

Past, present, and future of VERA

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Content

We constructed the Japanese VLBI network VERA (VLBI Exploration of Radio Astrometry) in early 2000s, which consists of four 20-m antennas with the maximum baseline length of 2300 km. The primary goal of VERA was to determine the 3D structure of the Milky Way Galaxy through VLBI astrometry (Honma et al. 2012, 2015), by measuring trigonometric annual parallaxes and proper motions of Galactic radio sources up to 10 kpc distances (Nagayama et al. 2020, Oyama et al. 2024). For this purpose, we developed the unique dual-beam receiving system with which target Galactic (mostly 22 GHz H₂O and 43 GHz SiO maser sources) and reference extra-galactic sources with separation angles within 2.2 degrees can be observed simultaneously (Honma et al. 2008). VERA as the Galactic astrometry project was completed in 2020 and the resultant catalog paper was published (VERA collaboration, Hirota et al. 2020).

Currently, VERA is open for VLCOP (VERA Large-scale Collaborative Programs) mainly led by the Japanese domestic communities contributing to array operation and instrumental developments. VERA has been collaborating with the Korean VLBI Network (KVN) just after the construction of both arrays in mid-2000's, and regular common-use observations have been conducted with KaVA (KVN and VERA Array) since 2014. Furthermore, some Chinese telescopes have been contributing to establish EAVN (East Asian VLBI Network), and it has also been open for common-use programs since 2018.

For the future plan, we are considering possibilities to expand collaborations with other networks such as South-east Asian VLBI Network, EVN, global VLBI alliance, and SKA-VLBI.

In this presentation, we will review past accomplishment, current status and possible future plan of VERA.

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