



## Express Production Real-time e-VLBI Service

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# Monthly Report- June 2009

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### Section 1- Introduction

This month's update is organized a bit differently. Instead of focusing on each of the project activities (NA1234, SA12, JRA1), the report will outline and describe the 8th International e-VLBI Workshop. The entire project has been involved in the preparation for this meeting. The workshop served as the end of project meeting for EXPReS, highlighting EXPReS contributions to the field as well as providing an opportunity to invite related and interesting work to be juxtaposed.

### Section 2.1- The 8th International e-VLBI Workshop

The International e-VLBI workshop series is an annual even which gathers VLBI researchers and users from around the world. The timing for the meeting in Madrid coincided with the close of the EXPReS project. As EXPReS has contributed greatly to the overall, global e-VLBI effort, we felt that it would be appropriate for EXPReS to help organize and host a meeting that not only highlighted astronomical efforts, but the infrastructure accomplishments as well. The meeting's motivation and and conference description statements highlight these desires.

The meeting itself was split into two sections, science (astronomy/astrometry) and technical (infrastructure, hardware, engineering) parts. One of the reasons was to allow "pure" astronomers to participate in the meeting without having to sit through technical talks of which they had no interest. The other reason was so that the meeting could be limited to a single track (no parallel sessions). This allows all participants to be able to see all of the talks. The limitations of this specific format were deemed minor compared to the shared knowledge aspect.

Over the history of workshops, this meeting is definitely the longest in terms of duration. There were more speakers, a broader range of talks and an increased understanding that e-VLBI is no longer a small technique. The meeting was also the largest to date, about 85 people per day. We believe this also shows that e-VLBI as a technique is proving interesting to individuals and organizations.





Figure: Two Group Photograph from the e-VLBI Workshop. Top from Madrid, bottom from Yebees.

## Section 2.2- Logistics, Organization and Related

As mentioned, organizing the meeting involved a great deal of time and effort from the project. The earliest plans started a year previous after the 7th Workshop concluded in Shanghai. Our partners CNIG-IGN in Madrid offered to host the next workshop and formed their Local Organizing Committee (LOC). Support from the project office began about 6 months ago and the load increased significantly in the final few months. Organization brought surprises including the implications of the summer temperature in Madrid

which required locals to explain the need for tents to the Netherlands based project office. CNIG-IGN graciously hosted the website and the project office also took care of most of the registration details.

The Scientific organizing committee (SOC) was led by John Conway and Ralph Spencer. The two first gathered members for the full SOC by invitation and then began the collaborative process of creating a basic schedule, inviting speakers and then finalizing the talks. This process produced a full week of talks and a rich mix from the spectrum of astronomy and technical aspects of e-VLBI (see program below for more details).

The Project Manager was not able to attend the meeting for personal reasons. This provided an opportunity to test video conferencing as a way to participate in the meeting remotely. The month leading up to the meeting included several tests of hardware (cameras), software (vidconf systems) and the network. In the end, Evo was the chosen system (<http://evo.caltech.edu/>) due to its ability to traverse firewalls, dynamically adjust bandwidth usage and flexibility in supported platforms (both host operating system as well as supported video devices). Overall, Evo worked quite well. A screenshot of one of the talks is shown below.



Figure: Tasso Tzioumis presenting in Yebes, Spain during the 8th e-VLBI Workshop (Charles Yun participates from his home in the Netherlands)

### **Section 2.3- Scientific and Technical Program**

The following is the program for the entire workshop. As you can see, the first half of the workshop is focused on "scientific" talks, astronomy talks that show how EXPReS (and similar e-infrastructure leveraging research) has improved the type of research that is possible. Wednesday's session was held at Yebes Observatory, north of Madrid. Yebes was a recipient of EXPReS support to connect the on-site telescope with dedicated fiber. The final days focused on the technology and infrastructure that supports the astronomy. A copy of the full program is attached at the end of this document.

### **Section 2.4- Output from the meeting**

The workshop provided an opportunity for individuals to gather and talk, and a set of persistent products will be created from the meeting: presentations and proceedings.

The project website will also host copies of all of the presentations slides that were provided to the organizers. These slides come from a variety of sources, but an effort will be made to at least provide PDF versions of the slides as a common, neutral format.

NA2/EVN-NREN also held their meeting in during the workshop. The meetings benefitted from the participation of the entire astronomy community. Their participation should also be captured in the proceedings (see below).

NA3/eVSAG will not provide a deliverable aside from the fact that the meeting itself was their core deliverable for the period. Their participation and activities should be obvious from the direct and indirect documents prepared.

Each of the speakers and posters have been encouraged to provide a paper for the proceedings. In addition, several individuals who were not able to participate in person inquired if they could submit a paper for the proceedings. The proceedings are being published via Proceedings of Science (PoS) <<http://pos.sissa.it/>>. The contents will be available online for no charge. We are planning to produce a limited number of hard copies of the proceedings, primarily for internal archiving.

### **Section 3- Other Highlights from the Meeting**

One of the benefits of having people physically in the same space is that certain types of discussions are easier to conclude. For several years, the community has worked on and evolved what became VDIF, the VLBI Data Interface Specification (VDIF). At the meeting, the standard was ratified, which should greatly facilitate the exchange of VLBI data between observatories and correlators.

Another topic of hallway discussion was what would happen after EXPReS. Huib Jan van Langevelde in his position as coordinator explained that the next FP7 call would soon be published and that the project office would be communicating their interpretation of the possibilities. We also encouraged the existing project members to read the call and determine if there were other ideas that might fit into the upcoming call.

### **Section 4 – Assorted project related matters**

Ongoing problems with e-MERLIN network causing problems with EXPReS deliverables.

The project office received a note officially indicating that a few deliverables are in jeopardy due to problems out of the project's control. Specifically, Ralph Spencer of Manchester indicated that the following three deliverables are unlikely to be completed:



D	Lead	A AD#	Description
45	JBO	SA 1.09	Tests using local Jodrell Bank home e-MERLIN telescope
52	JBO	SA 1.14	Test using remote e-MERLIN telescope
85	JBO	SA 1.19	Multiple e-MERLIN telescope tests

Spencer writes in an email on 10 June 2009:

...We have done a number of eVLBI tests with multiple telescopes - latest at 1024 Mbps for the local telescope, though using the analogue MERLIN links and restricted bandwidth on the remote telescopes - so we have formally delivered.

BUT I doubt very much that we get e-MERLIN wide band data through the correlator before the end of the project on Aug 31st, as we can't yet reliably get eMERLIN data in let alone out again at the moment...

The issue is that the e-MERLIN correlator is suffering from delays, so the actual tests can not be completed. Everything up to the actual correlation has been shown to function properly, but use of the e-MERLIN system can not be completed until their correlator is done. Work on the e-MERLIN correlator is not in the control of the EXPReS project. Additionally, aside from the formal need of these deliverables, an incomplete e-MERLIN correlator does not hinder the core activity or success of EXPReS.

Prior to this stage, members of the community at large expected the correlator to be completed. While we understood that the delivery had been delayed earlier in the project, we did not expect that it would be so late that it would fall outside of the 6 month extension period; we were advised that the work would be done inside of the original project timeframe.

At this point, we feel the appropriate response is to report on each deliverables listed above as completely as possible; up to the point where the correlator is needed. And then show that no additional work can be done. A short explanation of what should occur with a functioning e-MERLIN correlator will be delivered.

Lastly, From the NA4/Outreach, ICT Results article published an article about EXPReS titled "Network creates virtual super-telescope." You can read the article at:

<http://cordis.europa.eu/ictresults/index.cfm?section=news&tpl=article&BrowsingType=Features&ID=90635>

Figure: Updated Communication Interface diagram

## Appendix- Full Program of the e-VLBI Workshop in Madrid, Spain

### Monday June 22nd 2009

- 0900 – 0905 Welcome – Jesús Gómez-González (IGN Deputy Director)
- 0905 – 0910 Welcome by the EXPReS Project Coordinator – Huib J. van Langevelde
- SESSION 1 - INTRODUCTORY TALKS – Jesús Gómez González (IGN)*
- 0910 – 0950 Setting the scene; the scientific applications of eVLBI (invited) - John Conway (Onsala Space Observatory)
- 0950 – 1030 LOFAR project Status (invited) - Michael Garrett (ASTRON)



*SESSION 2 - TRANSIENTS I - James Miller-Jones (NRAO)*

- 1030 – 1110 Novae and CV's (invited) - Tim O'Brien (Manchester Univ)  
1110 – 1130 Coffee break  
1130 – 1210 Probing Gamma-Ray Burst and Supernova Explosions with Radio Observations (invited)  
Alexander van der Horst (NASA/MSFC/ORAU)  
1210 – 1250 Type II supernovae and starbursts (invited) - Miguel Pérez-Torres (IAA)  
1250 – 1320 A new radio supernova in M82 - Andreas Brunthaler (MPIfR, Bonn)  
1320 – 1500 Lunch  
1500 – 1540 Multi-wavelength observations of High Energy Transients (invited) - Julie McEnery (GSFC-NASA)

*SESSION 3 - NON-TRANSIENT EVLBI OBSERVATIONS - Chris Phillips (CSIRO/ATNF)*

- 1540 – 1610 A suspected dark lens revealed with the e-EVN - Zsolt Paragi (JIVE)  
1610 – 1640 Is an AGN at the center of the disk galaxy IC 2497 responsible for Hanny's Voorwerp? - Hayden Rampadarath (JIVE/Leiden)  
1640 – 1710 Coffee break  
1710 – 1740 e-VLBI observations of the ULX at M33 - Alfonso Trejo (UNAM)  
1740 – 1830 Spectral line applications using eVLBI (invited) - Andreas Brunthaler (MPIfR Bonn)  
1830 – 2030 eVSAG meeting (closed for members only)  
09:00:00 PM eVSAG members may join for dinner at Restaurant "La Gloria"

**Tuesday June 23rd 2009**

*SESSION 4 - GEODESY AND ASTROMETRY - Huib van Langevelde (JIVE)*

- 0920 – 1000 e-VLBI for geosciences (invited) - Rüdiger Haas (Onsala Space Observatory)  
1000 – 1030 Multi-view e-VLBI - Maria Rioja, (UWA Australia)

*SESSION 5 - TRANSIENTS II - Zsolt Paragi (JIVE)*

- 1030 – 1110 Active Stars and Brown Dwarfs' (invited) - Greg Hallinan (Galway U. Ireland)  
1110 – 1140 Coffee break  
1140 – 1220 Microquasars & eVLBI: Made for each other? (invited) - Vivek Dhawan (NRAO)  
1220 – 1300 The proper motion and changing jet morphology of Cygnus X-3 - James Miller-Jones (NRAO)  
1300 – 1320 Correlated radio/X-ray behaviour of Cyg X-3 – Valeriu Tudose (ASTRON)  
1320 – 1450 Lunch + Compulsory visit to OAM (Historic site and Herschel telescope)

*TRANSIENTS II (cont) - Alexander van der Horst (NASA/MSFC/ORAU)*

- 1450 – 1520 Variations within the compact jet from the black hole candidate GRS 1915+105 - Anthony Rushton (JBCA/Manchester)  
1520 – 1600 Pulsars, eVLBI and LEAP (invited) - Ben Stappers (JBCA/Manchester)  
1600 – 1630 Coffee break  
1630 – 1710 Monitoring the variable radio sky with LOFAR (invited) - Rob Fender (Southampton U)  
1710 – 1750 Standards and systems for transient response (invited) - John Swinbank (Amsterdam U)  
1750 – 1900 Panel discussion - Future organisation/multiwavelength coordination to maximise science impact of eVLBI



09:00:00 PM Conference dinner at Restaurant “El Cenador del Prado”

### Wednesday June 24th 2009

All sessions at Yebes Observatory

830 Bus leave from hotel Agumar

0830 – 0945 Drive to Yebes

#### *SESSION 6 - Joint Science/technical session - regional and instrument reports*

Part I Chair: John Conway (Onsala Space Observatory)

1000 – 1030 eEVN progress (invited) - Szomoru (JIVE)

1030 – 1100 e-VLBI Activities in Japan (invited) – Mamoru Sekido (Kashima)

1100 – 1130 Coffee break

1130 – 1200 e-VLBI progress in Australia (invited) - Tasso Tzioumis (ATNF, Australia)

1200 – 1230 Chinese VLBI Network and its application to eVLBI (invited) - Chen Zhong (CAS)

1230 – 1300 NRAO VLBA Upgrade Plans and Prospects (invited) - Vivek Dhawan (NRAO)

1300 – 1330 Current status of Korean VLBI Network and future plan for e-VLBI (invited) - Bong Won Sohn (KASSI)

1330 – 1430 Lunch

Part II Chair: Tasso Tzioumis (ATNF)

1430 – 1630 Visit to Yebes observatory.

1630 – 1700 Progress and status of eMERLIN (invited) - Ralph Spencer (JBCA/ Manchester U)

1700 – 1730 Future of eVLBI (invited) - Huib van Langevelde (JIVE)

1730 – 1800 Coffee break

-1800 Return to Madrid

### Thursday, June 25th 2009

#### *SESSION 7 - NREN MEETING (Chair: John Chevers - DANTE)*

0900 – 0935 Future prospects for GEANT (invited) - John Chevers (DANTE)

0935 – 1000 Connecting telescopes down under - the Australian Research and Education Network - Shaun Amy (CSIRO/ATNF)

1000 – 1025 The Network Infrastructure for radio astronomy in Italy - Mauro Nanni (INAF)

1025 – 1050 Regular e-transfer experiences for geodetic INTENSIVE experiments at Wettzell - Gerhard Kronschnabl (BKG-Wettzell)

1050 – 1120 Coffee

1120 – 1145 Experience gained in using 4 Gigabit Trans-European link from Onsala to Jodrell Bank - Richard Hughes-Jones (DANTE)

1145 – 1210 Discussion of Network Issues

#### *SESSION 8 - e-VLBI TECHNIQUES (Chair: Arpad Szomoru - JIVE)*

1210 – 1235 eVLBI Networking Tricks - Paul Boven (JIVE)

1235 – 1300 GPU - channelised eVLBI, a more efficient approach - Richard Dodson (UWA)

1300 – 1325 e-control - a new concept for remote control of VLBI telescopes and first experience at Wettzell -





Christian Plötz (BKG-Wetzell)

- 1325 - 1450 Lunch + Compulsory visit to OAM (Historic site and Herschel telescope)  
1450 – 1515 eVLBI developments on the LBA - Chris Phillips (CSIRO/ATNF)  
1515 – 1540 Connecting iBOBs to the eMERLIN correlator - Jonathan Hargreaves (JBO)  
1540 – 1605 European 4 Gbps VLBI and eVLBI – Guifré Molera (Metsähovi RO)  
1605 – 1640 Coffee break

*SESSION 9 - VDIF SESSION (Chair: Alan Whitney – MIT-Haystack RAO)*

- 1640 – 1710 Introduction VDIF and VTP (invited) - Alan Whitney (MIT-Haystack RAO)  
1710 – 1730 A proposal for defining the VLBI Application transport header - Richard Hughes-Jones (DANTE)  
1730 – 1830 Open discussion

**Friday June 26th 2009**

*SESSION 10 - SOFTWARE AND DISTRIBUTED CORRELATION (Chair: Richard Hughes-Jones - DANTE)*

- 0900 – 0925 Performance testing of the DiFX correlator - Chris Phillips (CSIRO/ATNF)  
0925 – 0950 eVLBI with the SFXC correlator - Mark Kettenis (JIVE)  
0950 – 1015 The latest tests of the SFXC correlator - Yuri Pidopryhora (JIVE)  
1015 – 1040 User interaction and workflow management in Grid enabled eVLBI experiments - Dominik Stocklosa (PSNC)  
1040 – 1110 Coffee break

*SESSION 11 - THE FUTURE OF NETWORKS AND VLBI SCIENCE (Chair: Ralph Spencer - JBCA/ Manchester U)*

- 1110 – 1145 Ja-Net prospects (invited) - David Salmon (JANET)  
1130 – 1205 Application Driven Petabit Optical Networking (invited) - Ivan Andonovic (Strathclyde U)  
1205 – 1240 Long Baselines in the Square Kilometre Array (invited) - Roshene McCool (SPDO)  
1240 – 1315 Advances in Optical Networking Technologies Transmission and Switching Techniques for Tb/s of Optical Data (invited) - J-P Hemingway (Ciena Ltd)  
1315 – 1330 Discussion and wrap up  
1330 Lunch and adjourn

