Yamaguchi 32-m telescope as an element of EAVN

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History and current status of Yamaguchi 32-m radio telescope

The antenna was originally constructed in 1979 by KDDI corporation for tracking, telemetry and control to a communication satellite (INTELSAT). The mount is Azimuth-Elevation type covering the full sky, and the cassegrain optics system with focused-beam reflector assembly is equipped. When the antenna finished its role of telecommunication in 2001, it was donated to NAOJ and we started to modify it to a radio telescope. The feed horn was changed from corrugate (4-6 GHz) to straight horn with 8.3 GHz dual-channel circular polarization feed for astronomical observation. A cooled dual-channel 8 GHz HEMT receiver is mounted. A 6.7 GHz feed and room temperature receiver is also available although it is exclusive use with the 8.3 GHz system. The telescope is on a building where the receiver and tracking systems are installed. The 22 GHz system was newly installed in 2006, and we have started test observations at 22 GHz.

Yamaguchi 32-m telescope is used for a variety of research projects on the Galactic Center, supernova remnants, active galactic nuclei and methanol maser in star forming regions (See posters of Wajima et al. and Sugiyama et al.). Furthermore, it participates in world-wide VLBI arrays, collaborating with telescopes in Japan, Korea and China. Its location makes it a vital element in Japanese VLBI Network (JVN) and East Asia VLBI Network (EAVN).

Yamaguchi 32-m telescope has a remarkable high-speed network-based observation system. The telescope joins real-time VLBI network in Japan via Super-SINET operated by the National Institute of Informatics (NII), achieving 2 Gbit/sec data transmission. Not only the dedicated high-speed network, we are planning to connect the telescope to the Internet for a new way of VLBI observation fully based on the PC and the internet. Process of VLBI observation (observation, data archiving, data transmission, and correlation) are all done on PCs.

Mapping of the Galactic Center

Yamaguchi 32-m telescope reveals the extended emission in the Galactic Center which spans 200 pc from the Galactic plane (Fujisawa et al. in prep.).

JVN and EAVN

Japanese VLBI Network (JVN) was formed in 2004 as a collaborated project of several universities and institutes which manage VLBI antennas in Japan. JVN has expanded rapidly, and now includes 10 antennas. Yamaguchi 32-m telescope provides sensitive longer baselines in JVN due to its large diameter.

We are also considering to collaborate with many radio astronomical groups in East Asia. One example of the collaborations is the East Asia VLBI Network (EAVN). A number of radio telescopes is increasing in East Asia region, and the combined array of VLBI is expected to be enhanced their capability.

EVN

JVN

Comparison of the best uv coverage between the Europe VLBI Network (EVN) at 1.6 GHz and the JVN at 8.3 GHz. JVN is equivalent in array size to the EVN, but it shows higher density for shorter baselines.