

## Performance and Reliability of the EVN

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EVN session 1/2013

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The session consisted of five frequency blocks (6cm, 1.3cm, 5cm, 3.6cm, 18cm). There were no fringes to Urumqi in the upper 14 bit streams/7 sub-bands. This is because the switch in front of the formatter was somehow in the local instead of remote FS control mode. On the the other hand, the earlier VLBI experiments were geodetic observations. So, the formatter remained in the geodetic mode instead of astronomical mode. Ef did not observe N13C1 and N13L1 due to snow. Jb1 was out N13L1 due to bad weather. Shanghai had no fringes in F13L1 due to a bad cable in the time-frequency system. The cable was replaced before the user experiment. Sv was out in all the 22 GHz experiments. There were good fringes to Onsala, Noto, Hart DBBC backends in the NME experiments. The KVN stations participated in N13K1 and displayed good performance. The Kunming 40m radio telescope participated in N13X1 and ET026 with good fringes.

### Highlights

- (1) Ftp fringes were found on the baselines to all the participating stations in the mix-mode 2Gbps test experiment F13C1. This is the most complicated EVN experiment. Three kinds of digital backends: DBBC, CDAS, R1002 were used with a recording rate 2 Gbps. Jb1 and Wb also did observations with 1 Gbps recording rate. See the EVNTech email sent by Mark Kenttenis on 25 Feb 2013 for the more details.
- (2) The first fringes to Medicina new 22 GHz receiver were clearly detected in the ftp fringe test of N13K1.
- (3) A new C/L band receiver was installed in the Onsala 25m radio telescope after Session 1/2013.

There were 30 user experiments (9 at 6cm, 2 at 1.3cm, 5 at 5cm, 4 at 3.6cm, 10 at 18cm) in session 3/2012. There were one To0 experiment R0004C and four Global experiments GK047A, GK047B, GK047C, GK047D. There were three experiments (EN097A, GK047A, GK047C) correlated at Bonn. There are two experiments ES068A and ES068B done in e-VLBI mode.

### Station and correlator feedback for individual stations:

Ef - Due to snow, Ef had to stow antenna for significantly long time in EK033B(95%), ES068B(100%), EG066G(100%), EG066H(100%), EY019(100%), EP087A(25%), EM100A(100%), EM100B(100%), EP087C(11%), EM100D(60%). The number in the bracket gives the percentage of lost time.

Wb - Success.

On - Correlation amplitude vs time plots showed a large variation (a factor

~5) on a time scale of ~4 hours in EP087C, while Tsys curve looked just normal. As the variation was seen consistently on all the baselines to Onsala, this is likely due to slowly drifting pointing error.

Tr - Data weights were about 0.6 for the last 1.5 hour in EG066G.

Nt - There were problems with its K-band receiver, 75% time was lost in EZ024. The RR correlation amplitude was significantly lower (0.4x) than LL amplitude in all the 5-cm experiments. No fringes in BBC 7 (IFs 7R and 8R), ET026, EM100A, EM100B, EM100C.

Mc - No observations of EG066H due to snow. The receiver was not correctly selected at the beginning and caused 40% time loss in EB052B. 1-bit sampling was used in all the 1Gbps experiment. The L-band receiver was not positioned correctly on the focus. This pointing error caused an increase of its SEFD by a factor of 5 in ED039B, EP087C, EM100D, EM100E.

Ys - Minor failure (half hour loss) in ET026 due to recording failure and in EP087B due a field-system problem.

Mh - Only RCP owing to a new DBBC mode that was not recognized by the field-system, thus not patched correctly internally in Session 1/2013.

Jb1 - Station VLBI friends gave the following feedback: A problem with our HM11 cable carrying LO up the Lovell Telescope meant there were occasional decreases in Rx power by up to 10dB. These drop outs were not noted by controllers and could have occurred at any time and remain for several hours. This feedback may explain the results that Jb1 had a sensitivity ~10 times worse than the nominal value in all the C-band experiments.

Jb2 - The K-band receiver was not cooled for this session. Its SEFD was ~10 times higher than the nominal table according to the pipeline-calibrated 3C84 data.

Hh - Success.

Ro70 - No fringes in EZ024 was probably associated with the tracking errors reported by the station. Minor failure at the beginning of ET026 due to problems with disk module.

Ar - Participated three experiments EG066G, EG066H, ED039B. No problems found in the post correlation data review.

Ur - No fringes in 7 subbands (the upper 14 bit streams) in all the C and K band 512/1024 Mbps experiments due to the improper recording mode (see the 1st paragraph).

Sh - Success in all the user experiments.

Sv - RCP had significantly low correlation amplitude in EM100C.

Zc - Missed scans 44-79 (~2 hours) in EM100C. It had significant sensitivity loss in EP087C (SEFD ~ 1800 Jy, a factor of six higher than the nominal value).

Bd - Success in the remaining experiments (see next paragraph).

Because there were some problems with Russian Custom and the EVN disk packs were not received on time, Russian stations missed the following experiments.

Sv: N13C1, EP087A, EK033C, N13K1, R0004C, EZ024, N13X1

Zc: Ek033B, EY019, N13C1, EP087A, EK033C, N13K1, R0004C, EZ024, N13X1, ET026

Bd: EM097A, EY019, N13C1, EP087A, EK033C, N13X1, ET026, EP087B, GK047A.

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