope in Shanghai, used for a memorable "first" single-baseline VLBI experiment together with Effelsberg in 1981, comes a close second. (As we noted at the time, the geometric mean collecting area of the baseline was essentially the same as that between two VLBA antennas.) The most conspicuous absence is the GBT (so far), and its predecessor, the Green Bank 300', never made it to the gallery because it collapsed within 12 hours of my taking THE definitive photograph! Two others in the collection, at Hat Creek and Richmond, Florida, collapsed without my help in storms, although their pictures did not fall off our wall in sympathy. The most under-represented continent is Africa, with only one telescope at Hartebeesthoek; even Antarctica has two, at O'Higgins and Syowa. The most represented countries, following the USA, are the UK (9) and the (former) USSR (8). The most ephemeral telescopes, only ever used for test observations, include Weilheim (30m) in Germany and Usseriysk (70m) in Russia. Perhaps the most "unusual" telescopes used for real VLBI experiments were the 10m in Bangalore, the Ooty 530x30m telescope, both in India, the Haystack 46m dish used for ionospheric research and the Nancay 8000 square-meter collector in France.

And now to the count.

Many observatories operate more than one telescope at the same site for VLBI observations (e.g. Jodrell Bank, Onsala, DSN sites at Robledo, Goldstone) and we have separate photographs of each, where necessary. With arrays we make an exception, and have just a single photograph of the whole array (e.g. WSRT, BIMA, Plateau de Bure, VLA) even if different individual elements, or the phased array, have been used on different occasions (or, in the case of the VLA, 4 separate VLA single dishes in a single "cluster-cluster" experiment).

Nor do we have separate pictures for telescopes which have been substantially modified; in the course of the last 30 years, many telescopes have been resurfaced (e.g. Jodrell Lovell Telescope and MkII) or have been increased in size (e.g. the Goldstone DSS14 64m was increased to 70m).

It is a moot point whether to include multiple pictures of telescopes which have been transported to different locations (e.g. the mobile MV-3 antenna). In fact, we had

fringes from (and have photographs of) both the TIGO 6m and the O'Higgins 9m in Germany, before they were taken to their present fringing locations in Concepcion (Chile) and O'Higgins Base (Antarctica). But to be fair, I count each only once. I have also excluded the 1.2m satellite dish used for holographic measurements of the Effelsberg telescope surface, in fact correlated on the MK4 correlator.

On the wall I count 95 frames, and 5 new ones are about to be mounted: Yellowknife, GGAO, and (courtesy of a recent southern hemisphere experiment) Ceduna, Mopra and ATCA. We have reached 100.

No doubt the recent arrival of our software correlator will result in many new photographs for the collection. And a word of advice to the builders of the SKA correlator - make sure you have a very large wall somewhere !

Richard Porcas (MPIfR, Bonn)

6. EVN participates in international projects

- ## RadioNET FP7

Preparations for the submission of a RadioNet proposal for FP7 are now in full swing! With Phil Diamond leading the PrepSKA FP7 project, I have been asked by the current RadioNet board to coordinate and put together a new RadioNet proposal for FP7. Over the last few months, a process of selecting the very best ideas from the community has taken place, and the overall programme of research that we will present to the EC is now defined. As in FP6, the programme will consist of Networking Activities (NA), Transnational Access (TNA) and Joint Research Activities (JRA). The EVN formed the original basis of the RadioNet collaboration, and although the partners now cover the full breadth of radio astronomy (from LOFAR at metre to APEX at sub-mm wavelengths), the EVN still forms an important component of the overall project plan. In particular, the RadioNet FP7 proposal will again include EVN Transnational Access (managed by Bob Campbell). Some relevant networking activities include the Engineering Forum (Reinhard Keller and Walter Alef, MPIfR) and the Science Working Group (Tiziana Venturi, IRA). Relevant JRAs include - ALBiUS (for user software led by Cormac Reynolds, JIVE) and Uniboard (a generic digital board with various applications in VLBI - including data correlation - led by Arpad Szomoru, JIVE). In total there are 7 NAs, 10 TNAs and 4 JRAs.

We are aiming very high, with a total requested contribution from the EC of ~ 15 MEuro over 4 years. Fortunately, Huib Jan van Langevelde (JIVE) has agreed to coordinate the JRA proposals and Simon Garrington (JBCfA) will look after the TNA proposals. The submission deadline is the end of February (nice that 2008 turns out to be a leap year!) and we expect to hear the commission's verdict around late spring.

Fingers crossed...

Mike Garrett (ASTRON)

PrepSKA FP7

The EVN has been the bedrock of collaboration in European radio astronomy since about 1980; it's existence and the fact that is has provided the vehicle for Europe's centimetric wave radio astronomers to work together, to talk often and to engage in joint developments has had far reaching consequences. It spawned the various projects within FP2, FP3, FP4, FP5 (the first RadioNet, an Infrastructure Co-operation Network), FP6 and now as we approach FP7 we see the community branching out, well beyond the shores of Europe, to engage with colleagues from all over the world in the development of the SKA.

In FP7 we have been funded for a 'Preparatory Study for the SKA', dubbed PrepSKA. This is a 3-year programme receiving 5.5MEuro from the EC, with an additional 15+MEuro committed as matching funds. The 'we' in this case has expanded considerably from the EVN (although those roots are still visible); PrepSKA is a collaborative project between funding agencies and radio astronomical institutes and organisations from around the world. It has, as its fundamental aim, the production a detailed costed design for Phase 1 of the SKA (Phase 1 will be the first 10-15% of the array and is expected to cost ~300MEuro). In addition, PrepSKA will develop plans for the governance, legal and procurement framework required to move the SKA from an R&D programme into a construction project. The design and plans are to be delivered around the end of 2011 and will form the basis of a proposal to governments around the world for funding for Phase 1.

The PrepSKA contract will shortly be signed and the project will kick-off with its first round of meetings in Perth, Australia in early April.

Phil Diamond (PrepSKA Co-ordinator)

ASTRO-G/VSOP-2 recent status

ASTRO-G/VSOP-2 is the Japanese Space-VLBI project following VSOP-HALCA with the expected launch in 2012. ASTRO-G formally started as the scientific mission project of JAXA in July 2007, and has moved to the phase-B (Basic design phase). At JAXA, the design of the spacecraft of ASTRO-G is proceeding based on the scientific requirements and VSOP-2 teams are working on spacecraft components and interfaces. It is expected that the VSOP-2 team will have Preliminary Design Review (PDR) of the basic design in 2008. Basic design parameters of the spacecraft are as same as described in the VSOP-2 Science Goal document; however some changes in satellite design are expected within the basic design. EVN teams are expected to join the ASTRO-G project and play important roles in technical, operational and scientific aspects.

The VSOP-2 Symposium "Approaching Micro-Arcsecond Resolution with VSOP-2: Astrophysics and Technology" was held December 3-7, 2007 at ISAS Sagamihara Campus in Japan. About 135 participants from around the world attended, including many graduate students and postdocs who are expected to be potential users of VSOP-2. The Symposium covered a wide range of topics in astronomy and astrophysics that will be addressed by the unprecedented angular resolution of VSOP-2. The presentations of

scientific results of VSOP-HALCA, potential science areas that ASTRO-G project can address, overviews of the spacecraft design and on-board instruments, and international collaborations have been made and discussed.

We all thank the participants from the European community for a number of excellent presentations and so many useful comments and suggestions for ASTRO-G/VSOP-2.

Information of the Symposium is already available on the meeting website, http://vsop.mtk.nao.ac.jp/VSOP2SYMP2007/ . This website also includes presentation files given in the Symposium.

In order to continue the discussion raised in the Symposium or discuss subjects that were not presented in the Symposium but important to approach, we are planning the VSOP-2/ASTRO-G meeting in May 2008 in Bonn, which will be co-hosted by MPIfR (see below). We are all looking forward to meeting you in Bonn, very soon!

Yoshiaki Hagiwara (NAOJ) and Yasuhiro Murata (ISAS/JAXA)

Space VLBI workshop at MPIfR, Bonn: May 13-16 2008.

The workshop will be hosted by Max-Planck-Institut in co-ordination with the EVN and ISAS. The meeting will embrace three major themes:

1. *Science with the VSOP-2 mission.* This discussion will focus on scientific priorities for VSOP-2 and European involvement in the Key Science Programmes of the mission.
2. The first meeting of the *VSOP-2 International Steering Committee (VISC-2).* The VISC-2 meeting is going to be dedicated to organizational issues and various aspects of providing sufficient ground support for VSOP-2
3. The *tracking station meeting*. This part of the discussion will be focused on technical and financial issues related to construction and operations of a satellite tracking station in Yebes.

An additional item of the agenda is under consideration at the moment that would include scientific and technical issues related to the RadioAstron mission to be presented by a few keynote speakers from Astro Space Center.

The first announcement of the workshop is going to be distributed by the end of January.

Andrei Lobanov (Max-Planck-Institut fuer Radioastronomie, Bonn)

- **Applications of VLBI in the Chinese lunar probe project Chang'E1**

On Oct. 24, 2004, China has launched the lunar explorer 'CHANG'E-1. It took about two weeks for CE-1 to fly to the designed orbiter of the moon. VLBI technique was used as an important part of the Tracking, Telemetry and Control (TT&C) system of Chang'E, which consists of the traditional United S-Band (USB) command system and VLBI. The Chinese VLBI facility for the tracking of Chang'E consists of four VLBI stations located in Shanghai, Beijing, Kunming and Urumqi, respectively, and a data processing center in Shanghai.

Shanghai and Urumqi radio telescopes are members of EVN. The Beijing and Kumming telescopes were built in 2006, and are equipped with S/X band receivers and MK5 recording systems. Meanwhile a new VLBI data processing center with near-real time data capability was also constructed at the Shanghai Astronomical Observatory (SHAO) in 2006.

The four stations were connected to the data processing center by fiber link network at a data rate of 34Mbps.

The data center comprises the correlators, the Mark5 terminals, servers for post processing, angular position determination and orbit determination, etc. The operators were able to control all the items at the command room. To achieve high reliability, there are two independent data processing systems, while the hardware correlator and the software correlator are the kernels of them respectively.

VLBI system is an important part of TT&C system. The data center will accomplish all the tasks such as schedule, data correlation, post processing, atmosphere delay correction, position determination and orbit determination. It will also complete the data and command communications with the Beijing Aerospace Control Center (BACC) and the observation stations. In the tracking mission, it supplied BACC with CE-1 satellite measurement results including delay, delay rate, angle position and also participated in the orbit determination and prediction. All the mission phases include the 24 hours and 48 hours phase-modulation orbit, the earth-moon transfer orbit, lunar captured orbit, lunar orbit. It also took part in the quasi real-time orbit determination and prediction in the phase-modulation, earth-moon transfer and capture lunar orbit. The VLBI system successfully accomplished all the CE-1 Tic tasks in 2007.

The CE-1 probe was successfully launched at 18:05 on Oct 24th the Chinese Xichang space center. From Oct 27th, 2007, CVN began to carry out the tracking mission.

According to the BACC commands, the CVN observation data from the stations were sent to the VLBI data center in real-time. The center took the near real-time data processing and sent to the result to BACC the satellite delay, delay rate and the angle position in 10 minutes (usually less than 5 minutes). It also received the USB data from BACC in near real-time mode, and finished the CE-1 orbit determination. After every day real-time observation, VLBI data center also took the system error correction, and sent the precision data including delay, delay rate, angle position and orbit to BACC again.

After Dec 18th, the CE-1 probe entered the lunar orbit successfully, CVN changed the near real-time observatory mode into the long-term operation and post management mode.

Results showed that VLBI contributed a lot to the CE-1 TT&C.

Xiaoyu Hong (SHAO, China)

7. EVN Symposium 2008: First announcement

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 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 results, including both recent scientific and technical developments in an era during which several new powerful radio astronomy facilities, e.g. e-MERLIN, LOFAR, ALMA, SKA, etc..., are coming along.

The Scientific Organizing Committee is formed by the members of the EVN Consortium Board of Directors and by the past and present EVN Programme Committee Chairman.

The web page of the Symposium (http://www.ira.inaf.it/meetings/evn9) will be made available soon. The address to contact the LOC is evn9@ira.inaf.it

The meeting will have an informal character and includes reviews, contributed papers and posters. The EVN Users Meeting will be held during the conference at the Medicina Radio Observatory Visitor Centre. Also the traditional football match will be organized (start your training).

LOC (Daniele Dallacasa, Marcello Giroletti, Karl-Heinz Mack, Franco Mantovani, Mauro Nanni, Barbara Neri, Carlo Stanghellini)

8. EVN Staff matters

• Job vacancies at EVN institutes

Onsala Space Observatory, Sweden has two openings for indefinite-term (permanent) positions within its newly established Nordic ALMA regional centre (ARC) node. JIVE seeks to fill the position of Head of Astronomical Computing at the EVN correlator.

- SUPPORT ASTRONOMER position at Onsala Space Observatory (Sweden)

Ref. nr.: 2007/174, Deadline: **1 Feb 2008**

This astronomer position will provide support to ALMA users and outreach to the Nordic community. It is also expected that he/she will also conduct his/her own astronomical research, especially using ALMA and APEX. The successful candidate should have a PhD in astronomy, with a strong research record. Experience in radio or millimetre wavelength interferometric imaging is essential. For details see

http://chalmersnyheter.chalmers.se/chalmers03/svensk/ext_ledigatjansterarticle.jsp?article=10506

- SOFTWARE SUPPORT position at Onsala Space Observatory (Sweden)

Ref. nr.: 2007/175, Deadline: **1 Feb 2008**

This position will involve establishing software support readiness for Nordic ALMA users and providing feedback to software developers. The person will also help in the development of new software and algorithms within the ARC node, and GRID enabled computing within the Nordic region. The successful candidate should have experience in installing, maintaining and programming astronomical data reduction packages, preferably packages related to radio or millimetre wave interferometry. For details see

http://chalmersnyheter.chalmers.se/chalmers03/svensk/ext_ledigatjansterarticle.jsp?article=10517

- HEAD OF ASTRONOMICAL COMPUTING position at THE JOINT INSTITUTE FOR VLBI IN EUROPE (JIVE, Dwingeloo, The Netherlands).

Ref.No JIVE2008/02, Deadline: **15 Feb 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 progress 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 the position of Head of Astronomical Computing. The responsibilities of this position include:

- Take the lead on an international project on radio-astronomy data reduction software
- Supervise a team of scientific programmers working on algorithm development as well as operational tools
- Participate in international projects dealing with astronomical computing or radio-astronomy initiatives, in particular the SKA
- Assume management tasks in personnel, financial or strategic matters
- Carry out (VLBI-related) astronomical research

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, and the ability to produce and maintain user software, and to manage software projects. The successful applicant would have experience in leading a small team and possess good communication skills. Thorough knowledge of radio-astronomy techniques, preferably VLBI, is important, and a track record as an active (VLBI) astronomer is seen as an advantage.

Candidates who fulfill part of the above requirements and have the ambition to develop 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 two year trial period, after which time a permanent appointment is possible. 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. Email: 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 February 2008, mentioning ref.No JIVE2008/02. 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

IRA-INAF (Italy) has a new permanent staff member working in VLBI: **Marcello Giroletti**, researcher. His field of activity is on VLBI study of BL Lacs and low power radio galaxies, at cm and mm wavelengths.

This fall there have been a few more staff changes at JIVE. **Rebeca Soria-Ruiz** left JIVE to return to OAN in Spain, and **Antonis Polatidis** has now joined the support team. **James Anderson**, who was employed on the ALBUS project, has taken a new position in Bonn, and his position in the software team has been filled by **Stephen Bourke**. On the secretary staff **Yvonne Kool** has replaced Diana van Dijk, who you may have met in her role as the EXPReS project scientist. And there are more changes coming up with the departure of **Hayley Bignall** and **Cormac Reynolds** to Australia by the end of February (2008). *Their positions have been advertised* (see above). Finally, **Stefanie Muehle** replaces Lisa Harvey-Smith, left to University of Sydney, Australia.

Metsähovi Radio Observatory (Finland) has a new staff member working in the EXPReS e-VLBI project: **Minttu Uunila**. She will be involved in development and documentation of the prototype of the multi-Gbps data acquisition demonstration system of EXPReS.

From January, **Simon Casey** is employed on a EXPReS funded temporary position as a Network Engineer for eVLBI at Onsala Space Observatory (Sweden). Simon comes from Jodrell Bank where he has been doing his PhD om network issues including new transmission protocols for eVLBI and methods of maximising useful throughpout through 1024Mbit/s links.

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