European VLBI Network Newsletter Number 15 September 2006

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1. Call for Proposals - Deadline 4 October 2006

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.

The EVN is open to all astronomers. Use of the Network by astronomers not specialised 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.

EVN Observing Sessions in 2006-2007

2006 Session 3	Nov 16- Nov 30	6cm, 3.6cm
2007 Session 1	Mar 01 - Mar 22	18/21cm, 6cm, 5cm, 1.3cm
2007 Session 2	May 31 - Jun 20	6cm, 5cm, +...

Proposals received by 4 October 2006 will be considered for scheduling in Session 1, 2007 or later. Finalisation of the planned observing wavelengths will depend on proposal pressure. Other wavelengths which may be scheduled in 2007 are 90cm, 50cm, 30cm, 3.6cm, and 7mm.

Special features for Sessions in 2006-2007

- Recording at 1 Gb/s (Mark 5A) is now possible for an increasing number of

projects. It is planned that this will become soon the standard observing mode for all continuum EVN-only projects.
- 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.
- The Arecibo telescope will not be available during session 1, 2007.

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

Complete a coversheet and attach a scientific justification (maximum 2 pages). Up to 2 additional pages with diagrams (black and white only) may be included; the total, including cover sheet, should not exceed 6 pages.

Submit to: Richard Porcas, EVN Scheduler, MPIfR, Auf dem Huegel 69, D 53121 BONN, GERMANY or by email to: proposevn@mpifr-bonn.mpg.de. Deadlines: 23:59:59 UTC on 4 Oct 2006.

Additional information

The detailed Call for Proposals has further information on Global VLBI, EVN+MERLIN and guidelines for proposal submission.

The EVN User Guide describes the network and provides general information on its capabilities.

The EVN Status Table gives current antenna capabilities.

The On-line VLBI catalogue lists sources observed by the EVN and Global VLBI.

2. Report fron the EVN TOG

The EVN TOG held a meeting on 23 - 24 March 2006 hosted by ASTRON in Dwingeloo. On the first day a so-called mini-workshop at Westerbork was offered for training in various aspects of VLBI operations at the telescopes: Mark 5 recording system, amplitude calibration, Field System operation, and an introduction to the EVN digital baseband-converter project. The digital baseband-converters will hopefully soon replace the old analog baseband-converters, which suffer from lack of spare parts and are inferior to their digital counterparts in many aspects. A working prototype was shown at the meeting.

Approximately 50 people attended the meeting. The minutes and various reports can be found under http://www.mpifr-bonn.mpg.de/div/vlbicor/tog_chair/togreps06/togminutes.txt and http://www.mpifr-bonn.mpg.de/div/vlbicor/tog_chair/togreps06/index.html
The participants of the mini-workshop gave a positive feedback. The presentations and course material are provided on the Internet http://www.mpifr-bonn.mpg.de/div/vlbicor/tog_chair/prog_ws_06.html so that they can serve as reference material for the VLBI friends.

The EVN has implemented (nearly) automatic "near real-time" fringe checks. Typically data from the first observation in every frequency session are transfered to JIVE where they get correlated and analyzed automatically. The EVN stations can access the results a short time after the data transfer has been completed. The next release of the Field System, which controls the data acquisition at the antennas, will have automatic transfer for those tests built in. The final aim will be to fully automatically transfer, correlate and analyze data on a fringe finder from every observation.

The improved reliability of the network does not apply to experiments recorded on tape which was still done for observations to be correlated at Socorro. As a consequence the TOG decided to stop any tape recording for future observing sessions provided the EVN directors agree and an arrangement can be found with NRAO of how to handle global observations. In the meantime the EVN directors have accepted this proposal and as a consequence nearly all global VLBI observations will be correlated at JIVE. For experiments which require the VLBA correlator some compromises have to be made.

Even though the schedule submission scheme remains unchanged for the observers, an additional safeguard has been implemented against stations observing different versions of a schedule. Observers still have to deposit schedules no later than 3 weeks before the session on the vlbeer ftp area. Schedules are "piped" through checks at JIVE and a selected station. Only after successfully passing those checks which takes about 1 week can an experiment schedule be downloaded by the stations.

Effelsberg single dish fluxes can be provided on a "best-effort" basis, on request from PIs. (The fluxes of some calibrators are measured at every session.) The accuracy depends on many factors such as the weather, observing frequency (particularly at low frequencies, confusion and extended source structure may be a problem). The PI must leave gaps in the schedule and also should request single dish flux density measurements via email/comments in the schedule.

Flux densities from Westerbork local interferometry can also be provided, and no special scheduling is needed. PIs should send a request to Foley for these data.

The Mark 5B system is available now. The software is expected to be operational in the 2nd half of 2006. The deployment of Mark 5B is to be decided at the next TOG meeting. An evaluation of the system will be done at JIVE. The Mark 5B system is very interesting for the Mark 4 correlators as it has the potential to make correlation more robust by replacing the old so-called station units with newer and simpler hardware.

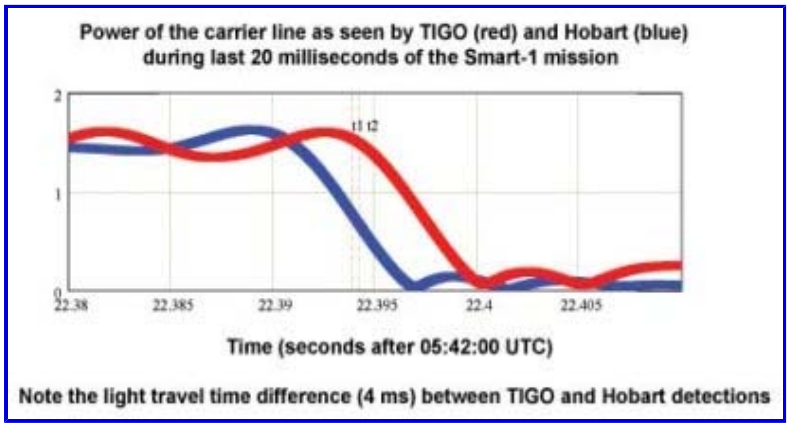
The increased throughput at the JIVE correlator and the growth of the EVNdisk pool have allowed more 1 Gbps observations to be scheduled. The Directors have agreed to purchase the necessary disk space to allow all continuum experiments to be recorded at 1 Gbps.

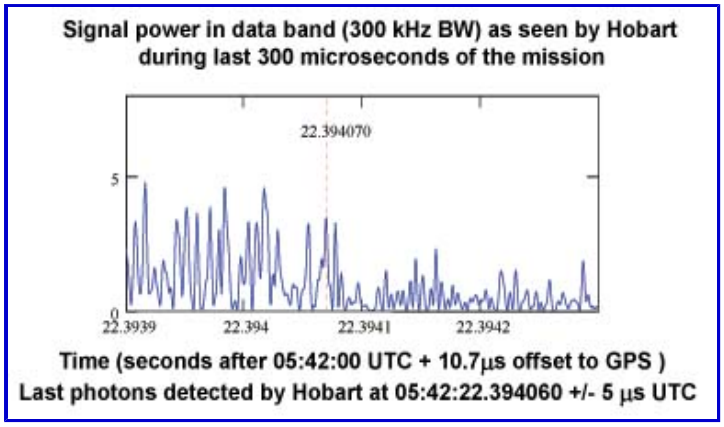
Walter Alef - MPIfR Bonn

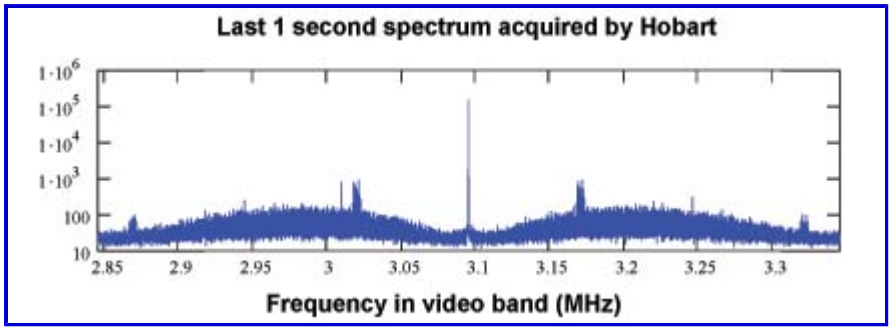
3. JIVE and EXPReS's observations of the SMART-1 impact

JIVE coordinated global radio observation of the SMART-1 final orbit and impact on 3 September 2006 with participation from five telescopes: Medicina (final pass over Europe only), TIGO, ROEN, Hobart and ATCA. Researchers were able to pinpoint the time of impact to 05:42:21:759 UT, with a signal last received by Hobart at 05:42:22.394 UT.

As a test of EXPReS, 10 seconds of data was sent from TIGO via REUNA (Chile), RedCLARA (South America), GÉANT2 (Europe) and SURFnet (Netherlands) with transfer rates of up to 8 Gbps.







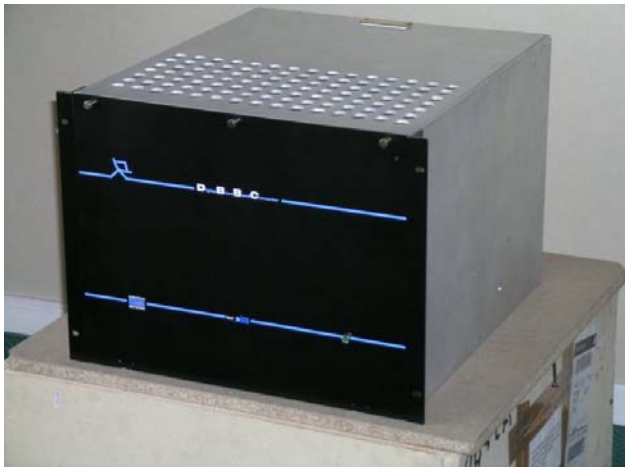
Observations of SMART-1's flight were conducted in May using Medicina, Metsahovi and Westerbork telescopes, and in July with Westerbork, to test the VLBI setup. These and the impact observation pave the way for future ground observation of Lunar and planetary missions such as China's upcoming Chang-E'1 Lunar orbiter, scheduled to launch in 2007.

Kristine Yun - JIVE

4. The DBBC backend started systematic tests under observing conditions

The first complete DBBC system has been presented at the 4th IVS General meeting in Concepcion (Chile) in January 2006. After his return back to Italy an intensive observing campaign to test the performance started with the baseline Noto - Medicina.

At present the DBBC is very similar to a standard MK4 or VLBA terminal, but much more compact with dimensions similar to a MK5 recorder. The standard version can accept 4 IFs each in a wide band up to 2.2 GHz and produce up to 64 channels (tracks equivalent) coming from up to 16 independently tuned L&U SSB bands with 2-bit output representation, for a maximum aggregate data rate of 2 Gbps on two VSI connectors. Some new configuration modes will be soon developed like the tuned bandwidth of 32 MHz with 64 MHz clock output. This mode, if adopted with 16 CoreBoards, will produce a maximum aggregate data rate of 4 Gbps on two VSI connectors. Multichannel configurations, with a reduced number of Core Boards processing elements, are also under development for future use.



All modes are in a testing phase and will be qualified in field tests during the coming months with the continuation of the observation program. Firmware upgrades, so as additional configurations for new modes will be available by means of an automatic exploder server, set to maintain the different units on the field up to date.

The DBBC is a completely programmable system so that its functionality can be modified with simple commands. New possibilities have been envisaged and will be developed in the near future. Some examples are: high resolution in time and frequency spectrometer, polarimeter, pre-processing RFI mitigation. Moreover making use of some of its part and a Metsahovi recording board, a new implementation of two digital receivers operating in L band are in development for Effelsberg and Noto.

A 'travel' version of the backend has been used in Evpatoria (Ukraine), for the test observation of this future EVN Station, and fringes have been found in the expected baselines of Evpatoria-Medicina and Evpatoria-Westerbork. In the upcoming months a similar observation will be realized in the other candidate EVN station, Irbene in Latvia.

Gino Tuccari - Istiituto di Radioastronomia/INAF Noto

5. VSOP-2 Project Status

The VSOP-2 project which was proposed last year was finaly approved at JAXA and then at the highest level governmental space

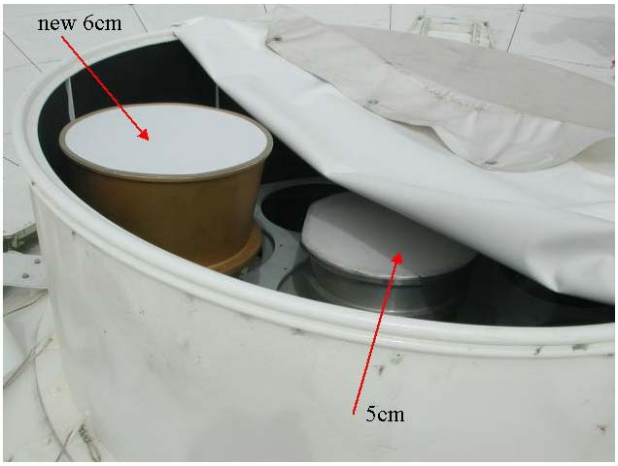
committee. VSOP-2 budget request starting
from April 2007 was submitted, and the the decision is expected to be given in the end of December 2006.

Current launch plan is February 2012, and until then the spacecraft will be called Astro-G with the project name VSOP-2. The 2006 fiscal year(started in April) is used for arrangements for the formal project start with phase-A budget. VSOP-2 is the first ISAS scientific space mission since JAXA was formed.

VSOP-2 European meeting was held at JIVE on June 15, and the next meeting in the spring of 2007 is being planned.

Hirax Hirabayashi - JAXA

6. A new 6cm Receiver in Medicina

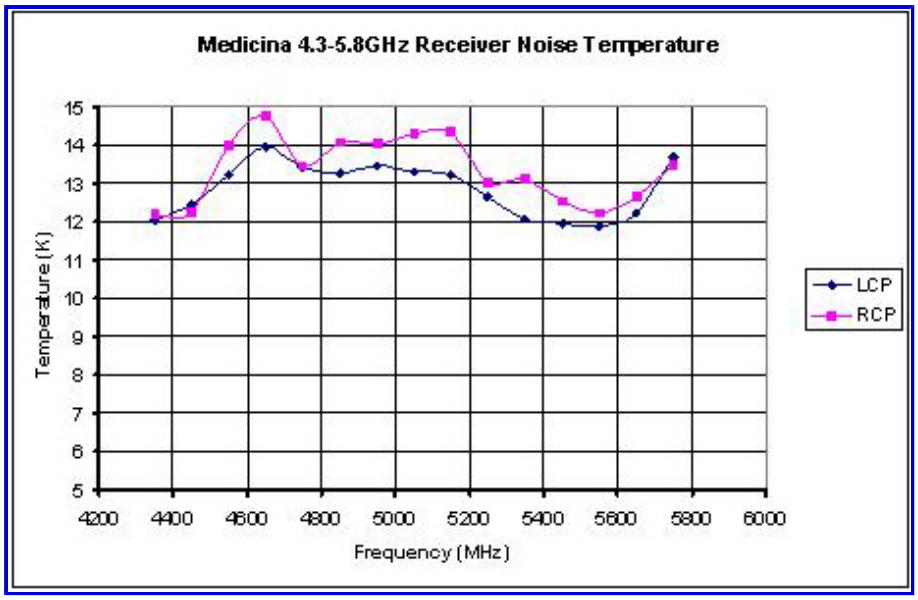


A new 6cm receiver has just been mounted on the VLBI parabolic antenna of the Medicina station, improving the sensitivity of almost a factor of two with respect to the old receiver..

It was designed in order to show very good performances in a large bandwidth and with the best performance in term of temperature noise and antenna gain (SEFD). It uses a dual flare corrugated horn, a circular waveguide irises polarizer and a square waveguide omt. The crosspolarization performance has been optimized in the central part of the band, the VLBI band.

A noise calibration injection is provided via a square waveguide directional coupler.

Both polarizer and omt are cryogenically cooled together with the LNAs.



In the following a brief summary of the performances and characteristics:
Mounting: cassegrain focus (Fig. 1 and 2)
Sky Band: 4.3-5.8GHz
Istantaneous band (IF): 100-500MHz or 100-900MHz, both tunable everywhere in the sky band
Output Channels: Left and Right Circular Polarization
Measured LNA Noise Temperature: 7-8K through band
Measured Receiver Noise Temperature (laboratory): 12-14K through band (Fig.3)
Measured Receiver System Noise Temperature (mounted on antenna): 27K at El=70.
-It comprises about 8K from sky (atmosphere contribution = 5K) and 5K due to spillover.
Measured Antenna Gain: 0.16K/Jy at 4.3-5.3GHz, 0.15K/Jy at 5.3-5.8GHz
Measured Crosspol level (on axis) < -33dB (<2% pollution) in the VLBI band
Measured Percentage of Pcal Amplitude: 4% Tsys

Alessandro Orfei - Istituto di Radioastronomia/INAF Bologna

7. First 10 Gbps installed at Metsäovi Radio Observatory

Metsäovi Radio Observatory in Kirkkonummi, Southern Finland, is the first Finnish research institute to have a network connection, whose bandwidth exceeds 1 Gbps. It is also the first radio observatory in the world connected at 10 Gbps.

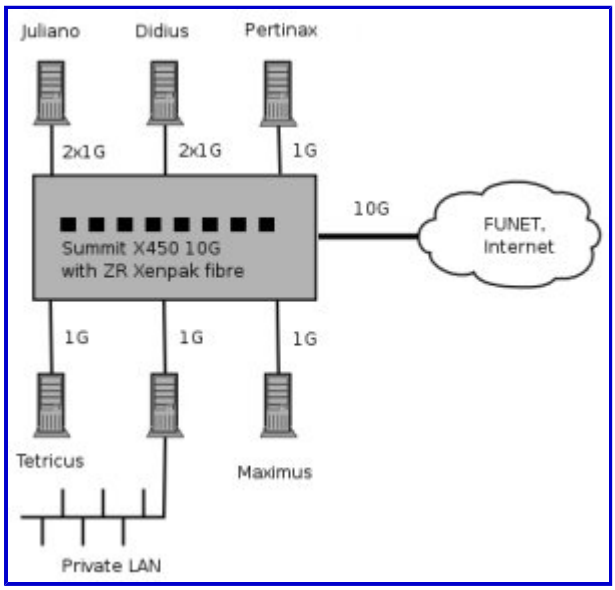
As the only observatory in Finland operating a radio telescope dedicated to radio astronomy, the MRO routinely performs a wide range of radio astronomical observations, such as long-term monitoring of active galactic nuclei, mapping and tracking of flares and active regions of the Sun, and global collaborative in VLBI observations.

Routine data rates in today's VLBI observations lie between 256 and 1,024 Mbps, with the trials already on their way at 2 and 4 Gbps. "The unsatiable need for

bandwidth makes VLBI one of the most
interesting and demanding precursory multi-Gbps Internet applications", says laboratory manager Ari Mujunen.

Dark fiber made this possible

Senior researcher scientist Jouko Ritakari explains, "We have longed for this connection for several years, but until now the cost was too high for a small laboratory that only has 20 employees. The telecom companies wanted to rent only connections that had their own active equipment."



The situation changed at the end of last year. We receive funding to rent a dark fiber connection to the Funet hub and the local telephone company was willing to provide it. Jouko Ritakari continues, "Originally we intended to have one or two 1 Gbps Ethernet connections. However, when we asked for tenders it became clear that we could have a 10 Gbps equipment for dark fiber at essentially the same price. So we could not refuse the chance to get 10 Gbps connection. Now we are in very good position to achieve new internationally interesting results in the field of eVLBI."

Installing and configuring the fiber connection

Installation of new 10 Gbps equipment went surprisingly smoothly, the equipment arrived at noon on 29.06.2006 and it was working four hours later. The actual layout of the network configuration is oriented to allow to use almost the full capacities of the 10 Gbps connection to the VLBI test-machines Five VSIB computers can make VLBI observations and transfer data up to 1 Gbps or even 2 Gbps rates. In addition, one tenth of the capacity is booked for the internal traffic generated by the users.

One of the first VLBI experiments transferred to JIVE for correlation was an experimental ESA Smart-1 lunar probe spacecraft position VLBI tracking observation. eVLBI transfers of joint observations of an Italian, a Dutch, and a Finnish radio telescope enabled quick and successful verification of a new software-based correlation processing technique developed at JIVE.

Guifré Molera Calvés, Ari Mujunen, Jouko Ritakari, Jan Wagner - Metsähovi Radio Observatory

8. EVN Scheduler's Report from the Last Observing Session

2006 Session 2: June 1 - June 19 Wavelengths: 30cm 18/20cm 5cm 6cm(+MERLIN)

This session proved difficult to schedule due to the restricted availability of the GBT, Arecibo, Jodrell_LT and the Effelsberg telescope (which was unavailable during daylight hours on work days from 12 June onwards). A further complication was the need to accomodate one highly-rated project requiring simultaneously the UHF receiver in

Effelsberg and L-Band receivers elsewhere, including GBT and Arecibo. However, in the end the session proved to be disk-limited, and only projects with ratings ~1.5 could be scheduled (all such eligible projects were).

Five of the 14 scheduled projects were global. Only one project was correlated at the VLBA correlator. All EVN observatories recorded using MK5A disks.

One "short observation" request was received on 20 April. (Such requests are for exploratory observations limited to 4h and minimal disk and telescope resources.) This was approved by the EVNPC Chair and it proved possible to accomodate this in a suitable gap in the main schedule.

A second Target of Opportunity proposal to observe RS Ophiuchi was submitted to the EVN on 26 April, requesting observing time either before (preferred) or within Session 2. Due to the willingness of observatories to accomodate this request it proved possible to schedule this at 9 stations on May 15/16, 2 weeks before the start of the session.

Richard Porcas - EVN Scheduler

The European VLBI Network (EVN) website (http://www.evlbi.org/) is hosted by the Joint Institute for VLBI in Europe (http://www.jive.nl/).