

# Ny-Ålesund Geodetic Observatory

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## Abstract

In 2012 the 20-m telescope at Ny-Ålesund, Svalbard, operated by the Norwegian Mapping Authority (NMA), took part in 163 out of 168 scheduled sessions of the IVS program. Since spring, all data was transferred by network, and the receiver monitoring computer was replaced by a bus-coupler. In autumn, the NMA received building permission for a new observatory from the Governor of Svalbard. The bidding process and first construction work for the infrastructure will start in 2013.

## 1. General Information

The Geodetic Observatory of the Norwegian Mapping Authority (NMA) is situated at 78.9° N and 11.9° E in Ny-Ålesund, in Kings Bay, at the west side of the island of Spitsbergen. This is the biggest island in the Svalbard archipelago. In 2012, Ny-Ålesund was scheduled for 122 24-hour VLBI sessions, including R1, R4, EURO, RD, T2, and RDV sessions, and 46 one-hour Intensives within the Int3 program.

In addition to the 20-meter VLBI antenna, the Geodetic Observatory has two GPS antennas in the IGS system and a Super Conducting Gravimeter in the Global Geodynamics Project (GGP) installed at the site. The French-German AWIPEV research base in Ny-Ålesund operates a DORIS station. In October 2004, a GISTM (GPS Ionospheric Scintillation and TEC Monitor) receiver was installed at the Mapping Authority's structure in the frame of ISACCO, an Italian research project on ionospheric scintillation observations, led by Giorgiana De Franceschi of the Italian Institute of Volcanology and Geophysics (INGV). Another Real-Time Ionospheric Scintillation (RTIS) Monitor was set up by the NMA in November 2012.

## 2. Component Description

The antenna, which has a 20 m diameter, is intended for geodetic use and receives data in S- and X-band. Its design and construction are similar to those at Green Bank and Kokee Park. A rack with 14 video-converters, a Mark IV decoder, and a Mark 5 sampler streams the data to a Mark 5B+ recorder. A Mark 5A unit is used to transfer data via network to the correlators. Timing and frequency is provided by a NASA NR maser, which is monitored by a CNS system.

## 3. Staff

The staff at Ny-Ålesund consists of four people employed at 75%, which means that three full-time positions are covered. Each position goes with a two-year contract that can be extended up to 12 years, but on average people stay three to four years. The observatory is part of the Geodetic Division of the Mapping Authority with the main office at Hønefoss (near Oslo).

In summer 2012, Carl Petter married and moved with his wife Carina to the mainland – Congratulations! By end of 2012, Kent Roskifte had been recruited as a new operator, and Moritz will take over the role of station manager after Carl Petter. See Table 1 for an overview.



Figure 1. Wedding scene in Kongsfjorden (Photo: Linda Bakken).

Table 1. Staff related to VLBI operations at Ny-Ålesund.

Hønefoss	Section Manager	Reidun Kittelsrud
	Technical Manager	Leif Morten Tangen
Ny-Ålesund	Station Manager	Carl Petter Nielsen (until 2012.12.31)
	Engineer	Geir Mathiassen
	Engineer	Kent Roskifte (from 2013.01.01)
	Engineer	Moritz Sieber
	Engineer	Åsmund Skjæveland

#### 4. Current Status and Activities

**Monitoring** After the former receiver monitoring system (based on a 386-board) stopped working after 16 years, we were looking for alternatives. TIGO ran into similar problems with their hardware in 2009 and had good experiences with a solution based on a Beckhoff BK9000 bus-coupler. We kindly were provided with their bits of software (which saved us a great deal of trouble and headache, so thanks a lot!) which fit into our environment.

For the documentation-wiki, at the station some scripts do a good job of generating graphs of the sessions' midob-data and thus provide both current data and their recent development not just for the FS-computer.

**Session Performance** After spurious phase-cal signals of unknown origin, the phase-cal unit was replaced during the maintenance-week in October. No bigger problems were observed afterwards, but the cable is probably beginning to wear out, also.

Four Int3 sessions were not observed due to a crack in one of the support pillars for the sub-

reflector at Tsukuba-32m. Seshan, which participated instead, was not available for those four dates.

An overview of sessions with trouble and their explanations can be found in Table 2. All other sessions were observed according to schedule.

Table 2. Sessions with trouble.

EUR115	general problem with schedule, updated on late notice
R1525	not ready after scheduled maintenance period (installing receiver monitor). The Int3-Intensive on the same day was replaced by a J-schedule on late notice
R1530	fieldsystem PC hard disk trouble slowing down the RAID and everything else
R4534	receiver warming up during last six hours
R1539	last six hours warm
RDV93	late start due to cooling down receiver
R4553	FS crashed due to bug in rxcom (the station's program doing the communication via TCP/Modbus with the receiver monitor). Restarted, but lost 15 minutes or so
R1559	late start, too late getting schedule
R4560	no data for two hours
R1564	warm receiver during the whole session

**E-Transfer** All measurement data is transferred by network to the correlators now, to Socorro with the great help of Haystack, which buffers the data. This is a great improvement since the ground handling of outbound freight from SAS Cargo and FedEx in Oslo recently became less and less reliable.

**New Instrumentation** At the end of April, NavSys AS started broadcasting RTCM3.x-data for customers of the CPOS-service in the Kings Bay area. Now the positioning accuracy has increased to a few centimeters, without the need to establish a reference station for each measurement.

The Norwegian Mapping Authority established two of its own instruments: another Real-Time Ionospheric Scintillation (RTIS) monitor at the end of November and an absolute gravimeter co-located to the existing superconducting gravimeter at the end of December.

**New Observatory** After the budget was granted in 2011, the Governor of Svalbard approved the impact analysis of the new observatory project. Construction work for the road will start in 2013, in parallel with the tendering process.

## 5. Future Plans

After the iron-values for one of the two azimuth gears showed high and increasing values in the past, it was decided to replace the gearbox with a spare, which will take place during the scheduled maintenance week in March. Later in 2013 the road construction work to the new observatory's location will start. Due to the arctic climate and environmental protection plans, this has to wait until summer.