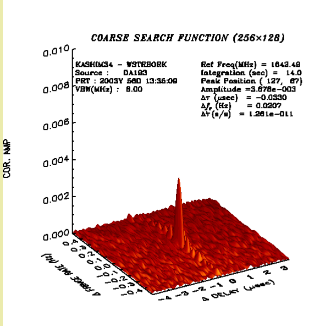
JOINT INSTITUTE FOR VLBI IN EUROPE

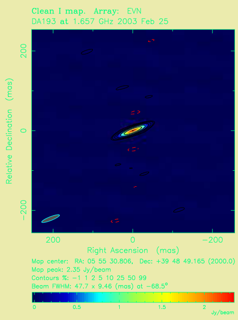
The European VLBI Network: developments and results

The European VLBI Network (EVN) consists of telescopes in Europe, South Africa, and China. There are in general three observing sessions in a year. Some of these are organized jointly with MERLIN (UK) to image larger scale structures, and some with the VLBA (US) to observe extremely compact sources with the global VLBI technique. The available observing bands are P, L, UHF (unique to EVN), S/X, C, K. The data are normally correlated at the EVN MkIV Data Processor at JIVE.

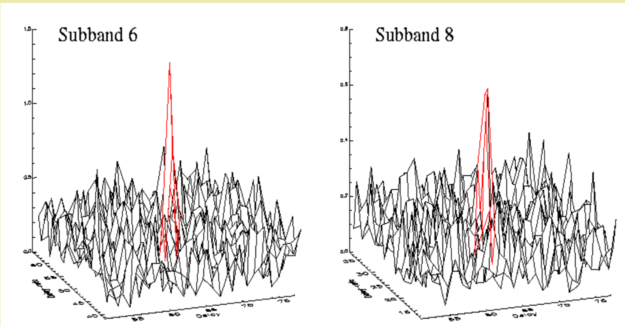
Recent developments in the EVN include the following (see also *http://www.evlbi.org/tog/tog.html*):

1. The station positions were significantly improved, making it possible to carry out higher quality phase-referencing experiments (see e.g. the Frey et al. result at the bottom right).

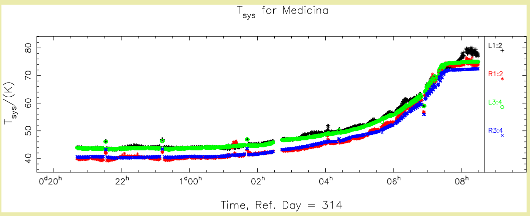




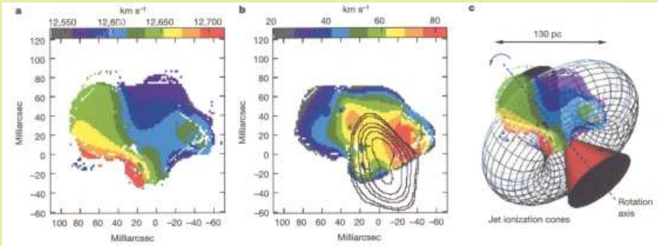
2. Recording rate of 512 Mbit/s is now operationally available. Fringes have been detected using data ftp-d over the internet using both the EVN MarkIV correlator and the CRL-Kashima software correlator (above left). The first EVN image including a Mk5-Mk5 baseline was produced (above right). Most recently fringes were detected at 1 Gbit/s using disk-based recording systems (below).



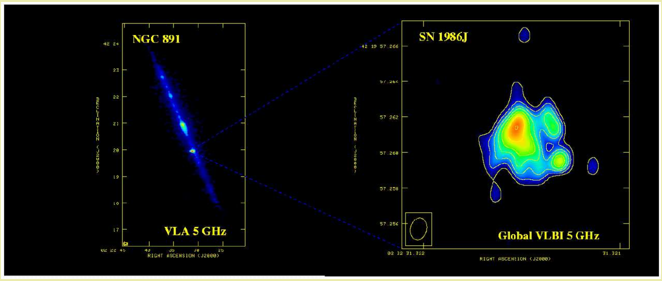
3. User experiments are processed automatically (pipelined). The DA193 map above was made from data processed by this pipeline. Calibration of the EVN was made robust with additional amplitude calibration experiments as well as by the introduction of continuous TPI measurements (below).



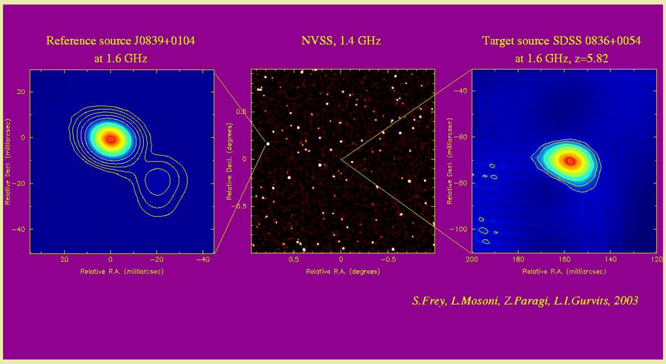
A selection of recent EVN results are presented here. The images shown below (from left to right) are of the Hydroxyl (OH) line velocity field, the velocity dispersion structure and finally a model of the nuclear torus in Mrk231. These observations strongly support the unification schemes that have been proposed for active galaxies. Klöckner H-R., Baan W.A. & Garrett M.A., 2003, *Nature*, **421**, 821



Left: VLA image of NGC 891 at 5 GHz. The brightest spot in the galaxy is SN1986J. Right: Global VLBI image of SN1986J at the same epoch and observing frequency. This high-resolution image shows a distorted shell of radio emission, indicative of a strong deformation of the shock front. Perez-Torres M.A., et al., 2002, *MNRAS*, **335**, 23



The object SDSS 0836+0054 at z=5.82 is the highest redshift radio-detected quasar known to date and was discovered during the Sloan Digital Sky Survey. The noise of the target image is about 34 microJy/beam and the peak flux density of the image is 770 microJy/beam. Frey S., Mosoni L., Paragi Z., Gurvits L.I., 2002, *MNRAS*, accepted



EVN Support Group