

Ny-Ålesund 20 Metre Antenna

Helge Digre

Abstract

For the year 2007, the 20-meter VLBI antenna at the Geodetic Observatory Ny-Ålesund has tried to participate in VLBI experiments at the scheduled level and has done 73 of 79 24-hour experiments. Ny-Ålesund has also participated in an e-VLBI test and in e-VLBI experiments, transferring experiment data from Ny-Ålesund to the Haystack Correlator and later to the Bonn Correlator. Ny-Ålesund has done 14 of 19 Intensive experiments. The reasons for the lost experiments were the personnel situation, problems caused by an error in the main power delivery, and a lack of Mark 5 modules at the station. In 2007, Ny-Ålesund has continued to feel some consequences of the reduction in maintenance support and the lack of operator presence, both of which were caused by the reduction in staff that came as a result of the general reduction in the Norwegian Mapping Authority's (NMA) budgets. For 2007, Ny-Ålesund was a two person station until June, when Jan-Ivar Tangen's contract ended. The station was closed for three weeks for summer holiday and became a three person station again in September. In August, a new, second operator, Inge Sanden, was employed and started his training, while in September, a new, third operator, Ole Bjørn Årdal, was employed and started his training. At the beginning of the year, maintenance and repair were done at a minimum level, given the personnel situation, and no responses were made to any alarms, and no errors were corrected during unmanned operation. Towards the end of the year, the station was normally manned while experiments were running, as long as all employees were present in Ny-Ålesund. Ny-Ålesund is a Mark 5 station only.

1. General Information

The Geodetic Observatory of the NMA at 78.9 N and 11.87 W is located in Ny-Ålesund, in Kings Bay, at the west side of the island Spitsbergen, the biggest island in the Svalbard archipelago. In 2007, Ny-Ålesund was scheduled for 79 R1, EURO, RD, and RDV experiments and 19 K07 Intensives. Some X-band experiments were totally cancelled because of systems being down. For the same reason, one X-band experiment ran only 13 hours. Some X-band experiments lost up to 15 hours observing time due to alarms during unmanned operation. Two experiments ended early, and up to 6 hours of observing time were lost because of the installation of e-VLBI equipment. Most of this lost observation time was caused by lack of maintenance and reduction of personnel.

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 on the site. There is also a CHAMP GPS and a SATREF (dGPS) installation at the station. At the French station in Ny-Ålesund, there is a DORIS station. In October 2004 a GISTM (GPS Ionospheric Scintillation and TEC Monitor) receiver was installed at the Statens Kartverk structure in the context of ISACCO, an Italian research project on ionospheric scintillation observations, led by Giordiana De Franceschi of the Italian Institute of Volcanology and Geophysics (INGV).

2. Component Description

The antenna is intended for geodetic use and is designed for receiving in S-band and X-band. The equipment is Mark 5. The station configuration file can be found on the IVS web site: <ftp://ivscc.gsfc.nasa.gov/pub/config/ns/nyales.config>. Ny-Ålesund is located so far north that it has daytime aurora in winter and midnight sun from the 20th of April to the 27th of August. The



Figure 1. Ny-Ålesund antenna.

location of the antenna enables signal reception over the North Pole. In 1998, Ny-Ålesund was the only antenna that could receive signals from the Mars Global Surveyor for 24 hours.

3. Staff

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

| | | |
|-------------|----------------------------------|---|
| Hønefoss: | Section manager: | Rune I. Hanssen (through September) |
| | | Line Langkaas (from October) |
| | Station responsible at Hønefoss: | Svein Rekkedal |
| | | |
| Ny-Ålesund: | Station commander: | Leif Morten Tangen ¹ / Helge Digre |
| | Engineer | Jan-Ivar Tangen to 2007.06.30 |
| | Engineer | Inge Sanden from 2007.08.01 |
| | Engineer | Ole Bjørn Årdal from 2007.09.01 |

¹Leif Morten Tangen was granted permission from 2006.11.01 until 2008.03.01. Leif Morten Tangen delivered his resignation in November 2007 and will have a last period in Ny-Ålesund from 2008.02.11 to 2008.03.13.

Helge Digre participated in the TOW 2007.

4. Current Status and Activities

Ny-Ålesund has tried to participate in VLBI experiments at the scheduled level and has done so, mostly as a tag-along station. Ny-Ålesund is a Mark 5A only station. Both the FS and Mark 5 are upgraded to the latest software versions. Two new FS computers were bought last year, and some modifications and testing still must be done before they can be used permanently for experiments. The communication problem with the receiver has been solved. What still remains is a communication problem with the weather station. A direct high-speed data link from Ny-Ålesund Geodetic Observatory to MIT Haystack has been tested. The high-speed data link was supposed to be able to transfer 100 Mbps. The Ny-Ålesund high-speed data link project is a cooperative effort between NMA, UNINETT, NORDUnet, NASA Goddard Space Flight Center, and MIT Haystack Observatory. The responsible person at NMA was Rune I. Hanssen. In the second half of 2007, e-VLBI has been used for transferring the K07 measurements from Ny-Ålesund to Bonn Correlator.

The Super Conducting Gravimeter (SCG) placed on the same fundament as IGS-GPS NYA1 has been running without problems. The yearly service on the system was performed by Dr. Yoshiaki Tamura and Ove Omang in the middle of August. National Astronomical Observatory of Japan, Mizusawa VERA Observatory, which owns the SCG, lent this equipment to NMA starting on 2007.04.01, to keep the recording of the data going. The Geodetic Observatory, Ny-Ålesund, was scheduled to use the last part of 2007 to again become fully manned with three people, operating on a normal basis.

5. Future Plans

Ny-Ålesund will continue to participate in the 80 regular and 53 Intensive experiments for which the antenna is scheduled, and it intends to move from tag-along status to fully operational from the start of 2008. Ny-Ålesund is likely to participate in CONT 2008. We hope that the new Field System computers, which in fact are not so new anymore, will be put into permanent use as soon as possible, as the last of the communication problems was solved the second week of 2008. The National Astronomical Observatory of Japan, Mizusawa VERA Observatory, is lending the Norwegian Mapping Authority their superconducting gravimeter, which is already installed in Ny-Ålesund, so the scientific measuring series can continue. The SCG has to be refilled with liquid Helium each year, and the lift has to be re-certified every year. The insulation in the roof of the Observatory has absorbed a lot of moisture. The plan is to renovate the roof and build a better solution during the summer of 2008, so that similar problems can be avoided in the future.