Impact of the Kutunse telescope on the Maser monitoring efforts

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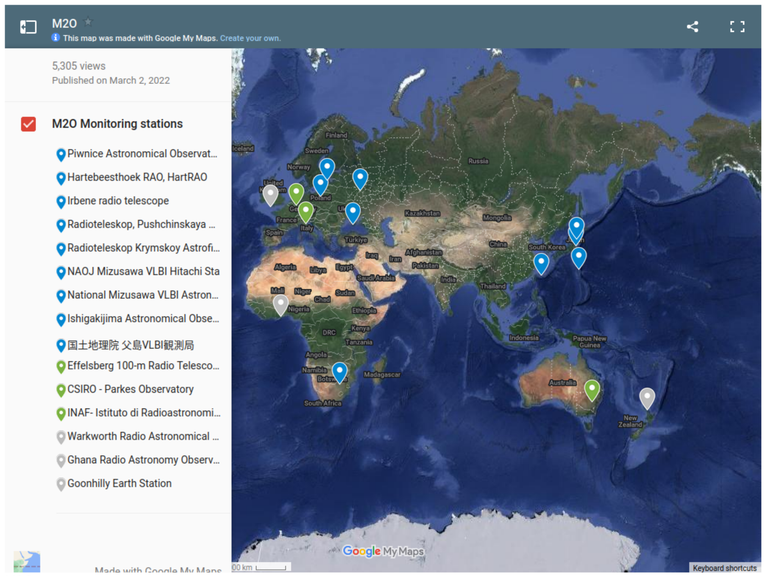
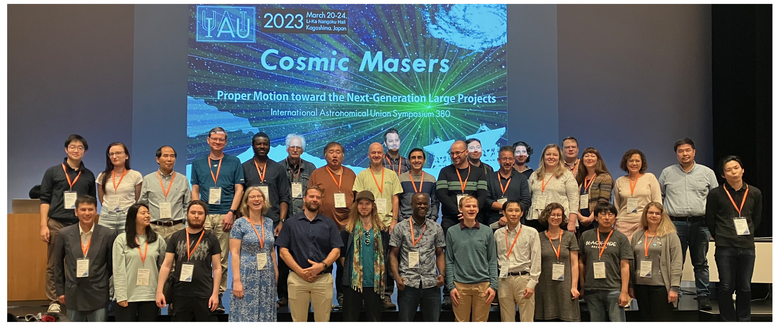
A bit of background on the Maser Monitoring Organization (M2O)

In 2017 at IAUS 336: Astrophysical Masers: Unlocking the Mysteries of the Universe, a source that was flaring by 2 different groups was reported, the one using data from the Acacama Large Milli(sub)metre Array (ALMA), and the second using Maser data from the Hartebeesthoek 26 m (HartRAO) radio telescope in South Africa. This showed the importance of international collaboration and working together. This initiated an international collaboration, which now consists of 13 single-dish telescopes around the world that monitor masers to observe serendipitous phenomena by looking at as many star forming regions as possible. This group is known as the MAser Monitoring Organization (M2O, https://masermonitoring.com).





The M2O would always want to improve the observation of star formation regions using as many dishes as possible. Fig 1 shows the stations that are involved and the stations that might get involved soon, and Ghana is one of the stations that will mostly probably join the efforts. The photo shows the people who are part of the M2O that was taken at the 2024 Maser conference in Kagoshima, Japan.

Fraction of Galactic plane visible

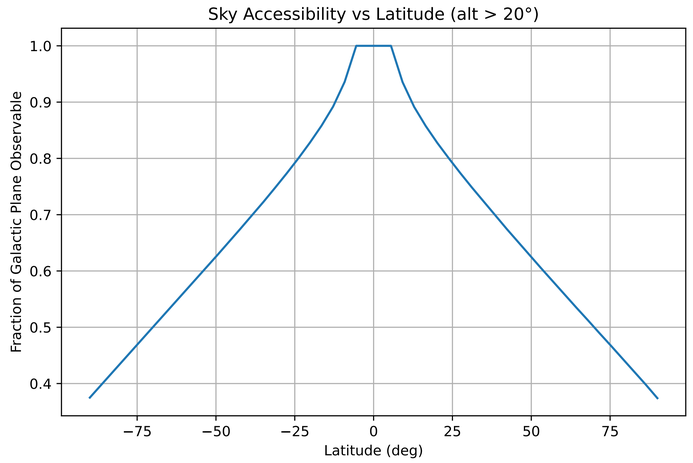


Figure 1. Fraction of the galactic plane that can be seen at different latitudes on Earth. This shows the importance of a radio telescope close to the equator; such at the 32 at Kutunse in Ghana.

Galactic plane visible from different observatories

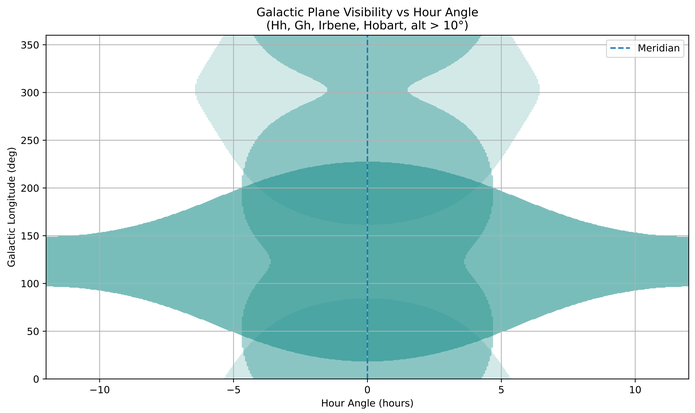


Figure 2. Coverage of the galactic plane from three different observatories, at a latitude of -26 deg (HartRAO), 5 deg (Kutunse), and 57 deg (Irbene). Showing how good a site Kutunse is for Monitoring masers

Acknowledgements

- The maser monitoring organization for providing the photograph and the map.
- Asabere et. al. 2014, from the South African Institute of Physics proceedings for providing the two images of Kutunse's strategic position and the UV-coverage plots if Kutunse is added to the EVN.

Advantage if Kutunse joins the monitoring efforts

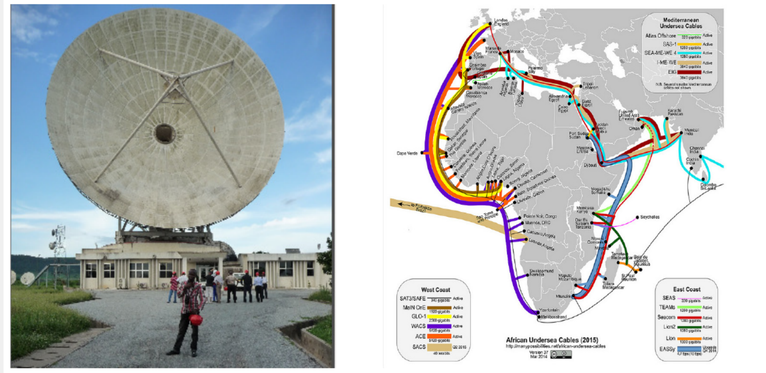


Figure 1. *Left:* The Kuntunse 32m disuse telecommunication antenna currently being converted to radio astronomy facility. Standing in front of the telescope is the first author. *Right:* African Undersea Cables span the coasts of Africa and link the continent to the outside World and represents greater internet bandwidth availability and potential of data transport from the Ghana antenna site [11].

- The position of the Kutunse radio telescope close to the equator will improve the Galactic plane coverage, specifically due to the shortage of radio telescopes in the Southern Hemisphere.
- It will improve the cadence at which the sources will be monitored naturally.
- It will also improve the idea of a "World Telescope", the east west coverage of different telescopes on earth will naturally provide us with the ability to study Intra-day variability.
- Improved number of sources monitored.
- If Kutunse joins the European VLBI Network (EVN), spatial resolution will also be dramatically improved.

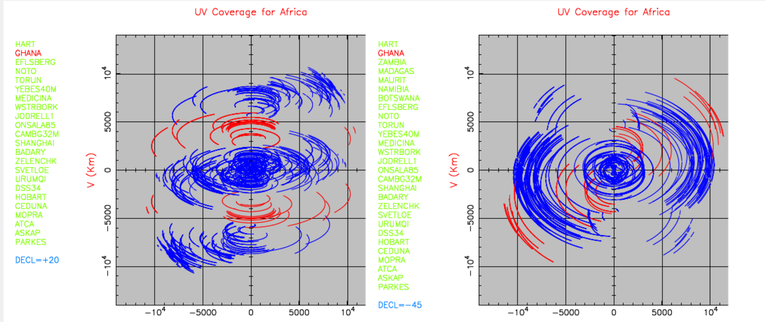


Figure 3. Global VLBI UV coverages of full-track observations showing input from the Ghana 32m antenna in red tracks observing a source: *Left:* At the declination $+20°$ with the existing VLBI antennas. *Right:* At the $-45°$ declination with other five proposed AVN antennas in Africa.