



# European VLBI Network Newsletter

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## Message from the Chairman of the EVN Board of Directors

Dear Colleagues in the European VLBI Network, Dear Users of the EVN,

First of all, I wish to express my great appreciation to Prof. J. Anton Zensus (MPIfR), who ended his tour of duty as the Chairman of the European VLBI Network's Consortium Board of Directors on 1<sup>st</sup> July 2015. During this period, we have seen the successful conclusion of the process of JIVE becoming a European Research Infrastructure Consortium (ERIC). We have also seen the inclusion of the Korean VLBI Network as an EVN Associate member. Three of the most important officers of the EVN (the PC Chair, the TOG Chair, and the Scheduler, all were rotated under Anton's chairmanship. And of course there was the introduction of novel observing facilities and modes, including joint observing with the Australian LBA, out-of-session observing opportunities, and the possibility to run automated e-VLBI triggered observations. All of these developments, and more, are indications of the vibrant state of the EVN. With John Conway, the new vice-chairman, and indispensably, with the participation of all of you, I look forward to building on that healthy state during my chairmanship.

The Call for Proposals for the 1<sup>st</sup> October 2015 deadline has already been circulated and describes in detail some of the new options available to EVN users. The EVN Programme Committee will review the new proposals in a meeting on November 11 in Dwingeloo, which will precede the EVN Consortium Board of

Directors Meeting on the 12<sup>th</sup> of November and the JIVE Council meeting on the 13<sup>th</sup> of November.

I also point your attention to the announcement in this newsletter that the next EVN Symposium will be hosted by the Institute of Applied Astronomy in St Petersburg in the week of September 19-23, 2016. Everyone: please reserve this week in your calendar for what will surely be another exciting Symposium!

*René Vermeulen,  
Chairman, EVN Consortium Board of Directors*

## Call for the EVN Proposals

European VLBI Network

Call for Proposals

Deadline 1st October 2015

This text is also available on the web at <http://www.oso.chalmers.se/evn/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 facility is open to all astronomers. Use of the Network by astronomers not specialised in the VLBI technique is encouraged.

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

### Future Standard EVN Observing Sessions (disk recording)

2016 Session 1 Feb 18 - Mar 10 18/21cm, 6cm ...

2016 Session 2 May 26 - Jun 16 18/21cm, 6cm ...

2016 Session 3 Oct 20 - Nov 10 18/21cm, 6cm ...

Proposals received by 1st October 2015 will be considered for scheduling in Session 1, 2016 or later. Finalisation of the planned observing wavelengths will depend on proposal pressure.

### Future e-VLBI Observing Sessions (real-time correlation)

2016 Jan 12 - Jan 13 (start at 13 UTC) 18/21cm, 6cm, 5cm or 1.3cm

2016 Feb 02 - Feb 03 (start at 13 UTC) 18/21cm, 6cm, 5cm or 1.3cm

2016 Mar 15 - Mar 16 (start at 13 UTC) 18/21cm, 6cm, 5cm or 1.3cm

2016 Apr 12 - Apr 13 (start at 13 UTC) 18/21cm, 6cm, 5cm or 1.3cm

Please consult the e-VLBI web page at [http://www.evlbi.org/evlbi/e-vlbi\\_status.html](http://www.evlbi.org/evlbi/e-vlbi_status.html) to check for possible updates, and for the available array.

Successful proposals with an e-VLBI component submitted by the October 1 deadline will be considered for scheduling in the above e-VLBI sessions starting from January 12 2016.

Note that only one wavelength will be run in each e-VLBI session, selected based on proposal priorities. See <http://www.jive.eu/jivewiki/doku.php?id=evn:guidelines> for details concerning the e-VLBI observation classes and observing modes.

### Features for the Next Standard EVN and e-VLBI Sessions

\* Recording at 2 Gbps is available at C-, X-, K- and Q-band at a subset of the EVN telescopes. The remaining telescopes will record at 1 Gbps (mixed mode observation). The current status is given here: [https://deki.mpifr-bonn.mpg.de/Working\\_Groups/EVN\\_TOG/2Gbps](https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/2Gbps)

Use of this data rate should be clearly justified and limited to projects which really need it.

\* A new e-VLBI class is available: "automated e-VLBI trigger" observations. It is an observation to be scheduled automatically during an e-VLBI run only if a specific set of triggering criteria is met. The expected response time to execute a new program may be as low as 10 minutes. For details see: [http://www.jive.nl/jivewiki/doku.php?id=evn:guidelines&-automated\\_e-vlbi\\_trigger\\_observations](http://www.jive.nl/jivewiki/doku.php?id=evn:guidelines&-automated_e-vlbi_trigger_observations)

\* The rules for the e-VLBI class "Triggered e-VLBI observations" have been modified in such a way that a triggered project can override the scheduled observing frequency for a given e-VLBI session. For details see: [http://www.jive.nl/jivewiki/doku.php?id=evn:guidelines&-triggered\\_e-vlbi\\_observations](http://www.jive.nl/jivewiki/doku.php?id=evn:guidelines&-triggered_e-vlbi_observations)

\* Please consult [http://www.evlbi.org/evlbi/e-vlbi\\_status.html](http://www.evlbi.org/evlbi/e-vlbi_status.html) and the EVN User Guide [http://www.evlbi.org/user\\_guide/user\\_guide.html](http://www.evlbi.org/user_guide/user_guide.html) for updates on the current EVN and e-VLBI array, availability of different stations per observing band and for the dates of the e-VLBI observing sessions.

#### Global VLBI Proposals

\* Global proposals can be proposed up to 2 Gbps including VLBA, GBT and the JVLA.

\* Some modes may require different bandwidth channels from EVN & NRAO telescopes; correlation at JIVE can handle this.

\* JIVE support staff and Amy Mioduszewski at Socorro will assist during the scheduling process of such observations.

\* Global observations will be correlated at the SFXC correlator at JIVE(default) or at the DiFX correlator in Bonn or at the DiFX correlator in Socorro (if appropriate justification is given in the proposal).

#### RadioAstron Observations

\* Proposals requesting the EVN as ground array support for RadioAstron AO3 observations in the period 18 February 2016 to 30 June 2016 may be submitted at this deadline.

#### Large EVN Projects

\* Most proposals request 12-48 hrs 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.

#### Availability of EVN Antennas

\* The Sardinia 64 m telescope (Sr) has completed its VLBI commissioning phase and will be available in "shared risk mode", at L-band, M-band (6.7 GHz) and K-band.

\* The WSRT will be participating with a single telescope, equipped with dual circular polarization receivers. The frequency coverage will remain the same. Pending characterization of the new receiver, Proposers who wish to use the EVN Calculator, should select "W1" instead of "Wb".

\* Tm65 is the 65 m telescope at Tianma, about 6 km away from the 25 m Seshan telescope (Sh). The 2-letter abbreviation for Tm65 telescope is T6. Both of these telescopes can observe at 18, 13, 6, 5, 3.6, and 3.6/13 cm. Tm65 can also observe at 21 cm. Tm65 is the default telescope; Sh will be used if the Tm65 is not available for some reason. If you select both, you should also discuss the motivation for the very short baseline in the proposal.

\* Both Jb1 and Jb2 will be available for EVN recording. At the moment, testing to incorporate the e-MERLIN stations as individual antennas within an EVN observation is ongoing. For updated information please consult the web at: <http://www.e-merlin.ac.uk/vlbi/>

#### Use of Korean VLBI Network Antennas

\* The Korean VLBI Network (KVN) is an Associate Member of the EVN. KVN telescopes may be requested for EVN observations at 1.3 cm and 7 mm wavelengths. For more details regarding the KVN, see: [http://kvn-web.kasi.re.kr/en/en\\_normal\\_info.php](http://kvn-web.kasi.re.kr/en/en_normal_info.php)

#### Use of Australian VLBI Network Antennas

\* Some Australian Long Baseline Array (LBA) time will be made available for simultaneous scheduling with the EVN, thus enabling the possibility of joint LBA/EVN observations. The easternmost stations of the EVN are in a similar longitude range to the LBA telescopes, and for sources in equatorial regions, baselines to western European stations are also achievable. Joint LBA time is likely to be heavily oversubscribed, and authors are requested to note whether they are prepared to accept scheduling without LBA antennas being present.

Any proposals for joint EVN+LBA observations submitted to the LBA by its 15 December 2015 deadline should also be submitted to the EVN by the 1 October 2015 deadline and will first be eligible for scheduling in EVN Session 1/2016.

For more details regarding proposing time on the LBA, see: <http://www.atnf.csiro.au/observers/apply/avail.html> & <http://www.atnf.csiro.au/vlbi/index.html>

EVN+LBA observations should be possible at all principal EVN wavebands from 21 cm to 1.3 cm.: See [http://www.evlbi.org/user\\_guide/freq\\_cov.html](http://www.evlbi.org/user_guide/freq_cov.html) and [http://www.evlbi.org/user\\_guide/EVNstatus.txt](http://www.evlbi.org/user_guide/EVNstatus.txt).

#### Out of Session Observing

\* Out-of-Session observing time (up to a maximum of 144 hours/year), is now available to all proposals (disk recording or e-VLBI). Proposals requesting Out-of-Session observing time must provide full scientific (and technical if appropriate) justification as to why observations must be made outside standard sessions. Out-of-Session observing blocks should be no less than 12 hours in duration (although individual observations can be shorter), and occur no more than 10 times per year. Proposals should specify which dates/GST ranges are being requested and indicate the minimum requirement in terms of numbers of telescopes (and any particular telescopes). Proposals will only be considered for dates occurring after the regular EVN session that follows EVN proposal review. Observations requiring much shorter lead times should be submitted as "Target-of-Opportunity" (ToO) proposals.

#### How to Submit

All EVN and Global proposals (except ToO proposals) must be submitted using the NorthStar on-line proposal submission tool. Global proposals will be forwarded to NRAO automatically and should not be submitted to NRAO separately.

New proposers should register at <http://proposal.jive.nl>.

The SCIENTIFIC JUSTIFICATION MUST BE LIMITED TO 2 PAGES in length. Up to 2 additional pages with diagrams may be included.

When specifying requested antennas from the LBA, please specify 'LBA' under the "other" row in the telescope-selection box - this selects all that are available for joint observations.

The deadline for submission is 23:59:59 UTC on 1st October 2015.

### Additional information

Further information on EVN, EVN+MERLIN, Global VLBI and e-VLBI observations, and guidelines for proposal submission are available at: <http://www.jive.eu/jivewiki/doku.php?id=evn:guidelines>

The EVN User Guide ([http://www.evlbi.org/user\\_guide/user\\_guide.html](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](http://www.evlbi.org/user_guide/EVNstatus.txt)

For the e-EVN array see [http://www.evlbi.org/evlbi/e-vlbi\\_status.html](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.

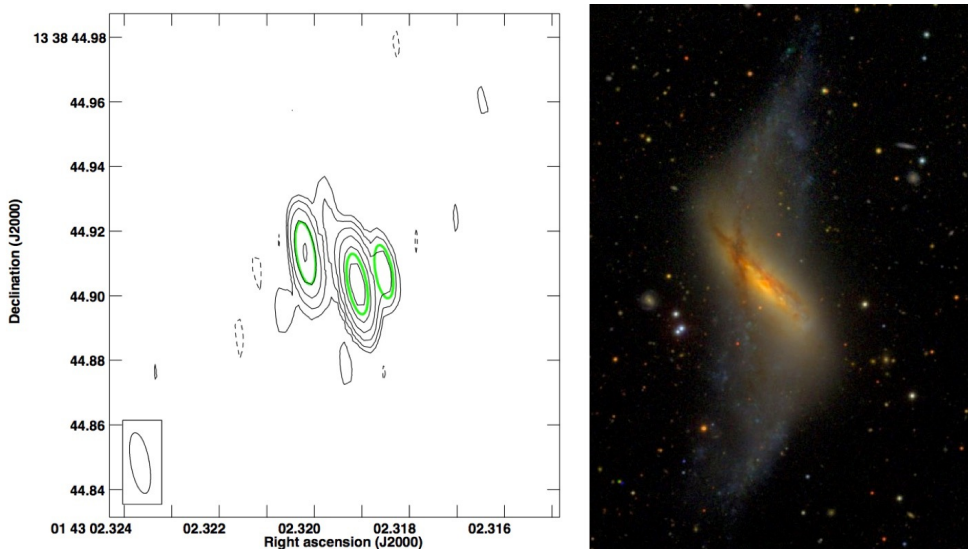
*Michael Lindqvist, Onsala Space Observatory, EVN PC Chairman*

## EVN Science Highlights

### A new period of activity in the core of NGC 660

A team, led by Megan Argo (Jodrell Bank Centre for Astrophysics), and Ilse van Bemmel (ASTRON/JIVE), has for the first time found evidence of the onset of a new phase of nuclear activity. The activity is associated with the central black hole in the polar ring galaxy NGC 660 (right image).

Indications that NGC660 increased significantly in radio brightness, found during an Arecibo survey in 2012, led Argo and van Bemmel to combine new observations from the Westerbork, e-MERLIN and EVN radio telescopes with archival results from ground- and space-based telescopes.



All evidence points to a new activity phase being triggered. The EVN data (left image) reveal a new, bright radio source at the location of the black hole with a typical core-jet structure associated with nuclear activity. The e-MERLIN observations show a spectral energy distribution typical for a very young active nucleus. Compared to observations from before 2010, the core of NGC 660 is several hundred times brighter, but the latest observations show that it is fading and may disappear over the next decade. The Westerbork

observations, used to study the kinematics of neutral hydrogen along the line of sight to the new radio source, indicated that there is cold gas close to the center, a potential reservoir of fuel for this new phase of nuclear activity.

Reference: *A new period of activity in the core of NGC 660*, M.K. Argo, I.M. van Bemmell, S.D. Connolly & R.J. Beswick, MNRAS, 452, 1081

## **EVN Technical Operations Group Report: Towards 2 Gbps operations and new recorders.**

The Technical Operations Group of the EVN, known as TOG, is composed of technical personnel from the stations and the correlator and they are in charge of VLBI observations at the EVN telescopes and the JIVE and Bonn correlators.

The last TOG meeting took place in the NASA's Deep Space Network Complex in Robledo de Chavela, Spain on June 26 2015. Minutes of the meeting can be found in: [http://www.oan.es/evn/minutes/tog\\_2015\\_1\\_minutes.pdf](http://www.oan.es/evn/minutes/tog_2015_1_minutes.pdf)

At the beginning of 2015, JIVE (on behalf of the EVN) and the firm NVI Incorporated signed an agreement under which the latter works on modifications in the Field System (FS) to implement some services in the DBBC: support to use 32 MHz bandwidth per channel in the DDC mode, support the operation of the Fila10G, and support for the Polyphase Filter Bank (PFB) mode. The ongoing work started in January 2015 and by the time of this newsletter several milestones have already been reached.

The DDC 32 MHz per channel mode was tested several times during the first months of 2015. HAT-Lab released three different firmware versions for the DBBC coded v105, v105E and v105F in January 2015. V105E allows to have 32 MHz per channel but it requires that the DBBC is equipped with 4 COREs and, if possible, with 4 IFs. After several successful tests this mode is available in the EVN and was advertised in the May 2015 call for proposals. 32 MHz per channel observations with 8 channels per polarization require 2 Gbps recording. This can be accomplished with Mark5B+ recorders and it is available in 12 EVN stations. Three stations will possibly upgrade their DBBCs in the future to support this mode. The list of stations with 2 Gbps capability can be found in the following link: [https://deki.mpifr-bonn.mpg.de/Working\\_Groups/EVN\\_TOG/2Gbps](https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/2Gbps). The Field System FS 9.11.7 is the latest stable version that provides the previous capabilities.

The second important milestone has been the Fila10G support. HAT-Lab also released a new version firmware, 3.3.1, in May 2015, which is supported by the Field System. This support was achieved after great teamwork between EVN personnel and Ed Himwich (NVI), which involved work in the DBBC Fila10G firmware, the jive5ab software, and the Field System. The Fila10G is a module that provides two 10 Gb/s outputs to the DBBC from 2 VSI inputs, or one high speed channel in the DBBC bus. The Fila10G provides the connectivity required to connect a Mark5C, a Mark6, a Flexbuff, or deliver 2 Gbps to the correlator through Internet. Two tests in May and September 2015, have been performed with successful results. FS 9.11.8 was used in these tests, and will be released as a stable version in the near future. The importance of the Fila10G support comes basically from two main facts:

- it provides VDIF format
- it allows to use Mark5C, Mark6 and Flexbuff recorders. In all cases jive5ab needs to be executed in these recorders.

The new steps to be covered in the next months are 2 Gbps e-VLBI observations and the usage of PFB mode. We will provide information about these developments in future newsletters.

As already mentioned, new recorder systems are appearing in the EVN stations. These new recorders can provide recording speeds higher than 2 Gbps, and prepare the way to observations with larger bandwidths. Currently Onsala, where a Flexbuff is being tested, and Effelsberg, where a Mark6 has been installed, lead this movement. The Fila10G support at the FS has opened an easy usage of these new recorders to the stations, and possibly other stations will follow in the future. It is also important to underline that these changes will push a wider adoption of the VDIF format.

The usage of Flexbuff recorders, at the stations, requires that the correlator also has a similar unit per station to store the observations from at least one or two EVN sessions. It is therefore strongly recommended that stations that will be equipped with Flexbuff recorders, purchase two units. Mark6 recorders can be used as Flexbuff units using jive5ab software and their four bays with four diskpacs, which provide plenty of space for storage. In both cases, Flexbuff and Mark6, stations can record an observation while transferring another observation to the correlator.

*Pablo de Vicente , Observatorio Astronómico Nacional, Yebes, Spain, EVN TOG Chairman*

## EVN Scheduler's Report

### 2015 Session 2: 28 May – 18 June

Wavelengths: 3.6, 0.7, 6, 18/21cm

Number of different user experiments observed: 29

Session Duration: 21.0 days                      Efficiency: 53.3%

Breakdown of observations by type and correlator. TBYTES indicates the estimated disk usage (in TB) at EVN telescopes.

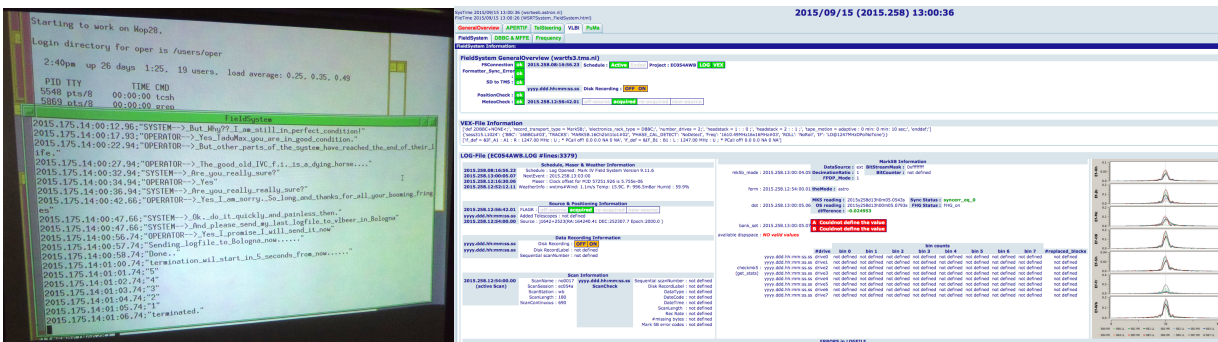
<b>May15</b>	<b>N-OBS</b>	<b>HOURS</b>	<b>DAYS</b>	<b>T-BYTES</b>
TOTAL	34	269.5	11.2	1542.8
EVN-only	21	202.5	8.4	1071.7
Global	8	54.0	2.3	427.6
Short Obs.	0	0.0	0.0	0.0
Tests	5	13.0	0.5	43.5
EVN Correlator	34	269.5	11.2	1542.8
Bonn Correlator	0	0.0	0.0	0.0
VLBA Correlator	0	0.0	0.0	0.0
eEVN Correlator	0	0.0	0.0	0.0
Other Correlator	0	0.0	0.0	0.0
CAL-only	4	16.0	0.7	0.0
MERLIN	0			
Arecibo	8			
VLBA	5			
GBT	0			
VLA	4			
Robledo	0			
Goldstone	0			
RadioAstron	0			
KVN	3			
Wettzell	3			

*Alastair Gunn, University of Manchester, EVN Scheduler*

## News from EVN Institutes First fringes with the single Westerbork telescope and the DBBC.

On June 24, 2015 a chapter in the history of the Westerbork Synthesis Radio Telescope closed, with the decommissioning of the Multi-Frequency Front End receiver systems and the associated backends. By coincidence, the last operational experiment of the array was the eVLBI session of June 23/24, 2015, exactly 45 years to the day that Queen Juliana opened the WSRT. While at the end of the experiment, the backends were ceremoniously switched off (figure below left), rollout of the APERTIF system to 12 of the WSRT telescopes started in earnest. The APERTIF system, which will introduce 121-element phased-array feeds (PAFs) and digital beamformers, with a digital correlator and Tied Array beamformer to match, will transform the WSRT to flexible wide-band survey instrument at L-band, with scientific operations starting in 2017.

Meanwhile the WSRT will participate in VLBI arrays with a single 25m telescope equipped with one of the current MFFE receivers that was modified for circular polarization or the existing 5cm receiver and a DBBC. Commissioning of this new system took place over the spring and summer of 2015 and the first operational observation was in the e-VLBI session on September 15/16 2015 (the figure on the right shows the first real time fringe plot of the new system). In addition, from 2017, WSRT plans again to offer tied-array capability at L-band, using the APERTIF receivers.



Antonios Polatidis, WSRT Observatory, ASTRON

## Recent and Upcoming Meetings

### YERAC 2015 in Latvia

The 45<sup>th</sup> Young European Radio Astronomers Conference (YERAC) was hosted by the Ventspils International Radio Astronomy Centre (VIRAC), in Latvia on August 19-21. This was an important event for the Ventspils International Radio Astronomy Centre (VIRAC), which celebrated 20 years of existence in 2014.





Thirty five master and doctoral students in radio astronomy as well as early stage postdocs (shown in the photo above along with the hosts) presented their research in an informal but stimulating atmosphere. The meeting was crowned with the inauguration ceremony at Irbene of the newly refurbished RT16 and RT32 telescopes operated by VIRAC.

*A. Polatidis, EVN Secretary*

## SKA VLBI Working Group

There is a strong interest to do VLBI observations with SKA1-MID, and possibly with SKA1-LOW. The possible technical realisation and some of the science drivers were presented in the SKA-VLBI Chapter of the revised SKA science case (online in Proceedings of Science: <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=215>). In fact VLBI was mentioned in several other chapters.

Due to the concerted efforts of our community, and especially the “VLBI Focus Group”, the SKA Organization has decided to formally initiate a SKA VLBI Working Group that kicked off during the summer of 2015. The co-chairs are Cormac Reynolds (ICRAR, Australia) and Zsolt Paragi (JIVE, Netherlands). Our role is to make sure that SKA is technically and operationally ready for VLBI observations. At the same time, we are very much science driven.

Some of the SKA-VLBI core and associate members had the first face-to-face meeting at the first SKA Key Science Workshop from 24-27 August in Stockholm, Sweden. The goal of this workshop was to discuss how KSPs should be organized, and to develop ideas for Key Science Projects. The slides for the presentations can be found at: <https://indico.skatelescope.org/event/342/page/4>

We plan to organize a more focused workshop for the VLBI community at a later time.

The SKA VLBI WG members were originally selected by self-nomination. The core members keep regular contact with the SKA Office to improve the various design documents. They inform the associate members and the broader VLBI community as well. The co-chairs and the core members will rotate-off after about two years, allowing new members to join the group.

*Zsolt Paragi & Cormac Reynolds*

## 19-23 September 2016: The 13<sup>th</sup> European VLBI Network Symposium

The XIII European VLBI Network (EVN) Symposium will be hosted by the Institute of Applied Astronomy of the Russian Academy of Sciences (IAA RAS) in St. Petersburg, Russia, **in the week of September 19-23, 2016**. The programme will also include the EVN User’s meeting. This 2016 event promises to be a memorable extension of the successful series of EVN Symposia. Further details on attending and participating in the science programme and adjoining events will become available in the next EVN Newsletter. But already, everyone interested in EVN should surely block that week in their agenda.

*Antonios Polatidis, EVN Secretary*