

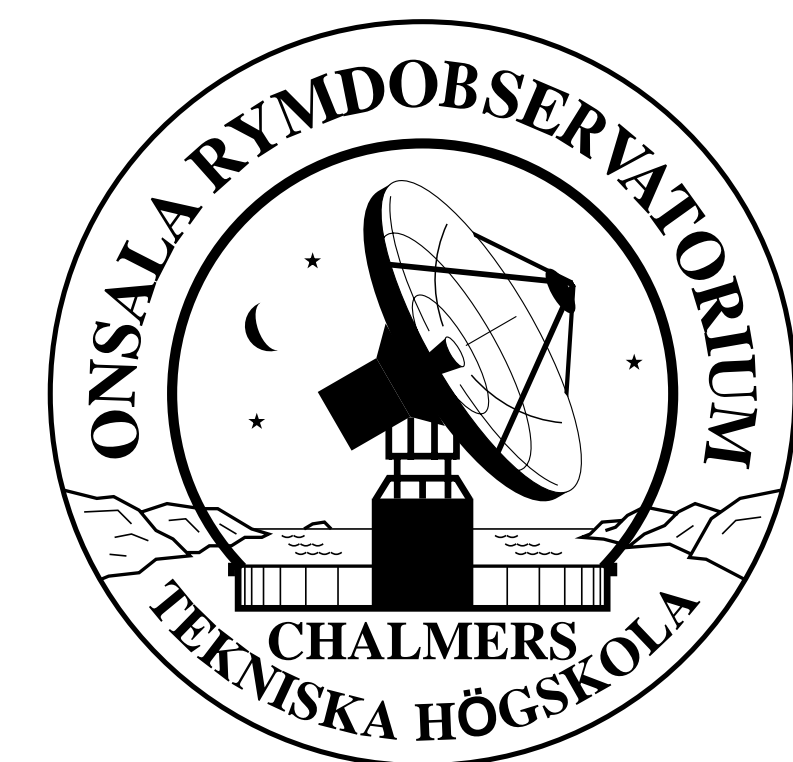


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# The Onsala Twin Telescopes Project

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## Introduction

The Onsala Space Observatory is the European site in the International VLBI Service for Geodesy and Astrometry (IVS) that has the longest history in VLBI. First geodetic VLBI measurements were performed already in 1968 with the 25 m radio telescope. Onsala is today one of the sites with the longest time series in the IVS data base. The observatory is one of the unique fundamental space geodetic sites that have a direct access to the coast line and co-locate VLBI, GNSS, gravimetry, and sea-level monitoring. Onsala is thus an important co-location site for the Global Geodetic Observing System (GGOS).

Being well aware of the VGOS standard it was clear around 2010 that Onsala was in need for a telescope with significantly faster slew rates than the existing radome-enclosed 20 m telescope.

## Twin telescope project

Summary of the construction phase:

2011 August: a proposal for funding was submitted to Knut & Alice Wallenberg Foundation by the president of Chalmers.

2012 April: the proposal was approved.

2014 February: the building permit was obtained and the preparation of the grounds including road construction was immediately started.

2014 June: start of the procurement process of the twin telescopes.

2014 December: an order for the telescopes was placed with MT Mechatronics.

2015 August: the procurement of the telescope concrete foundations was handled separately by Chalmersfastigheter and an order was placed with the main contractor Hansson & Söner.

2016 January: the concrete foundations were completed, now waiting for the telescopes.

2016 June: the containers with the telescope parts arrived and the installation started.

2016: two VGOS receivers were built in house by the electronics laboratory at Onsala.

2016 December: the Site Acceptance Test (SAT).

2017 January: the 1st VGOS receiver, with a QRFH feed, was installed in the north telescope.

2017 March: the digital backend units, two DBBC3, were installed and commissioned.

2017 April: the 2nd VGOS receiver, with an Eleven feed, was installed in the south telescope.

## Overall geodetic milestones at OSO

1968: First intercontinental VLBI for astronomy and geodesy using the 25 m telescope.

1980: First Mk-III experiments with a supporting WVR using both the 20 m (X-band) and the 25 m (S-band) telescopes.

1990: The ONSA GNSS station started operations. It is today the GNSS station with the longest observing history in the world.

2004: First ever intercontinental real-time VLBI fringes (Onsala–Westford baseline).

2009: Installation and start of operation of the superconducting relative gravimeter.

2012: Installation of the seismometer station, a site in the Swedish national seismic network.

2015: Inauguration of the super tide gauge station, a major site in the national sea level observational network.

2017: Inauguration of the Onsala twin telescopes.



The vision when the building permit was obtained.



Preparing the grounds in February 2014.



Ground preparations almost ready.



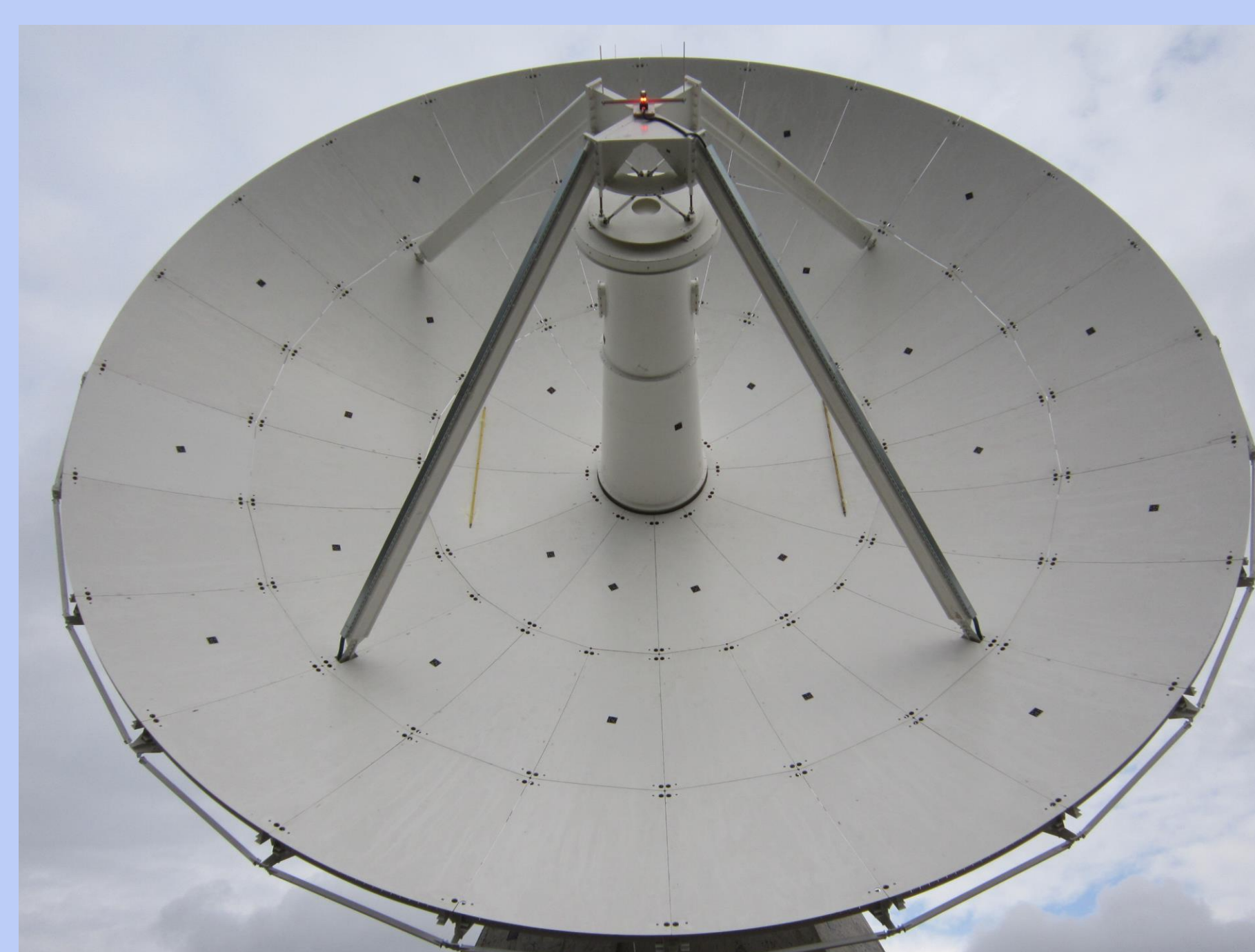
The concrete foundation of the southern telescope.



Lifting the azimuth cabin of the southern telescope.



The reflector on its way to the northern telescope.



Reflector prepared for adjustment measurements.



Most of the heavy items in their appropriate place.

**More details of the Onsala twin telescopes project presented at the 23<sup>rd</sup> working meeting of EVGA**  
Flygare, J., et al., Sensitivity and antenna noise temperature analysis of Onsala twin telescopes 3-18 GHz  
Pantaleev, M., et al., Design, implementation and tests of the signal chain for the twin telescopes at Onsala Space Observatory.  
Helldner, L., et al., Time and frequency distribution for the Onsala twin telescopes.