

Prospect for VLBI Network Extension: the First Results of an Ad-hoc S2 Array Experiments

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Abstract. The Canadian S2 system gives a chance for Russian and some other radio telescopes in the world to be involved into international VLBI programs. Brief descriptions of previous S2 experiments and future possibilities are presented.

There are many large radio telescopes in the world not integrated into current VLBI networks because of the lack of modern compatible VLBI recorders. Above all, this situation holds for Russia. Using the Canadian S2 recorder and playback terminals - used mainly for VSOP mission support - gives Russian telescopes a chance to be involved in ground VLBI programs and to achieve a stable position within the VLBI Community. 12 countries have now S2 systems while S2 compatible correlators have been developed in Australia, Canada, Japan and Russia. A few large telescopes (i.e. Bear Lakes RT-64 in Russia, Evpatoria RT-70 in Ukraine, GMRT in India) could join the EVN if S2 enhancement of MkIV correlator at JIVE could be implemented. A first test of MkIV/S2 cross-processing may be made with the loan of S2 playback and S2/MkIV conversion machine from Astro Space Center, Moscow. Secondly, it may be proposed to arrange an ad-hoc S2 VLBI array using the telescopes around the world which are equipped with S2 systems, together with the Penticton S2 correlator. High

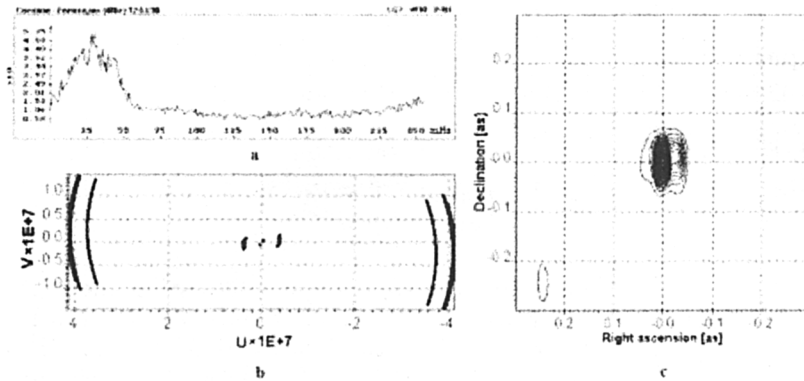


Figure 1. VLBR99.1: fringe for echo signal from Venus for Evpatoria-Svetloe baseline, 6 cm (a), INTAS98.5: (u, v) -plane (b) and ASL image of 3C309.1, 18 cm (c)

sensitivity (due to Arecibo, GMRT and GBT telescopes) and wide spectrum of baselines up to the largest ones on the Earth could be achieved.

Many successful international VLBI experiments that were carried out since 1993 confirm the feasibility of this S2 initiative. The first international S2 observations were carried out with Parkes RT-64, Hobart RT-26 and Ussuriysk RT-70 in November 1993 (Slysh et al. 1996). The longest S2 baseline 11538 km was achieved between Bear Lakes and Tidbinbilla in June 1996 (Chuprikov et al. 1996). These data were correlated with Australian ATNF processor at Sydney. Three Russian antennas (Bear Lakes RT-64, Puschino RT-22, Svetloe RT-32) joined with three foreign radio telescopes during observations INTAS98.5 (Arecibo, Green Bank, HartRAO) and INTAS99.4 (HartRAO, Noto, Shanghai) to investigate AGN, solar corona and wind, OH-masers and stars (the data were correlated with Canadian DRAO processor at Penticton). The next such session INTAS00.3 with Noto, Shanghai, GMRT, HartRAO will be carried out on November 28, 2000. The pioneer VLBI radar experiments VLBR99.1 (for Mars and Venus planets) and VLBR00.2 (for Mithra and 2000CE59 asteroids) were organized with use of the planetary radar at Evpatoria RT-70 to develop the new method of investigations of Solar system bodies (test data processing was made by Russian IAA processor at St.-Petersburg).

Some results of INTAS98.5 and VLBR99.1 are presented in Figure 1.

References

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