

New 7.3 meter satellite antenna to FMI Arctic Research Centre at Sodankylä

Jyri Heilimo⁽¹⁾, Petteri Ahonen⁽²⁾, Riika Autio⁽²⁾, Jouni Pulliainen⁽¹⁾

*⁽¹⁾Finnish Meteorological Institute
P.O. Box 503, 00101 Helsinki, Finland*

*⁽²⁾Finnish Meteorological Institute
Tähteläntie 62, 99600 Sodankylä, Finland*

Finnish Meteorological Institutes's Arctic Research Centre (FMI-ARC) owns and operates satellite receiving station in its Sodankylä facilities. With the current 2.4 meter antenna FMI receives the direct data downlink from NASA's EOS Aura and EOS Terra, and EOS Aqua spacecraft. EOS Aura spacecraft has OMI instrument on board measuring atmospheric ozone column. The OMI data is downlinked to Sodankylä simultaneously as it is measured for Very-Fast-Delivery (VFD) data products of ozone content above Finland and northern Europe. Direct downlink of MODIS data from EOS Terra and EOS Aqua is also received and data is distributed to scientific users in Finland.

In 2009, FMI initiated a project to enhance its satellite data reception and data processing capabilities at Sodankylä. A part of this project is procurement of a new antenna and receiver system capable of receiving entire data dump from the polar orbiting spacecraft.

As a result of international bidding process, a antenna supplier was selected in spring 2010. At the moment, the satellite antenna has passed the Critical Design Review (CDR) and is being manufactured at the suppliers factory. Next major milestone, Factory Acceptance Test (FAT), is scheduled to mid January. In FAT the antenna, along with all the deliverable items is, assembled at the manufacturer's premises and tested before shipment to the site at Sodankylä. The antenna assembly at the site, is scheduled in April 2011 and the On-Site Acceptance Tests (OSAT) are scheduled to End April

The antenna has 7.3-meter Cassegrain type main reflector. The receiver works in X-band, with frequency range 7.750-8.400 GHz. The receiver system is multi-mission capable of receiving data dump from several satellites, with data rates up to 320 Mbits/s. The system is flexible and is upgradeable to accommodate higher data rates and new frequency bands (L and Ka). Additionally, upgrade to support S-band uplink is possible.

In addition to the antenna and receiver, a data processing system is being procured. The processing system will be capable to process data from Radarsat-1, FengYun-3, Envisat's ASAR and MERIS instruments. The processing system has plenty of processing capacity remaining and new target missions are being investigated.

The new satellite receiving station and data processing facilities will facilitate the development of independent environment observation system that enables Finland to prepare for natural disasters as well as weather and climate induced emergencies more efficiently. Potential applications and uses of the system are for example: flood detection, ice monitoring in the Baltic Sea, forest fire detection, oil-spill monitoring, and snow cover analysis and various other remote sensing applications.

FMI has established wide co-operation with NASA, ESA, EUMETSAT and KNMI in satellite data reception and processing. With the new antenna and the processing infrastructure, a new wider avenue is opened for FMI to provide satellite data reception and data processing services both domestic and international partners.