

Radio telescopes for Mexico and Latin America

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Inspired by efforts in Asia, Australia and Africa, we have undertaken the conversion of a retired telecommunications antenna into a radio telescope. The Tulancingo-1 antenna is a 32-meter parabolic dish, located at the Tulancingo Earth Station in the Mexican state of Hidalgo. When fully operational, we anticipate a useful frequency range from 1 to 15 GHz, and possibly as high as 23 GHz. Here, we describe the current state of the conversion project, mention several of the many potential science applications, and extrapolate our experience to what might be achieved by a Latin American network of radio telescopes, based on similarly converted antennas.

After extensive work by the metrology team of the INAOE and technicians from the San Pedro Mártir Observatory operated by the UNAM, the Tulancingo-1 antenna is now ready for commissioning, which we expect to last for most of the 2024 calendar year. The development of a pointing model and overall testing of the telescope will be carried out with an L-band receiver covering 1400 to 1800 MHz. After this initial commissioning, we plan to install a cryogenic C-band receiver, and also to make test observations with a warm K-band receiver. Early science applications will include maser and AGN monitoring observations.

Through the *Iniciativa VLBI Ibero Americana* (IVIA¹) we have contacted researchers throughout Latin America and identified a number of retired telecommunications antennas that might be suitable for conversion. As these radio telescopes come on-line, our long-term goal is to equip them for VLBI observations and thus involve Latin America in global centimeter-wave VLBI projects.



Figure 1. Front view of the 32-m Tulancingo-1 antenna. The electro-mechanical work for the conversion to a radio telescope is largely complete; commissioning will commence in 2024 using an L-band receiver.

¹<https://oaq.epn.edu.ec/ivia-net/index.php/es/>

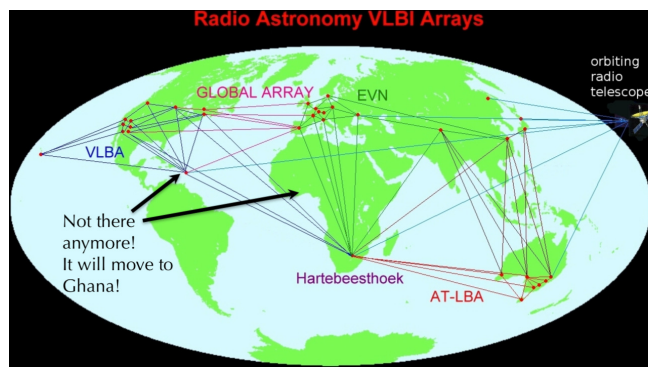


Figure 2. The map shows existing centimeter-wave VLBI networks. With the collapse of the Arecibo telescope (and the coming-online of the Ghana telescope) existing baselines will shift further eastward. Central and South America is the most notable region without cm-VLBI coverage. The IVIA effort seeks to bring Latin America into the global cm-VLBI fold.