



# MEOS™ Polar Ground Station

The *MEOS Polar Ground Station* is a multi-mission, flexible and modular turnkey system for acquisition, archiving, processing, analysis and distribution of meteorological data.

The *MEOS Polar Ground Station* supports the following satellites, sensors and transmission formats:

Satellites	Sensors	Transmissions
NOAA	AVHRR, TOVS, ATOVS	HRPT
SeaStar	SeaWIFS	HRPT
FY-1	MVISR	CHRPT
TERRA and AQUA	MODIS, AIRS, AMSU-A, HSB	Direct Broadcast
METOP	AVHRR, ATOVS	HRPT

*Supports other missions upon request.*

We have two different options for METOP and NOAA level 0 reception; either a L-band tracking antenna for L band reception or a stationary 1.0 m antenna for Hotbird reception (Eumetcast solution).

The *MEOS Polar Ground Station* can be delivered with support for any combination of these missions depending on the customer's requirements.

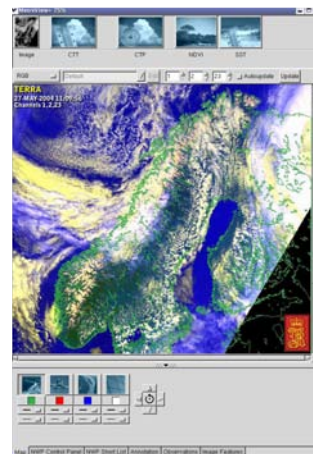
## Options

- Advanced Package Software
  - Generation of Value Added Products
- AVHRR, TOVS and ATOVS processing
- AIRS, AMSU-A and HSB processing
- TIP data extraction and archiving
- Web catalogue
- Archiving to DLT or DAT drive or jukebox
- Integration of customer-specific model data, in-situ and radar images into the MEOS Visualisation Tools



## Key features & benefits

- Complete ground station
- Open architecture allows easy upgrading
- Unix/Linux based environment
- Flexible, modular and scalable design
- Multi-mission support
- Basic Package software
- Ingest of raw data to disk and pre-processing
- Local and remote operation control
- Configurable Graphical User Interface for monitoring and control of the ground station
- Advanced logging and display of site telemetry and status in real time
- Quick Look Viewer
- Processing of basic products depending on mission
- Open data access at all processing levels
- Generating of browse and meta data files
- Archiving of raw data and higher order products
- Export file formats: JPEG, PPM and PNG
- Distribution of raw data and products (FTP, Geotiff and NFS)
- Visualisation tools
- Web reports
- Extensive training, maintenance and support program



MODIS channels 1,2 and 23  
with overlaid coastlines



Quick Look Viewer - AVHRR

## Basic Package

The Basic Package ingests data from the Front End System and provides all the necessary tools for basic processing and operation of the ground station. Data are pre-processed and stored into a Unix file system in mission specific formats or as Level 0, Level 1 and map-projected products in HDF 5 format. All data is archived in a product database.

Map-projected products can be viewed with the visualisation software package *Vimsat*, which is a standard feature of the Basic Package. It is a fast, operational viewing tool containing functions; such as accessing archived products, zooming, printing, image enhancements, format converting and overlaying graphics.

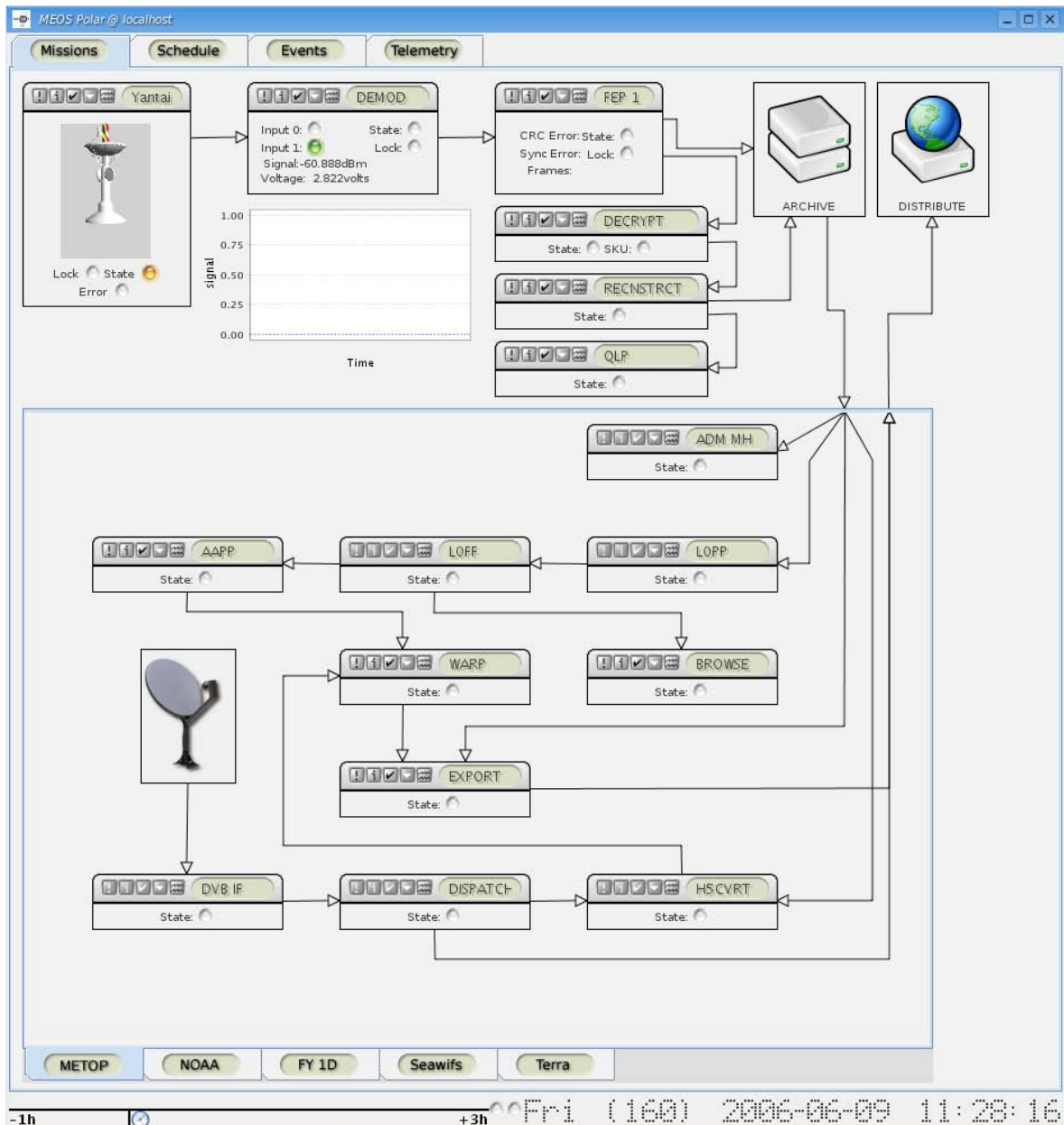
Raw data files and higher level products may be distributed over LAN/WAN to other users. All operations are automatic and easily configurable, including management of disk space and retrieval of processing parameter files.

The system has advanced capabilities for monitoring of the system. All status information is written to disk as log reports. This gives a unique capability to do diagnostics locally as well as remotely, and to generate reception quality reports. The Basic Package contains a Quick Look Viewer showing incoming data in real time, with possibility to show selected channels, perform image enhancement, view a previous dissemination and to display multiple missions.

## Advanced Package

The Advanced Package is an add-on to the Basic Package and contains automatic processing of Value Added Products. The range of Value Added Products include nowcasting products, such as Cloud Type and Cloud Top Temperature, and climatological products like Sea Surface Temperature and Normalised Difference Vegetation Index.

## Display Examples



## Front End System

The system provides the functionality to track the satellite, receive the radio frequency and deliver data to the ingest system. The Front End System includes:

- Antenna
- Feed/downconverter
- Digital receiver/bitsynchroniser
- Satellite tracking controller

Kongsberg Spacetec provides different antenna sizes depending on the customer's requirements:

Frequencies	L	L	L	L	X	X	Dual L,X
Antenna sizes (m)	1.2	1.8	2.1	2.4	2.4	3.2	3.2 ->
Satellites							
NOAA	+	+	+	+			+
METOP	+	+	+	+			+
SeaStar	+	+	+	+			+
FY-1	+	+	+	+			+
TERRA and AQUA					+	+	+

## Basic Package

- Ingest of raw data to disk and pre-processing
- Production oriented *Station Control System*
- Local and remote operation control
- Configurable Graphical User Interface for monitoring and control of the ground station
- Advanced logging and display of site telemetry and status in real time:
  - Schedule display
  - Activity display
  - Event log display
  - Station overview display
  - Telemetry viewer display
- *Quick Look Viewer*
- Generating of browse and meta data files
- Archiving of raw data and higher order products

- Processing of the following products:
  - AVHRR:
    - Level 1b and calibrated map-projected products
  - SeaWiFS:
    - Level 1a and Level 1b as generated by the SeaDAS processing package
  - MVISR:
    - Calibrated map-projected products
  - MODIS:
    - Level 0, Level 1a and Level 1b, and bowtie corrected calibrated map-projected products
    - The SeaDAS package is integrated in MEOS and used for Level 1a and Level 1b MODIS processing
- All map-projected products have defined projection parameters, and are stored as HDF 5 files
- Open data access at all processing levels
- Export of HDF 5 products to JPEG, PPM and PNG, GeoTiff
- Distribution of raw data and products (FTP and NFS)
- Visualisation tools:
  - MEOS Visualisation tools for HDF 5 products
  - HDFLook can be used for MODIS and SeaWiFS Level 1a and Level 1b
- Web reports

## Host Computer

The host computer typically runs Linux operating system. It is equipped with state-of-the-art hardware, a recent model CPU, sufficient RAM for fast processing, and disk space dimensioned for the customer's data storage demands.

Additional computers can be connected in LAN/WAN if a distributed system with multiple workstations is desired.

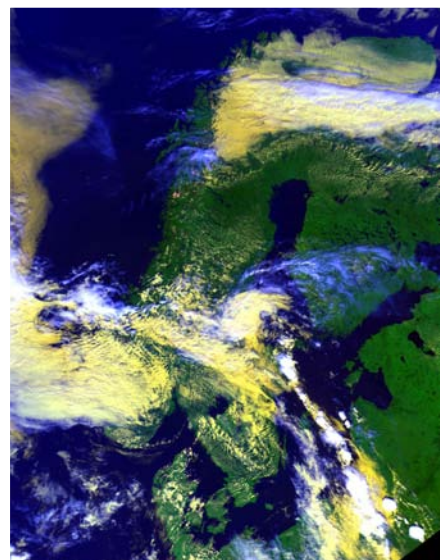
### Processing Speed for TERRA and AQUA Direct Broadcast

From the end of reception (loss of signal) to finished Level 1 is typically 15 minutes for a pass of 12 minutes.

## Display Examples



Example of 3.2 m X and L-band tracking antenna



AVHRR - Channels 1,2 and 4

**Options**

The following packages are fully integrated in the MEOS for operational production:

• **AVHRR Advanced Package - Value Added Products:**

- Sea Surface Temperature (SST)
- Cloud Top Temperature (CTT)
- Cloud Top Height (CTH)
- Cloud Top Pressure (CTP)
- Cloud Amount (CA)
- Cloud Mask (CM)
- Hot Spot Detection (HSD)
- Precipitation Index (PI)
- Normalised Difference Vegetation Index (NDVI)
- Aerosol/ash detection

• **MODIS Advanced Package - Value Added Products:**

- Chlorophyll
- Sea Surface Temperature

Other value added products will be added in next release.

• **AVHRR, TOVS and ATOVS Processing**

Kongsberg Spacetec integrates the ATOVS and AVHRR Pre-processing Package - AAPP.

• **AIRS, AMSU-A and HSB Processing**

Kongsberg Spacetec integrates the International MODIS and AIRS Processing Package - IMAPP.

• **TIP Data Extraction and Archiving Package**

The package demultiplexes NOAA and METOP HRPT raw data files and extracts TIROS Information Processor (TIP) data. TIP data is stored as a separate data type in a standard rolling archive of the MEOS system. User defined processing TIP files, such as extraction and archiving of Argos information, is implemented upon demand.

• **Web catalogue**

The package supports inventory of archived data and products through a web browser.

• **Tape Archival and Retrieval Package**

The package supports archiving and retrieve of raw data and products to DLT or DAT drive or jukebox.

• **Other Antenna Sizes**

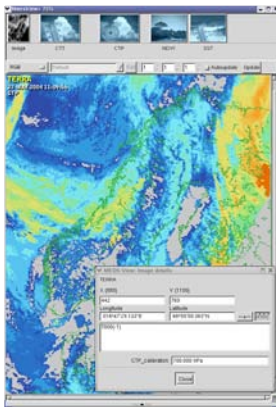
Kongsberg Spacetec provides other antenna sizes.

• **Additional Value Added Products**

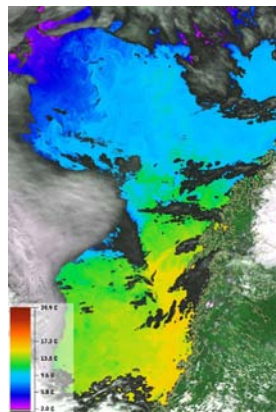
Please consult Kongsberg Spacetec for more details.

• **Integration**

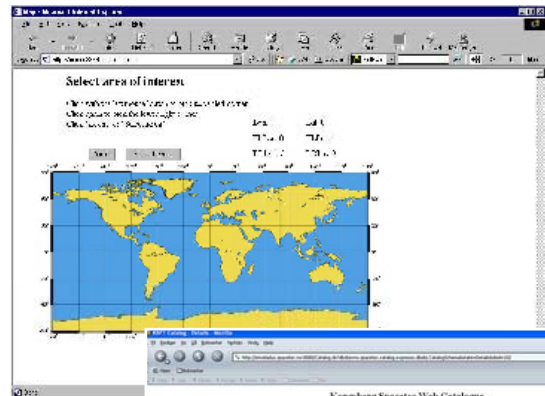
Integration of customer specific data, in-situ and radar images into the MEOS Visualisation Tools.



Cloud Top Pressure  
- MODIS



Sea Surface Temperature  
- AVHRR



Catalogue and Browse query page by using map background



Catalogue and Browse product details

**Note:**  
MEOS is a registered trademark of Kongsberg Spacetec AS.  
Specifications are subject to change without notice.

**KONGSBERG SPACETEC AS**

Prestvannveien 38 P.O.B. 6244 NO-9292 Tromsø NORWAY  
Phone: +47 77 66 08 00 Fax: +47 77 65 58 59 Email: marketing@spacetec.no www.spacetec.no

