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Development of Radio Astronomy Infrastructure in Thailand: The Thai National Radio Telescope and Beyond

The Thai National Radio Astronomy Observatory (TNRO), established in Chiang Mai in 2017 by the National Astronomical Research Institute of Thailand (NARIT, Public Organization), advances radio astronomy and geodesy infrastructure in Thailand. Its centerpiece, the 40-meter Thai National Radio Telescope (TNRT) that is designed as an enhanced version of the 40-meter Yebes Radio Telescope, operates from 0.3-115 GHz, supporting diverse scientific studies like molecular/maser lines, interstellar medium, pulsar/frb, time-domain astrophysics, and geodesy. The TNRT features advanced L-band and K-band frontends with a universal backend both developed by the Max Planck Institute for Radio Astronomy, enabling spectroscopic, pulsar, polarimetric, and very-long-baseline interferometry (VLBI) observations. Scientific operations commenced in October 2023, initially focusing on L-band observations. Q- and W-bands are already in the plan for installation in the near future.

TNRT is envisioned as a key single-dish instrument and a future node in Asia-Pacific and global VLBI networks, enhancing regional and global capabilities for higher-angular resolution and higher-imaging-quality radio astronomy, including mm-VLBI observations. Complementing this is a 13-meter VGOS-type geodetic radio telescope, developed with the Shanghai Astronomical Observatory and officially launched in May 2025. TNRO has evolved into the Center for Radio Astronomy and Engineering (CRAE), including an Advanced Radio Frequency Laboratory and plans for two more VGOS stations in southern Thailand within two years.

These initiatives aim to realize Thai National VLBI Array (TVA), which will serve as a robust foundation for the establishment of a future regional VLBI network in Southeast Asia, known as South-East Asia VLBI Network (SEAVN), in collaboration with Indonesia, Malaysia, and Vietnam. It will support global research on the variety of astrophysics and geodesy through enhanced observational capabilities.

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