

# Current Status of the VERA

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*Abstract:* VERA (VLBI Experiment of Radio Astronomy) has finished construction in 2002 March, and test observations of it are under going.

## 1. Introduction

The VERA system consists of four VLBI stations at Mizusawa, Iriki, Ogasawara (Chichijima), and Ishigakijima. The maximum baseline (Mizusawa,Ishigaki-jima ) is 2300 km. Construction of the former three stations of VERA started in 2000, and finished in 2001. The construction of the fourth station at Ishigaki-jima started in 2001 and finished in 2002 March.

The VERA is a newly developed VLBI system, which is dedicated to the differential VLBI. We have succeeded to obtain not only the first lights of all stations but also first fringes between them (Figure 1). We have also succeeded simultaneous VLBI observations using the 2 beam systems(Figure 2).

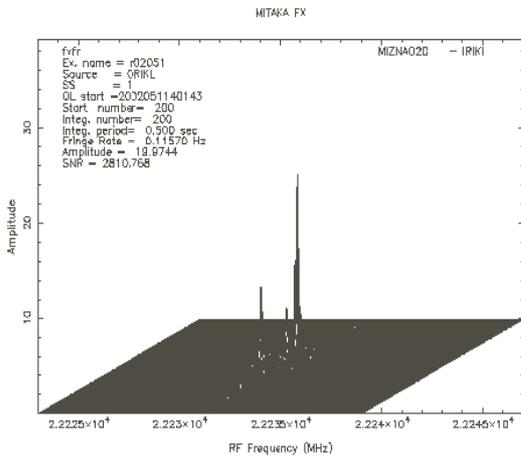


Figure 1. VERA first fringe between Mizusawa and Iriki stations.

## 2. Scientific goal

The scientific goal of theVERA is mainly measurements of the proper motion and parallax of masers in the Galaxy (Figure 3). 3D map and velocity field of the Galaxy will be clear by using the results. Additionally, there are some other interesting scientific goals: detailed velocity structure of molecular gas around evolved stars and star

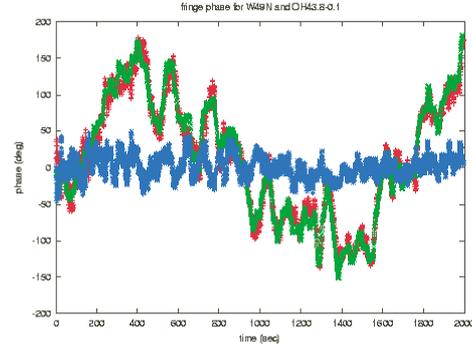


Figure 2. Results of 2beam simultaneous observation between Mizusawa and Iriki stations.

forming regions; mass including dark matter distribution in the Galaxy; and phase referencing to improve sensitivity with long integration; precise measurements of moon satellites.

Distribution of known H<sub>2</sub>O maser sources near the Galactic plane and their expected errors of distance determination.

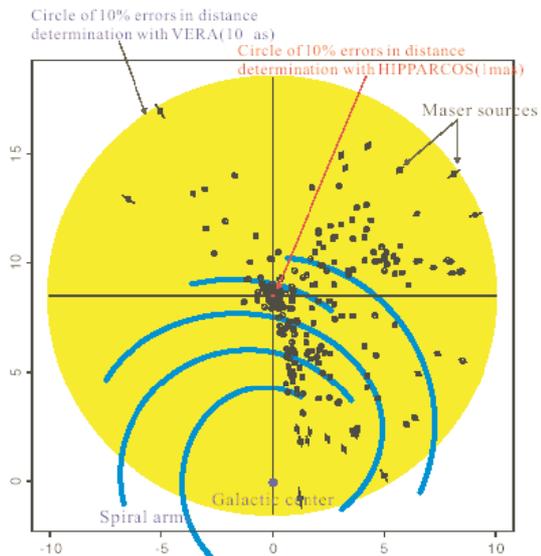


Figure 3. Expected circle of 10% errors in distance determination with VERA on the face on view of the Galaxy.

## 3. The VERA System

VERA antenna has dual-beam system with which we can observe two adjacent sources, simultaneously. Minimum and Maximum angular separation is 0.3 deg and 2.2 deg, respectively (see Figure 4). Amplified radio signals are digitalized and transmitted to the observation building by using

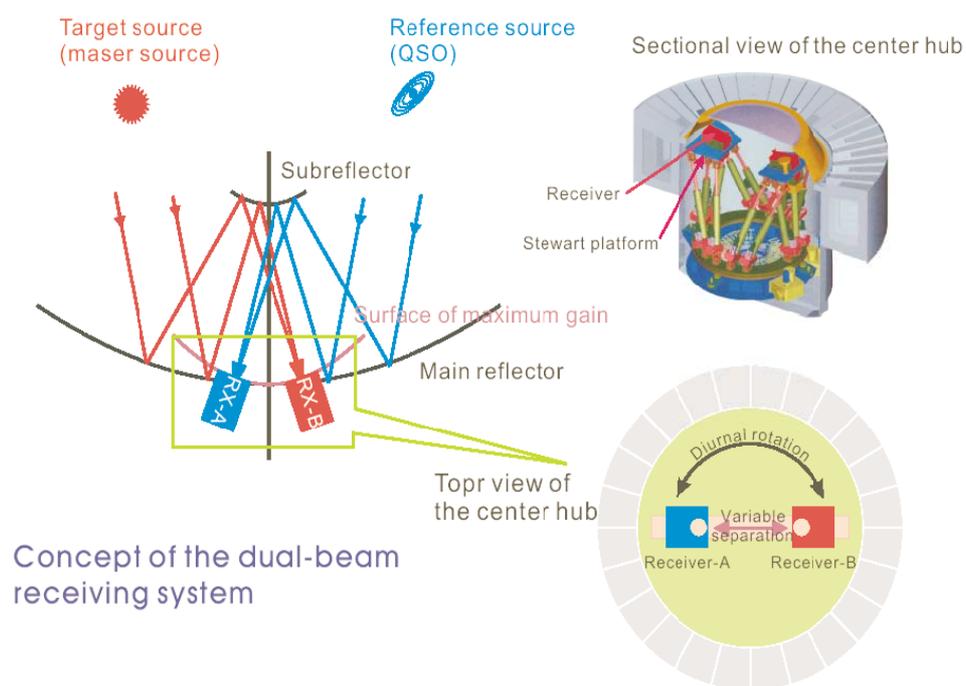


Figure 4. Concept of the dual beam receiving system.

optical fiber. The backend system, the frequency standard, and operation computer system are in the observation building of each VERA station. We can observe, S/X, 22GHz, 43GHz bands (Figure 5).

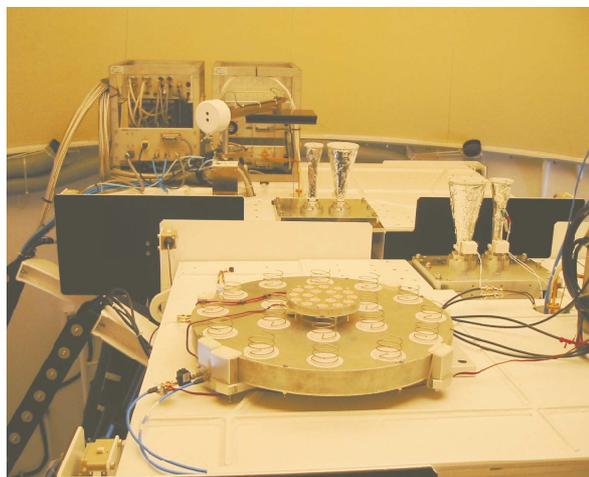


Figure 5. The real view of the receivers. S/X spiral horn is seen.