



Express Production Real-time e-VLBI Service

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Section 1.0- Introduction

This report for October is being generated later than normal due to travel by the project manager. Some of the travel was related to EXPRoS and is reported below.

There are now external (user facing) signs of progress, instead of internal milestones. It was encouraging to receive feedback from astronomers indicating that up upgrade to 512 Mbps was happily noted. It is also nice to having the general "technology and science public" begin notice e-VLBI. There is a very information log of e-VLBI news stories as caught by search engines and the number has been slowly, but steadily rising. A wider base of sites catch our activities than when the project began.

Section 2.1- NA1 - Management

MIT Disucssion

MIT Haystack Observatory was contracted to complete several pieces of work as reported previously. Haystack reported that they have made significant progress on all items, but would not be ready to deliver final products. Realizing that this was going to be the case, the project manager took a side trip to Haystack towards the end of October. At that time, he met with their director and several of the individuals executing the work to encourage the speedy completion of the activities. Since that time, Haystack has had several conference calls with EXPRoS members and there is a general sense of satisfaction and happiness with the expected completion estimates for end of the calendar year.

INGRID 2008 Committee

Charles Yun has been asked to participate in INGRID 2008 and act as a reviewer. The meeting is scheduled for April 2008. EXPRoS has previously sent speakers to INGRID and will plan to do so again for the upcoming meteing. Additional information about the meeting is available online at <<http://www.ingrid.cnit.it/>>.

EVN TOG, CBD

Paco Colomer's (leader of NA4) home institute will host the EVN CBD, TOG and JIVE Board meetings. The meeting is not directly associated with any core EXPRoS activities, but he has indicated that it is a good opportunity for individuals to speak face to face if they are interested.



EXPReS and the evolution of e-VLBI

The selected quote below comes from John Conway's (leader of NA3) regular announcement to the community. The note highlights the advancement of regular e-VLBI operations that can be attributed to work done through EXPReS. As noted, experiments are expected to be run in 512 Mbps mode and the quick turnaround that is the core of e-VLBI is being used for the 'double header' observation.

Proposals for EVN eVLBI observations on pre-scheduled dates in late 2007/early 2008 are invited for submission for the Oct 1st EVN deadline. New features and possibilities for eVLBI observing include the following.

- * Based on recent tests (see http://www.expres-eu.org/512Mbps_6tel.html) it is expected that a 512Mbit/s bit rate can be achieved.
- * A special 'double header' observation is scheduled for January 2008, with two eVLBI runs three days apart in which the schedule for the second run can be changed based on the results of the first run.
- * A new class of 'triggered' e-VLBI proposal is now defined in which a pre-approved project can be activated up to 24 hours before a scheduled eVLBI run based on a trigger criterion being met. In addition other 'standard' eVLBI proposals are no longer restricted to rapid response science.
- * Spectral line observations are now supported.

Selected text from the e-VLBI Proposal Announcement

The steady evolution of e-VLBI often seems slow. It is important to highlight when the community begins to assume the capabilities that have been made available by a project, during the project's lifetime. The EXPReS project is pleased to be able to support this type of progress.

Section 2.2- NA2 - EVN-NREN

The fifth EVN-NREN meeting (the second for the EXPReS project) took place on 19th September 2007. A total of 23 attendees were present, from 10 different countries. Particularly welcome were representatives from Australia, USA and Japan who had not previously attended the EVN-NREN gatherings.

Presentations gave updates on the status of the EXPReS and GÉANT2 projects and detailed the progress made in the 12 months since the last meeting. There were also presentations on UDP data transfers, FABRIC bandwidth testing, and advanced network monitoring. Discussions centered on the connectivity status of telescopes and the progress made using dedicated circuits in recent months. Effelsberg and Yebes are expected to be connected to JIVE by dedicated paths in the very near future.

Full minutes of the meeting can be found at <<http://www.jive.nl/dokuwiki/doku.php/expres:evn-nren>>

Section 2.1- NA3 - e-VLBI Science Forum

Email discussions were held within the eVSAG about implementing the new Target of Opportunity policy (as approved by the EVN directors at their last meeting). This set of new procedures was first used for the highly successful e-VLBI observations of supernova SN2007gr by Paragi et al. The full policy is now available on the EVN/JIVE site and an easy to use options for this class of proposal is presently being incorporated into the online tool for submitting EVN proposals (NORTHSTAR). It is anticipated that as soon as this tool option is fully operational the option will be advertised widely. In October there were also further email discussions about options to put before the EVN directors for their November 12th meeting for increasing access to e-VLBI observation on dates that are not pre-scheduled.

Section 2.1- NA4 - Public Outreach

EXPReS Media Coverage

EXPReS received favorable media attention at the end of August and beginning of September following the successful demonstration of real-time China-Europe, China-Australia and Australia-Europe baselines. Press releases were issued by EXPReS, SURFnet, AARNet, CSIRO and TERENA, and were picked up by a number of news boards and blogs. This resulted in a significant spike in traffic to the EXPReS web site. Links to the materials published online are available on the EXPReS web page via the url <<http://www.expres-eu.org/news.html>>.

DANTE is preparing a press release for 30 October highlighting EXPReS's use of the GEANT2 network. JANET (UK) is also preparing a press release highlighting EXPReS's use of their new lightpath.

Public Outreach

The EXPReS web site was updated in mid-October with more comprehensible text and navigation that is easier to update.

Informative text and graphics were submitted to the BELIEF project for a new "e-Infrastructures: Success Stories" brochure.

The annual ASTRON/JIVE Open Day was held at the Westerbork Synthesis Radio Telescope on 21 October with approximately 1500 visitors. EXPReS presence included posters with overviews of e-VLBI (in Dutch) and astronomy science, brochures, handouts and staff on-hand to answer questions.



Two photographs from the JIVE Display during Open Dag

EXPReS brochures and telescope photos continue to be requested by partners. Most recently, PSNC requested a small bundle for use at Supercomputing 2007 conference. At the moment, there are approximately 250 brochures remaining from the original printing. Slightly more brochures have been used than expected. The project will discuss if additional brochures are required as copies dwindle.

Section 3.1- SA1- Production e-VLBI Correlation

In the beginning of October a scientific e-VLBI run took place involving 3 Australian telescopes and the JIVE correlator. During this run, in which a supernova was observed, data were streamed at 512 Mbps from each telescope, for a period of 12 hours. Three dedicated lightpaths were used, provided



by AARNet, CENIC, CANARY and SURFNet. The data transport, which was done using the UDP protocol, a modified Mark5A control code and on-the-fly data conversion, was extremely stable and the correlator, recorders and playback units performed flawlessly. The observations generated quite a lot of publicity, and will lead, in time, to a scientific publication.

Shortly after this run, a test was done with yet another version of the Mark5A code, and during this test we succeeded to fill the 1-Gbps link from Torun to JIVE by selectively dropping packets on the sending side to reduce the actual (useable) data rate to ~980 Mbps. By inserting dummy data for the missing packets at the receiving end we actually managed to get green leds at the correlator, with only slightly lower than normal weights. Clearly this method holds a lot of promise for >512 Mbps data transport.

Several software developments progressed rapidly during October, Modifications to the correlator control software were tested which make it possible to remove and add stations in the middle of correlator jobs, without having to restart the entire job. Work on the "spacecraft tracking mode" continued, which enables switching rapidly between real-time e-VLBI and disk-recording at the correlator. A lot of effort went into a re-write of the Mark5A control code, which is being tested right now. Other efforts include the implementation of adaptive observing (awaiting tests) and real-time station feedback.

Nearly all Mark5As have been upgraded with new hardware, and two Mark5As were modified to Mark5B. Work on integrating the Mark5B into the correlator system is progressing well.

Section 3.2- SA2- Telescope Network Connections

The leader of SA2 provided a lengthy update to the activity as a whole, which has been posted on the wiki via the URL <<http://www.jive.nl/dokuwiki/doku.php/expres:sa2>>. The document outlines changes and activities for the participants as a whole. Several significant items have been completed. The following are highlights from the full report.

MPIfR has connected both sites with new cable and most fibers are verified. The new node to connect to DFN is planned before the end of the year. In South Africa, everyone is waiting to determine how a variety of political decisions will be resolved. The government's decision on monopoly control over cable will be critical to allow or prevent additional network connectivity, not only for HartRAO, but for the country and continent as a whole. Arecibo reports plans to upgrade connectivity to their mainland to 1 Gbps. While this connection is not yet in place, there is growing confidence that it will be realized. Additionally, Arecibo has participated in a variety of successful tests with JIVE which are boosting confidence and hopes that they will be able to participate in observations. TIGO has also completed tests similar to those completed at Arecibo. Again, successful tests are improving the expectation that some type of observation will be possible. While connectivity is not as high as desired, the ability to reliably send a known amount of traffic establishes the long baseline. MRO reports that their 10 Gbps line is operational. UniMan also expected their 10 Gbps connection, but it is still in tender. Their 1 Gbps connections are in place and have been tested.

Section 4.1- JRA1- FABRIC

Software Correlator Update

A version of the software correlator that allows parts of the correlation to be distributed over multiple nodes in a cluster has been completed. The code can now correlate all sub-bands of a VLBI experiment in a single run. This version has been successfully used during the first FTP fringe tests of the October/November EVN session. As part of this effort, the correlator control/configuration file has been redesigned; the old format was not expressive enough to correlate a complete VLBI



experiment. The workflow manager will need to be changed to take this into account. Work on further parallelization of the software correlator continues.

Software to distribute the input data has been written. It is implemented as a SOAP web service, such that the workflow manager and VLBI grid broker developed at PSNC can communicate with it.

Appendix - EXPReS Contact Points

For convenience, a list of the activities and the associated contact points are listed here for reference.

ID	Description	Contact	email
PC	Project Coordinator	Huib Jan van Langevelde	langevelde // jive.nl
NA1	Management of I3	T. Charles Yun	tcyun // jive.nl
NA2	EVN-NREN Forum	John Chevers	john.chevers // dante.org.uk
NA3	e-VLBI Science Forum	John Conway	jconway // oso.chalmers.se
NA4	Public outreach	Kristine Yun	kyun // jive.nl
SA1	Production Services	Arpad Szomoru	szomoru // jive.nl
SA2	Network provisioning	Francisco Colomer	f.colomer // oan.es
JRA1	FABRIC- WP1	T. Charles Yun	tcyun // jive.nl
	FABRIC - WP2	Mark Kettenis	kettenis // jive.nl