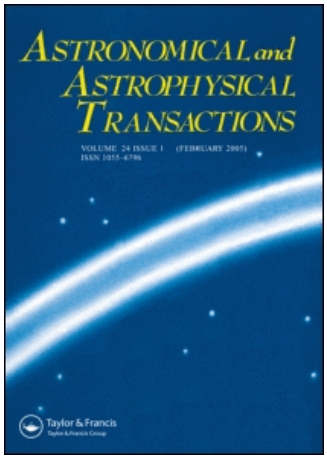

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INTERNATIONAL COOPERATION FOR THE VSOP PROJECT: SPACE VERY-LONG-BASELINE INTERFEROMETRY FRINGE FITTING

A. CHUPRIKOV[a], I. GUIRIN[a] and R. DODSON[b]

[a]Astro Space Center, P.N. Lebedev Physical Institute, Russian Academy of Sciences, 84/32 Profsoyuznaya Street, 117997 Moscow, Russia;
[b]University of Tasmania, Hobart, Tasmania, Australia

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The Data Processing Department of the Astro Space Center of the P.N. Lebedev Physical Institute (Moscow, Russia) has been developing a software project 'Astro Space Locator' (ASL for Windows) as an alternative package to AIPS and DIFMAP. We tested AIPS against ASL for an extremely marginal data set consisting of a single baseline from Hobart to VLBI Space Observatory Program (VSOP) (VS041). The Penticton data quality analysis (DQA) found occasional fringes on this baseline, but AIPS failed. ASL managed to match the DQA fringes and can apply these to the data.

Keywords: ASL; Fringe fitting; Space very-long-baseline interferometry; AIPS

1 INTRODUCTION

The VSOP survey experiment VS041, observing a quasar J0231 + 1322 had a poor start in life. All ground-based telescope except for Hobart failed to observe it. Nevertheless, data have been correlated, but no fringes were reported by the Penticton correlator (Carlson et al., 1999). The attempts to construct any phase solution with any tasks of AIPS (FRING, KRING and BLING) have not been successful. Therefore these data were submitted to the Russian software group, to use the ASL software (Chuprikov, 2002). Correct values for delays and fringe rates were found using the ASL fringe-fitting procedure application.

2 DATA PROCESSING

J0231 + 1322 had been observed on August 13, 1999, from 18:15 universal time (UT) until 21:35 UT. Initial data are in the FITS format. There are two frequency bands. The lower band is 4800–4816 MHz, and the upper band is 4816–4832 MHz. The integration time for these data is 0.5 s. An ordinary text calibration file has been used to carry out the ASL amplitude

* Corresponding author.

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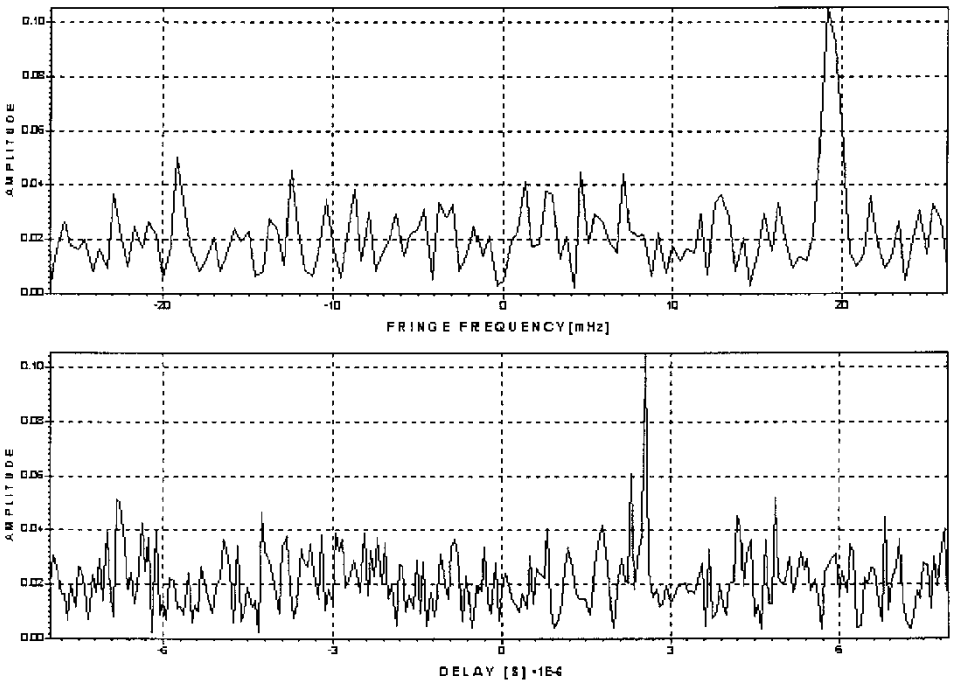

FIGURE 1 Dependence of the correlation function amplitude on (a) the fringe rate and (b) the delay for the upper frequency band. The solution interval is 40 min.

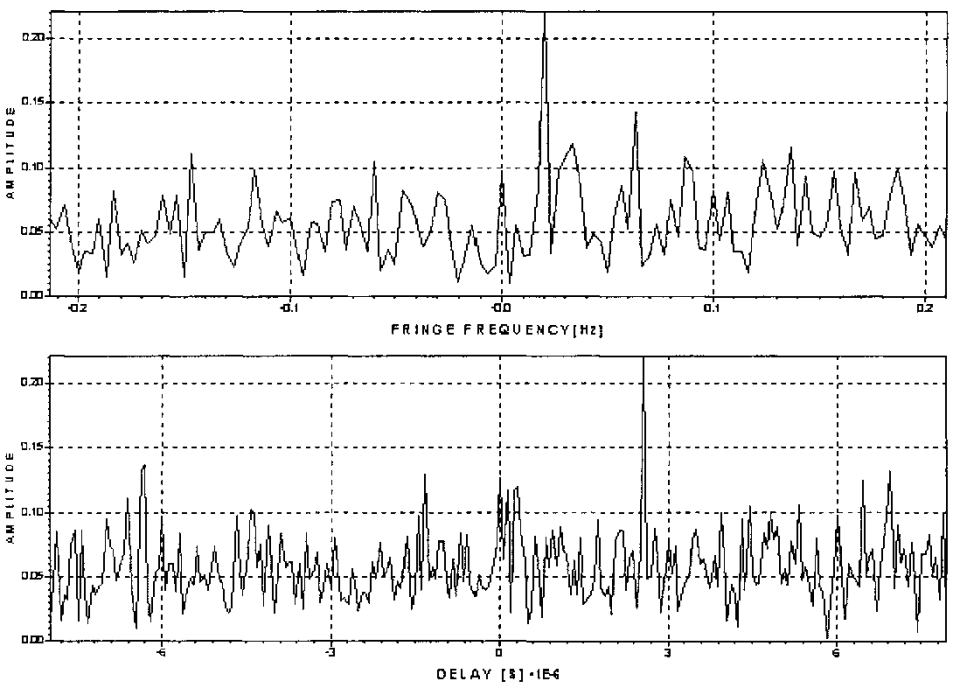

FIGURE 2 Dependence of the correlation function amplitude on (a) the fringe rate and (b) the delay for the lower frequency band. The solution interval is 15 min.

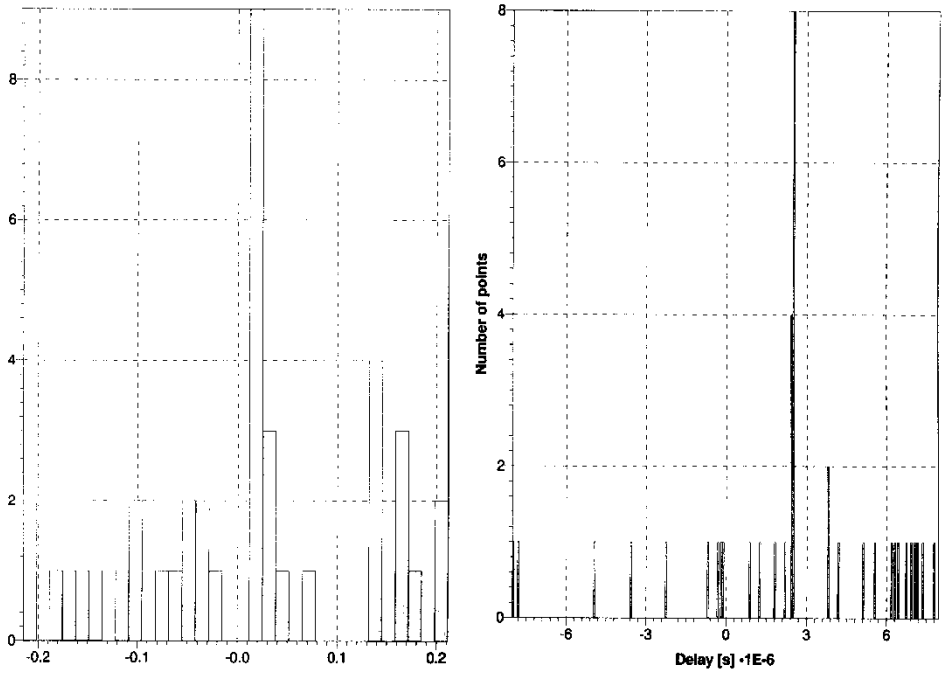

FIGURE 3 Distribution histograms of (a) the fringe rate and (b) the delay for the lower frequency band with a 5 min solution interval.

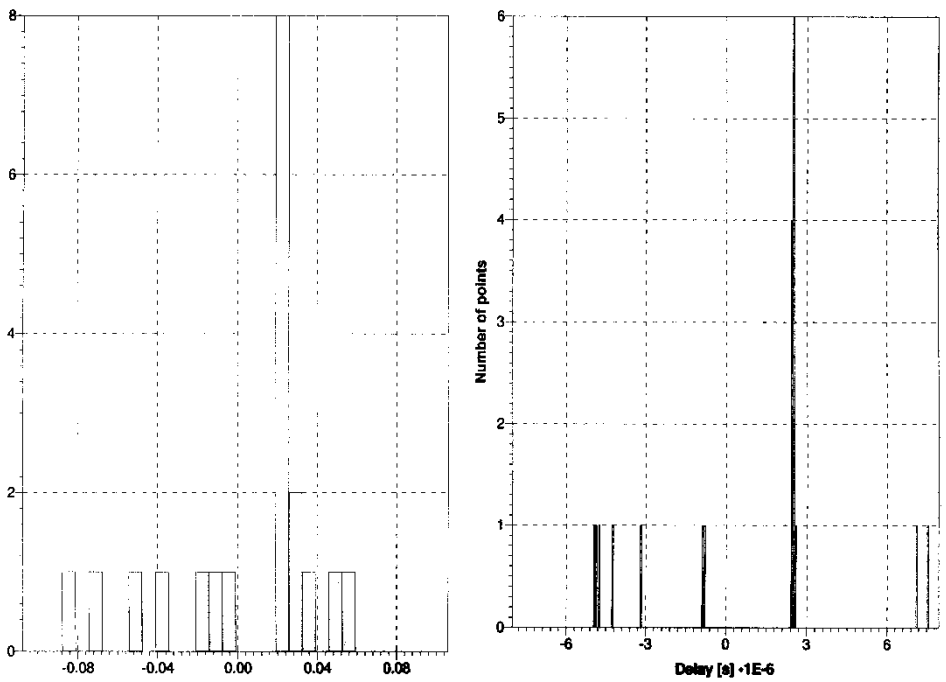

FIGURE 4 Distribution histograms of (a) the fringe rate and (b) the delay for the lower frequency band with a 10 min solution interval.

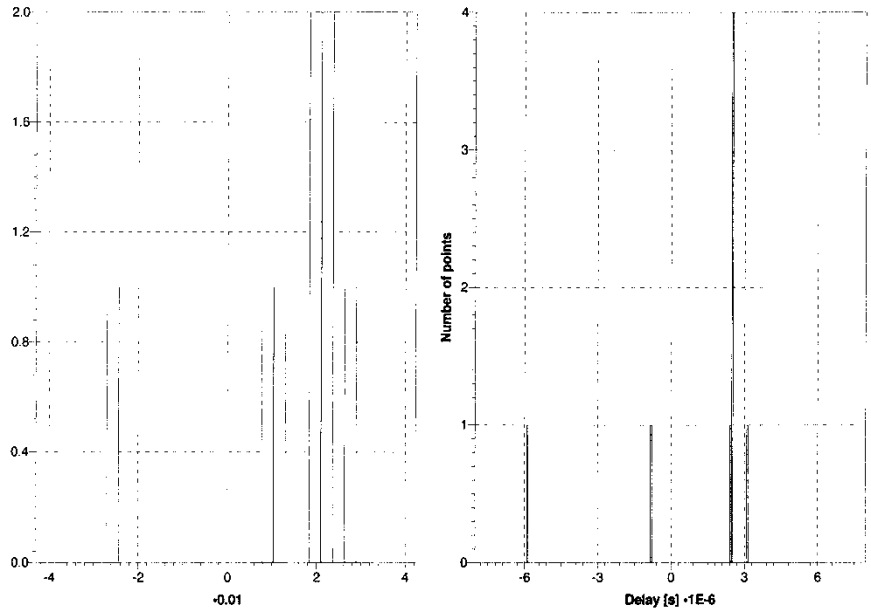

FIGURE 5 Distribution histograms of (a) the fringe rate and (b) the delay for the upper frequency band with a 25 min solution interval.

calibration procedure. The single-band ASL fringe-fitting procedure has been used for the phase calibration. We have to use a wide range of solution interval values (5–40 min). The plot of fringes showed that the signal is not random (Figs. 1 and 2). Histograms of the delay and fringe rate distributions have been created for each value (Figs. 3–5). The fringe fit data, processed in ASL, show that there is phase coherence.

3 CONCLUSION

The experience of the ASL fringe-fitting procedure application to the data of VS041 observations shows that this procedure is relevant for space very-long-baseline interferometry data processing. We intend to improve it and to create a global fringe-fitting option. Moreover, the option using a phase calibrator will also be created. Thus, an updated version of the ASL fringe-fitting procedure will be relevant for processing the data from weak sources observed on great baselines. The updated ASL fringe-fitting procedure will be included into the next version of the 'Astro Space Locator' software.

Acknowledgement

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