

Status of Ny-Ålesund Geodetic Earth Observatory

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Abstract The current status of the Ny-Ålesund Geodetic Earth Observatory is presented.

In September 2023 the legacy 20-meter radiotelescope (Ny) was decommissioned. All efforts are focused on the VGOS VLBI twin telescopes (Nn and Ns) operations during 2024. The SLR is planned to become operational in the beginning of 2025. Then the observatory will be a so-called fundamental station co-locating VLBI, SLR, DORIS, GNSS, and gravimeters.

Keywords Ny-Ålesund, status, station, VLBI, SLR, DORIS, GNSS

1 Introduction

The Geodetic Observatory of the Norwegian Mapping Authority (NMA) is situated at 78.9° N and 11.9° E in Ny-Ålesund, on the west side of the island Spitsbergen in Svalbard. The Geodetic Observatory at Brandal site features two fast-slewing VGOS twin telescopes, three GNSS receivers in the IGS network, and two Superconducting Gravimeters which are part of the International Geodynamics and Earth Tide Service. The SLR is under installation, planned to be operational in 2025. A solar radio burst monitor and a fourth GNSS receiver from the German Research Center of Geosciences (GFZ) are hosted in Rabben site. The observatory also hosts an accelerometer from the Insti-

tuto Geográfico Nacional in Spain and a GISTM (GPS Ionospheric Scintillation and TEC Monitor) receiver which is operated in the frame of ISACCO, an Italian research project on ionospheric scintillation observations, led by the Italian Institute of Volcanology and Geophysics (INGV). Another Real-Time Ionospheric Scintillation (RTIS) Monitor has been set up and operated by the NMA since November 2012. A DORIS station is located approximately 350 m from the new geodetic observatory at Brandal and is hosted by the French-German AWIPEV research base. A tide gauge is in operation at the harbor in Ny-Ålesund.



Fig. 1 The observatory will be a so-called fundamental station from 2025.

2 Dismantling 20-m Antenna (Ny)

The 20-m legacy VLBI radiotelescope at Rabben site observed its last light on the 14th of August 2023. The colleagues from Greenbank observatory visited

1. Norwegian Mapping Authority - Ny-Ålesund Geodetic Earth Observatory

2. Norwegian Mapping Authority



Fig. 2 The Ny-Ålesund geodetic observatory with the 13-m twin telescopes. From left to right: Ny-Ålesund 13-m North antenna (Nn) which is currently contributing in both the IVS VGOS and legacy networks, SLR dome, and Ny-Ålesund 13-m South antenna (Ns) which has been contributing in the IVS legacy network with parallel observations with the 20-m antenna (Ny). Operations building on the right front.

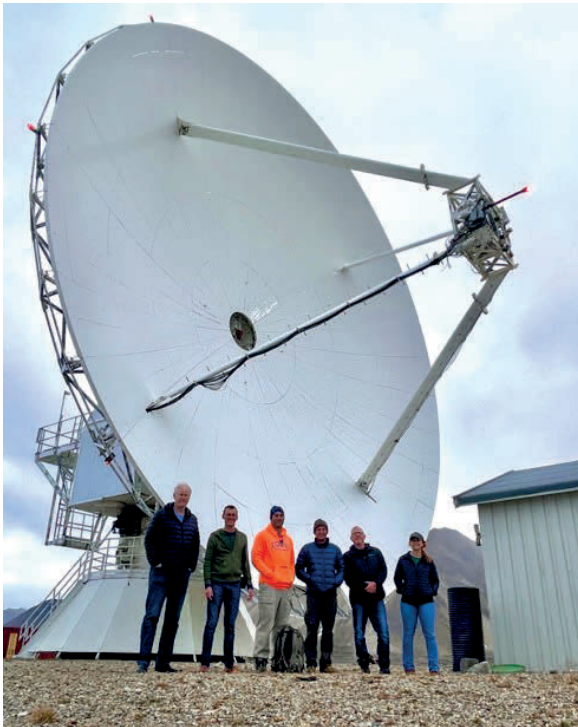


Fig. 3 Leif Morten Tangen from Kartverket and the colleagues from Greenbank Observatory before the dismantling of the antenna started.

Ny-Ålesund to take parts from the antenna that they could use as spare parts for their twin 20-m telescope.



Fig. 4 The colleagues from Greenbank Observatory working on the 20-m antenna, taking panels from the parabola and gear boxes as spare parts.

After two weeks of work, all the parts they collected were sent to Greenbank observatory in a container.

3 Local-tie Measurements

Every year, a local-tie measurement campaign is carried out at the Ny-Ålesund Geodetic Observatory to ensure the stability of the observatory over time. To know more about the local-tie measurement results, please check the ‘Local-ties and Repeated Stability Measurements in Ny-Ålesund’, O. Tangen et al., proceedings article in the current proceedings volume.



Fig. 5 The colleagues from Greenbank Observatory and their container full of spare parts.

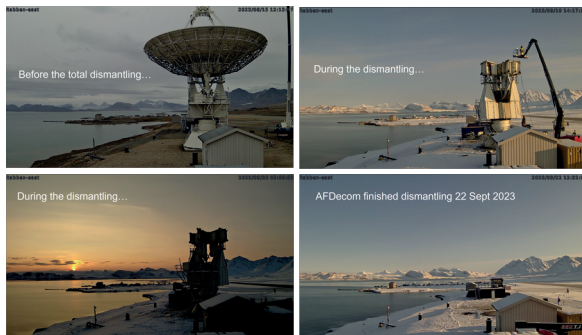


Fig. 6 A Norwegian company completed the total dismantling of the antenna from the 14th to 22nd of September 2023.



Fig. 7 The area where the 20-m antenna had been located, once the decommissioning was finished.

4 NYTIE Sessions

Before the dismantling of the 20-m antenna (Ny), a series of legacy sessions were observed in parallel between Ny and the 13-m South antenna (Ns) to establish an overlap between the Ny time series coordinates and the Ns time series coordinates. Customized local VLBI



Fig. 8 Halfdan Pascal Kierulf during the last local-tie measurement campaign with the 20-m antenna (Ny) in the background before the decommissioning.

sessions (NYTIE) were also observed between Ns and Ny, and at a later time, the 13-m North antenna (Nn) joined the NYTIE sessions as well.

5 4G in Ny-Ålesund

Since late November 2023, a 4G mobile network has been available in Ny-Ålesund. Evaluation of the impact on the VLBI data is ongoing, and a coordination area of 900 m around the observatory was established.

6 SLR

The SLR project is ongoing, and the GTA (Gimbal Telescope Assembly) was installed during February 2024. The Moon was used to observe its first light, and the calibration and the first pointing model were real-

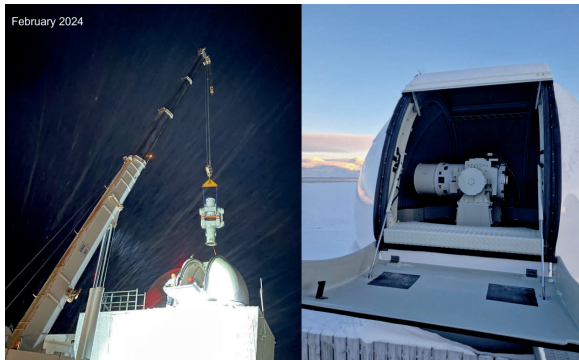


Fig. 9 Installation of the GTA during February 2024.

ized by observing a set of bright stars. The next step will be the installation of the laser on-site in the beginning of 2025. The SLR is expected to be fully operational in the second half of 2025.

7 Coming Future

The VGOS receiver, to be installed in Ns during autumn 2024, is being upgraded at Yebes Observatory. The upgrade consists mainly of modifying the configuration of the LNAs (Low Noise Amplifiers) from a single-ended to a balanced configuration. After the upgrade, the receiver will be exactly equal to the VGOS receiver in the Nn antenna. The Ns antenna will start contributing to the IVS VGOS and legacy networks as soon as the installation and first tests are completed by the end of 2024 or the beginning of 2025. The SLR will be fully operational by the second half of 2025.