
European VLBI Network
Call for Proposals
Deadline: 1 February 2019

Observing proposals are invited for the European VLBI Network (EVN). The EVN is a very long baseline interferometry (VLBI) network of radio telescopes located primarily in Europe and Asia, with additional antennas in South Africa and Puerto Rico, operated by an international consortium of institutes. It provides very high angular resolution and high sensitivity images in the radio domain, to probe (sub-)milliarcseconds angular scales.

EVN observations may be conducted with disk recording (standard) or in real-time (e-VLBI). Standard EVN observations are available on wavelengths of 92, 18/21, 13, 6, 5, 3.6, 1.3 and 0.7 cm, with a subset of antennas offering a wider range. e-VLBI observes at 18/21, 6, 5, and 1.3 cm.

The EVN facility is open to all astronomers. We particularly encourage astronomers with limited or no VLBI experience to apply for observing time. EVN User Support on proposal preparation, scheduling, correlation, data reduction and analysis can be requested at the Joint institute for VLBI ERIC (JIVE).

Proposals can be submitted for the following main classes of observations:

- **Standard EVN observing sessions** including Global observations
- **e-VLBI observing sessions**
- **Out-of-Session observations**
- **Target of Opportunity (ToO)**
- **Short observations**

The first 3 classes have deadlines at 1 February, 1 June or 1 October each year, while proposals for ToO and Short observations can be submitted any time. More information regarding the EVN capabilities, the observing sessions, the proposal guidelines, and user support can be found on <http://www.evlbi.org>.

Proposal guidelines

Standard EVN, e-VLBI and Out-of-Session proposals should be submitted through the [Northstar submission tool](#).

Proposals must include a Science & Technical justification, and optionally, figures, tables and references. These sections shall be submitted as a single PDF document. The total length of this document is limited to 4 pages (A4 or US Letter format), with a font size no

smaller than 11 points. Proposers are free to adjust the length of the various proposal sections within this overall length limit.

The strongly recommended breakdown is 2 pages for the Science & Technical justification and 2 pages for figures, tables and references. Figures and tables may be interleaved with the science justification, so that e.g. figures appear close to the location in the text where references are made to them.

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.

Guidelines for ToO and Short observations proposals can be found here:

<http://www.jive.eu/jivewiki/doku.php?id=evn:guidelines> or the Operational modes section on <http://www.evlbi.org/capabilities>.

Questions regarding the proposal preparation can be sent to Zsolt Paragi zparagi@jive.eu. In case you need assistance, please indicate that well in advance of the deadline.

Large EVN Projects

Most EVN/Global proposals request 12-48 hrs observing time. The EVN Programme Committee (PC) also encourages larger proposals (>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. There is in principle no upper limit to the size of an EVN large proposal that can be proposed and projects of more than one hundred hours have been granted. Large proposals can also be proposed as Globals (although note the different levels availability of VLBA, versus VLA and GBT, see 'Global VLBI proposals' below). Large projects involving several observing epochs will be asked for progress reports by the PC.

Upcoming standard EVN observing sessions (disk recording)

2019 Session 2 May 23 - Jun 13 18/21 cm, 6 cm ...

2019 Session 3 Oct 17 - Nov 07 18/21 cm, 6 cm ...

2020 Session 1 Feb 20 - Mar 12 18/21 cm, 6 cm ...

Proposals received by 1 February 2019 will be considered for scheduling in Session 2, 2019 or later. Finalisation of the planned observing wavelengths will depend on proposal pressure and grade.

Upcoming e-VLBI Observing Sessions (real-time correlation)

2019 Apr 16 13:00 UTC - Apr 17 13:00 UTC 18/21 cm, 6 cm, 5 cm, 1.3 cm

2019 May 14 13:00 UTC - May 15 13:00 UTC 18/21 cm, 6 cm, 5 cm, 1.3 cm
2019 Jun 18 13:00 UTC - Jun 19 13:00 UTC 18/21 cm, 6 cm, 5 cm, 1.3 cm
2019 Sep 17 13:00 UTC - Sep 18 13:00 UTC 18/21 cm, 6 cm, 5 cm, 1.3 cm

Successful proposals with an e-VLBI component submitted by the February 1 deadline will be considered for scheduling in the above e-VLBI sessions starting from 16 April 2019. Note that only one wavelength will be run in each e-VLBI session, based on the proposal priorities.

e-VLBI sessions are intended for rapid response science or science with temporal constraints (transients, astrometry). The request for e-VLBI should be clearly justified in the proposal. Please consult the [e-VLBI website](http://www.evlbi.org) or the Operational modes section on <http://www.evlbi.org/capabilities> to check for possible updates, and for the available array.

Out-of-Session Observing

Out-of-Session observing time on user specified dates (up to a maximum of 144 hours/year), is available for both disk recording and e-VLBI modes. 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 will be scheduled in blocks of no less than 12 hours in duration (although proposals may request shorter observations), 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.

Urgent observations requiring much shorter lead times should be submitted as "Target-of-Opportunity" (ToO) proposals.

Recording capabilities for the next Standard EVN and e-VLBI Sessions

Disk recording at 2 Gbps is available at 6 cm, 3.6 cm, 1.3 cm and 0.7 cm at a subset of the EVN telescopes. The remaining telescopes will record at 1 Gbps or highest possible bit-rate (mixed mode observation). The current status is given here:

https://deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/2Gbps

e-VLBI at 2 Gbps is available at 6 cm and 1.3 cm at a subset of the EVN telescopes. The remaining telescopes will observe at 1 Gbps or highest possible bit-rate (mixed mode observation). The current status is given here: http://old.evlbi.org/evlbi/e-vlbi_status.html

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

Global VLBI Proposals

Global VLBI proposals can be proposed up to 2 Gbps including VLBA, GBT and the JVLA. Global proposals will be forwarded to NRAO automatically and should not be submitted to NRAO separately. Given the constraints in the availability, particularly of the large aperture telescopes in the US, proposers are asked to clearly justify the need for and illustrate the plan of use for these antennae.

The **Green Bank Telescope**, has transitioned into a new partnership arrangement, the Green Bank Observatory (GBO). Time available for global VLBI on the GBT is small (VLBI typically accounts for 10% of Open Skies observing at the GBT), and only the most highly rated proposals across all GBT observation types will be awarded time. Additionally, proposers should be aware that long scheduling blocks (more than 6 hours) will be very difficult to schedule owing to constraints coming from non-NSF GBO partners. Proposers are encouraged to make clear in the technical justification section any constraints about how observing time could be broken into smaller pieces without adversely affecting the proposed science; include information as relevant regarding maximum elapsed time of a split schedule and minimum scheduling block lengths.

Observations using the GBT 6 cm receiver must be taken, correlated, and calibrated in full Stokes mode. Due to the large cross talk between polarisations, only total intensity (Stokes I) data will be usable.

The **Very Long Baseline Array** (VLBA) has no limit to hours spent performing global VLBI. Use of VLBA for Open Skies observing is guided by the scientific merit of the proposal.

The **Karl G. Jansky Very Large Array** (VLA) follows the same model as VLBA in that there are no restrictions on total hours of joint observing time but telescope time access is quite competitive so a good justification is required.

Some modes may require different bandwidth channels at different telescopes; correlation at JIVE can handle this. JIVE support staff will work with Socorro to assist you 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 or correlation at JIVE for **RadioAstron** A06 (till June 2019) and A07 (July 2019 till June 2020 inclusive) observations may be submitted at this deadline. The RadioAstron A07 proposal submission deadline is January 21 2019. For more information see <http://www.asc.rssi.ru/radioastron/>.

Availability of EVN Antennas

The **Sardinia Radio Telescope** (SRT) is again available for VLBI and e-VLBI operations at wavelengths of 21, 18, 5, and 1.3 cm.

The **Arecibo Observatory** is again available for VLBI observations. However, severe flooding following Hurricane Maria, has caused a deformation of a localised area of the dish affecting its exact sphericity. This has resulted in a drop of Arecibo's high-frequency gain that can be quantified at 18cm as an SEFD of ~3.1-3.5 Jy (cf. an SEFD of ~2.2-2.5 Jy normally expected for zenith angles less than 16 deg) and at 6 cm as an SEFD of ~7.3 Jy (cf. an expected SEFD of ~3.5 Jy between zenith angles 3 and 15 deg). The dish deformation has been surveyed, and the readjustment to return the surface to be truly spherical is expected to be realised in 2019.

The **Tianma 65m telescope** (Tm65), 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, 1.3 and 0.7 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.

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://radio.kasi.re.kr/kvn/main_kvn.php

The **Kunming 40 m telescope**, an affiliated EVN station situated on Phoenix Mountain, about 10 km east of the city of Kunming, China, may be requested (and will participate on a best efforts basis) for EVN disk-recording observations at 13, 6, 5 and 3.6 cm wavelengths.

Integration of e-MERLIN Telescopes into the EVN

Integrated **e-MERLIN + EVN** observations, initially on a shared risk basis, are available following commissioning work at Jodrell Bank. This additional capability provides short-spacing coverage between 11 and 220 km within e-MERLIN together with intermediate and long baselines between e-MERLIN and EVN antennas.

PIs can request multiple e-MERLIN outstation antennas (all, or a subset of Pi, Da, Kn, De, Cm) in addition to an EVN homestation antenna at JBO (Jb1 or Jb2). Such proposals should clearly indicate that they are e-MERLIN+EVN observing requests and provide clear scientific/technical justification for the inclusion of e-MERLIN telescopes, including why e-MERLIN outstation antennas are required for the science goal delivery. In addition to EVN PC approval, these requests will be forwarded by the EVN to the e-MERLIN TAG for approval of the specific e-MERLIN contribution. For approved projects e-MERLIN outstation data will then be available for full correlation with other EVN antennas. EVN proposals requesting only Jb1 or Jb2 are still considered as standard EVN proposals and will only require approval by the EVN PC. Full bandwidth e-MERLIN observations will require a separate linked e-MERLIN proposal which should be submitted by the PI to e-MERLIN. For more information see: <http://www.e-merlin.ac.uk/>

For e-MERLIN outstations correlated within the EVN, the maximum bitrate available for each outstation correlation at JIVE (both disk and e-VLBI) is 512Mbps – equivalent to 2 polarizations at 64 MHz bandwidth. Thus the PI may request up to 5 outstation telescopes in dual polarization mode with a bandwidth of 64 MHz per polarization in addition to the e-MERLIN homestation antenna at up to 1Gbps (2 polarizations at 128 MHz bandwidth).

For further enquiries regarding e-MERLIN + EVN observations please see the e-MERLIN Contact Web page: <http://www.e-merlin.ac.uk/contact.html> or alternatively email to vlbi@jb.man.ac.uk

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 for a brief period of time. 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. EVN+LBA observations should be possible at all principal EVN wavebands from 21 cm to 1.3 cm

Any proposals for joint EVN+LBA observations submitted to the EVN by its 1 February 2019 deadline should also be submitted to the LBA by their (provisional) 15 May 2019 deadline and will first be eligible for scheduling in EVN Session 3/2019. For more details regarding proposing time on the LBA, see:

<http://www.atnf.csiro.au/observers/apply/avail.html>

Joint observations with other facilities

For joint observations with other facilities, e.g., EVN+XMM, separate proposals should be submitted to the EVN and to the other facility. Such proposals will be considered by the EVN PC on a case-by-case basis.

EVN Travel support through the Transnational Access Programme

Travel support to the EVN is supported, for eligible projects, by the Transnational Access programme of the RadioNet project, funded by the EC Horizon 2020 Research and Innovation Programme under grant agreement No 730562. This transnational access support, includes also travel reimbursement for visits to JIVE in order to analyse and process EVN, EVN-MERLIN or global VLBI Data. Further information can be found at:

<http://www.evlbi.org/travel-support>

Additional information

The EVN Archive, containing raw data, pipeline calibrated uvfits data and fits files, can be queried at <http://archive.jive.nl/scripts/avo/fitsfinder.php>.

A selection of recent science highlights is presented here:

http://www.jive.eu/jivewiki/doku.php?id=evn:evn_science

or in the recent [EVN newsletter](#).

A selection of recent refereed EVN publications is presented here:

http://www.jive.eu/jivewiki/doku.php?id=evn:evn_publications