

Events
2014/15

22 - 26 September 2014
EUMETSAT 2014
Geneva, Switzerland
<http://www.eumetsat.int/>

21 - 23 October 2014
Brussel Expo 2014
Brussel, Belgium
<http://www.meteorologicaltechnology-worldexpo.com/>

4 - 8 January 2015
95th AMS Annual Meeting
Phoenix, Arizona, USA
<http://annual.ametsoc.org/2015/>

For meeting and appointments during the events, e-mail us on marketing@spacetek.no



this issue

New 5 m MEOS™ Antenna	P.1
PH II 26GHz Telemetry Receiver	P.1
MEOS™ Sentinel-1 CGS	P.2
NRTSAR-Core	P.3
MEOS™ Capture HRTG	P.4
Test capabilities MEOS™ NAS	P.4

KSPT provides Sentinels Collaborative Ground Stations

- read more on page 2-3

MEOS™ Antenna - 5 m X/S/L band

Kongsberg Spacetek can now present our newest product - MEOS™ 5 m X/S/L antenna.

The MEOS™ 5 m antenna gives sufficient margin for data reception from direct readout and remote sensing satellites (such as Sentinel and Landsat).

Designed for optimal maintainability and reliability, the MEOS™ Antenna utilizes the most modern industrial components available. 25 years of satellite ground system experience is built into the design.

This antenna is designed and manufactured by Kongsberg for customers that request a feasible antenna with minimum maintenance needs. The antenna is intended for remote sensing satellite terminals that receive payload data in X, S- and L-band. The Kongsberg MEOS™ antenna offers better performance in situations with bad signal quality. *Our antenna product range is from 2.4 m up to 5 m.*



**MEOS™
Antenna**
5 m X/S/L band

Phase Two 26GHz Telemetry Receiver development

Kongsberg Spacetek (KSPT) has started the work for Phase Two of the 26GHz Telemetry Receiver development, in cooperation with SINTEF. The project is undertaken for ESA under the General Support Technology Program (GSTP), and through the ESOC establishment. The receiver will support Variable Code Modulation and Adaptive Code Modulation at Gigabit rates.

Phase One, which has been completed and accepted by ESA, comprised requirements consolidation, design of receiver front-end, demodulator and a SCCC (Serial Concatenated Convolutional Codes) turbo decoder.

Phase Two of the project comprises the implementation of the first prototype receiver, and then the first production unit will be built.

An early prototype receiver has been built, and is currently being tested. This prototype will be used for validation of a transmitter from an ESA establishment, where KSPT also will provide validation support.

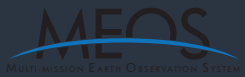
This development, which is based on the existing MEOS™ HRDFEP product from KSPT, will be a benefit to the future product evolution, driven by new missions requiring higher reliability, flexibility and supporting higher rates. More details on <http://www.spacetek.no/products>



EXTREME PERFORMANCE FOR EXTREME CONDITIONS

Sentinel-1

The SENTINEL-1 mission comprises a constellation of two polar-orbiting satellites, operating day and night performing C-band synthetic aperture radar imaging, enabling them to acquire imagery regardless of the weather. SENTINEL-1 will work in a pre-programmed operation mode to avoid conflicts and to produce a consistent long-term data archive built for applications based on long time series. SENTINEL-1 is the first of the five missions that ESA is developing for the Copernicus initiative. © ESA - <https://earth.esa.int/web/sentinel/missions/sentinel-1>



CGS contract KSAT

Kongsberg Spaceteq is under contract with Kongsberg Satellite Services (KSAT) to deliver their integrated Sentinel-1 (S-1) Collaborative Ground Segment (CGS) reception and processing system.

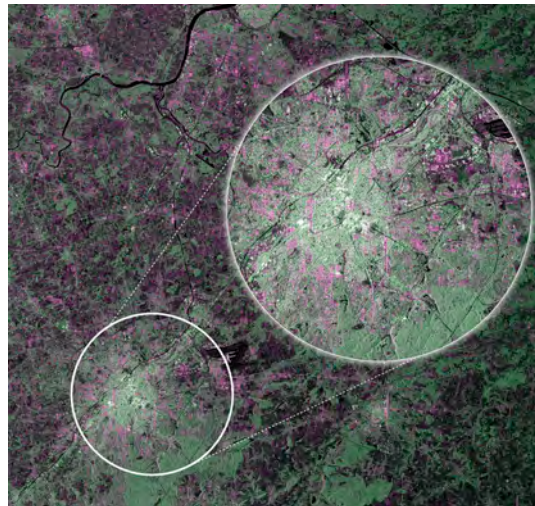
The system will do data reception at the KSAT ground station network and process the Synthetic Aperture Radar (SAR) data to level 0, Level 1 and Level 2.

MEOS™ is a registered trademark of Kongsberg Spaceteq AS, in Norway and other countries.

MEOS™ Sentinels / S-1 Collaborative Ground Station (CGS)

The MEOS™ Sentinels CGS consists of a Level-0 (L0) processing node, a management and control node, including a dispatcher, and one or more processing nodes for Level-1 processing. All the nodes are delivered on standardized HP servers.

A standard MEOS™ Sentinel-1 CGS contains an NRTSAR-Core node and an ESA Instrument Processing Facility (IPF) node. The MEOS™ Sentinel-1 CGS supports adding more NRTSAR-Core or ESA IPF nodes depending on the requirements of the user. Through supporting ESA IPF nodes the CGS supports all Level-1 and Level-2 processing modes, including Wave-mode which is not supported by the NRTSAR-Core node.



The MEOS™ Sentinel-1 CGS is a multi-mission framework that may be enhanced to support new missions. The CGS is further optimized to work with the Kongsberg Spaceteq HRDFEP / Sentinel DFEP, meaning low implementation loss and adaptive equalizer ensures optimal performance / data quality.

<http://www.spaceteq.no/products>

Brussels from Sentinel-1A © ESA

*“16 April 2014
Launched on 3 April, ESA’s Sentinel-1A satellite has already delivered its first radar images of Earth. They offer a tantalising glimpse of the kind of operational imagery that this new mission will provide for Europe’s ambitious Copernicus environmental monitoring programme. Rather aptly, the first image shows Brussels in Belgium, the seat of the European Commission.”*

Among the unique benefits of the MEOS™ Sentinel-1 CGS are the following:

Feature	Benefit
Customized Level-0 processor:	Offers the possibility to provide Level-0 products originating from a segment while it is still being downloaded. This makes it possible to start higher level processing (Level-1 processing) before the complete segment has been downloaded from the satellite.
NRTSAR-Core:	Utilizes the direct downlinked data stream. Makes it possible to start Level-1 processing in real-time. Processing options are fully configurable, enabling configurable Level-1 products that are optimized for the higher level processing or analysis. NRTSAR framework is under continuous development, utilizing new state-of-the-art functionality, including GPU usage and direct streaming functionality.
ESA IPF:	The MEOS™ Sentinel-1 CGS includes one or more of the official ESA IPF processors, integrating it seamlessly into the MEOS™ Control framework.
Java GUI with low bandwidth requirements:	The Java GUI can be displayed on any computer (Windows, Mac, Linux and Unix) in the network, LAN as well as WAN. Long distance operations and monitoring are possible.
Web and PDF quality reports:	The comprehensive quality reports are available for reporting ground station performance to the owner. They are also used for diagnostics of problems. The reports per pass are generated automatically.
SUSE Linux Enterprise based:	This gives the owner a robust system that is less prone to security attacks.
MEOS™ Control:	MEOS™ Control is a KSPT product for providing monitor and control of a complete ground station and ground station components. It can be used to control an entire ground segment, including antenna, demodulator and processors.



EXTREME PERFORMANCE FOR EXTREME CONDITIONS

Near Real-Time SAR (NRTSAR)-Core

NRTSAR-Core is a processor that provides Single Look Complex (SLC) and Ground Range Detected (GRD) products based on either a Level-0 input file or directly from an ISP data stream (accessed early, before a Level-0 product has been produced). The NRTSAR-Core processor is fully controlled from MEOS™ Control.

The NRTSAR-Core processor is part of the NRTSAR framework, which also includes higher level processing (i.e. ship detection) optimized to provide end-services in near real time. The generated Sentinel-1 products are fully compliant with the Sentinel-1 Product Specification.

The NRTSAR framework is under continuous improvement, and among future modifications are General Processing Unit (GPU) utilizations for performance enhancement.

The NRTSAR-Core processor is fully configurable to support official Sentinel-1 products as specified in the table below. In addition, processing parameters may be changed (i.e. output pixel spacing, processing bandwidth, multi-look parameters) to provide non-official products that may increase the quality of the subsequent value added processing. This means that all supported product families may be processed to a configurable format which is still compliant with the product specification.

Topographic Progressive Scan (TOPS) algorithms used by the NRTSAR-Core processor have been developed in cooperation with the Northern Research Institute (NORUT) in Tromsø. These algorithms were developed under an ESA contract and are optimized regarding processing speed and quality.

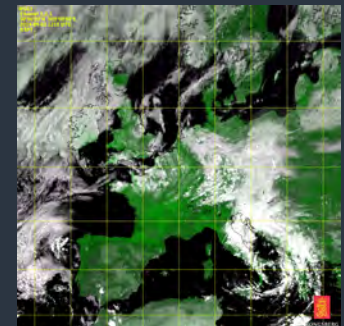
Preliminary performance numbers for the NRTSAR-Core GRD processing of TOPS mode Sentinel-1 data indicate that the NRTSAR processing is up to three times faster than processing using an official ESA IPF node on a similar hardware setup. These numbers are measured before any GPU utilizations are done.

Sentinel products		
IWS	SLC	Official
		Configurable
Interferometric Wide Swath	GRD	High Resolution - HR
		Medium Resolution - MR
		Configurable
EWS	SLC	Official
		Configurable
Extended Wide Swath	GRD	High Resolution - HR
		Medium Resolution - MR
		Configurable
SM	SLC	Official
		Configurable
StripMap	GRD	Fine Resolution - FR
		High Resolution - HR
		Medium Resolution - MR
		Configurable

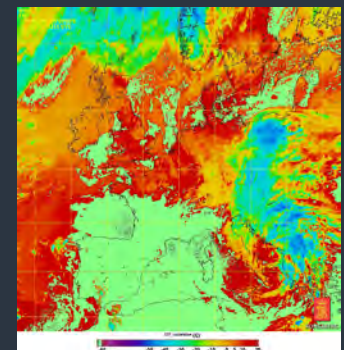
MSG DVB II

Kongsberg Spaceteccs MSG XRUS is a well tested system which has been on the market for more than ten years. The current version runs on SuSE Linux Enterprise Server 11 SP3 and includes both processing and band math processing. The MSG XRUS system fully supports the new DVB-S2 transmission of EUMETCAST by use of third party DVB-S2 receivers.

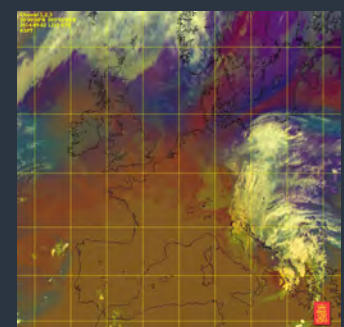
CENTRAL EUROPE IMAGES



Channel combination 1,2,1 (RGB)



Value added processing - Cloud Top Temperature



Band math combination - Airmass



Antarctica Peninsula from Sentinel-1A - © ESA
 "Acquired on 13 April 2014 at 23:57 GMT (14 April at 01:57 CEST) by Sentinel-1A, this image shows a transect over the northern part of the Antarctica Peninsula. It was acquired in the satellite's 'strip map' mode with a swath width of 80 km and in dual polarisation. The colours indicate how the land, ice and water reflect the radar signal differently."



New contracts

Kongsberg Spacetek has signed a contract with Kongsberg Satellite Services (KSAT) to deliver one MEOS™ Capture HRDFEP

SEPT2014

Kongsberg Spacetek has signed a contract with Kongsberg Satellite Services (KSAT) to deliver one MEOS™ NAS

SEPT2014

Kongsberg Spacetek is under contract with Kongsberg Satellite Services (KSAT) to deliver their integrated Sentinel-1 (S-1) Collaborative Ground Segment (CGS) reception and processing system.

AUG2014

Kongsberg Spacetek has signed a contract with MicroStep-MIS, to provide our MEOS™ Polar and Geo system to the Slovakian Hydromet Institute in Bratislava.

AUG2014

Kongsberg Spacetek has received a new purchase order from Honeywell Technology Solutions Inc/NASA, 2 EBOX-S systems, 2 EBOX-R and four HRDFEP systems (derivate of MEOS™ Capture systems).

JUL2014

Contract with Raytheon Company of the U.S. for delivery of parts of the ground segment for the satellite program Joint Polar Satellite System (JPSS).

APR2014

MEOS™ Capture HRTG Test capabilities

The MEOS™ Capture HRTG (High Rate Test Generator) is a high performance, programmable test generator, supporting ECL/IF output of PN sequences, simulated data and real satellite data. Current users include space agencies, satellite operators and ground station operators.

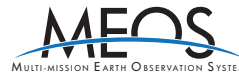
The MEOS™ Capture HRTG implements the same key properties as all MEOS™ Capture products: Performance, Reliability and Flexibility.

More information on MEOS™ Capture HRTG v4 can be found on <http://www.spacetek.no/products/receivers-demodulator>.



Data type	Modulated data				Data/Clock
	BPSK	xQPSK	8PSK	16QAM	
PN sequences	250 Mbps	500 Mbps	750 Mbps	1 Gbps	2x300 Mbps
Frame formats	250 Mbps	500 Mbps	600 Mbps	600 Mbps	2x300 Mbps
Files on disk	TBD	TBD	TBD	TBD	TBD
Ext clock/data input	250 Mbps	500 Mbps	500 Mbps	500 Mbps	NA

MEOS™ Capture HRTG supported data rates



MEOS™ NAS - Network Attached Storage

MEOS™ NAS is Kongsberg Spacetek's (KSPTs) new solution for file-level data storage accessible from other systems on the network, including SLE (Space Link Extension). SLE support includes RAF (Return All Frames) and RCF (Return Channel Frames), UIB (User Initiated Bind) and PIB (Provider Initiated Bind), protocol versions 2 and 4, as well as data rates up to 600 Mbps.

MEOS™ NAS is fully compatible with MEOS™ Capture and MEOS™ Polar, but data can also be provided from other systems supporting (S)FTP.

When arriving at MEOS™ NAS, files will be cataloged based on file names, where catalogs are created automatically if needed. Data files are by default under automatic storage management.

Stored datafiles can be retrieved from external clients using SLE (Offline RCF/RAF), based on mission and time, or interactively using the embedded GUI (Graphical User Interface).

MEOS™ NAS includes both monitoring and control through a well-defined, socket based API, as well as through the embedded GUI. MEOS™ NAS will also issue reports upon data arrival and extraction.

To ensure maximum reliability, MEOS™ NAS uses SAS (Serial Attached SCSI) disks with RAID technology for data redundancy and dual power supplies. Disk fan status, as well as temperatures, are monitored.

This product is also delivered to the JPSS Ground Segment.

MEOS™ NAS is MEOS™ Connect Ready for seamless integration into overall monitoring and control systems.

