

I. 総論

I. GENERAL CONSIDERATIONS

Radio Research Laboratories (RRL) had been developing the K-3 type VLBI (Very Long Baseline Interferometer) system at Kashima Branch, according to the five-year plan (1979 to 1983 fiscal-year) and completed it in October, 1983. On November 5, 1983, a test observation was made in cooperation with Mojave Base Station of NASA and Owens Valley Radio Observatory of California Institute of Technology, both of which were equipped with the Mark III system compatible with the K-3 system. This was the first transpacific VLBI experiment in history conducted between Japan and the United States of America, and resulted in a precision of 0.1 nano sec in determining the delay time as expected beforehand.

On January 23 and February 25, 1984, system-level experiments were made in cooperation with Mojave Base Station and Hat Creek Radio Astronomy Station of University of California (participating only in the second experiment). In each of the experiments 13 radio stars were observed for 24 hours. The data processing and analyses made both in RRL and in NASA revealed that the K-3 system realized a precision of less than 3 cm in determining the baseline lengths, which was the goal of the system performance.

The K-3 system is to be used for the Japan-US joint experiment which starts in July, 1984, to measure the crustal plate movement with a precision of less than 3 cm. It will also be used for precise time comparison between RRL and Naval Observatory, measurements of the earth rotation, and the domestic VLBI experiment with the Geographical Survey Institute of the Ministry of Construction.

Here we will discuss the international and domestic background of the VLBI experiment projects, circumstances of the K-3 system development and an outline of the VLBI joint experiment projects. Also discussed are the design concept of the K-3 system, its function and performance, and possibility of its various applications.