INTERACTIVE ANALYSIS TOOLS (IAT)

FOR THE SOIL MOISTURE AND OCEAN SALINITY (SMOS) MISSION

SEPS-GS SMOS E2E Simulator

• SEPS-GS simulates MIRAS Instrument scientific and calibration timelines

• It includes also a detailed NIR modelling implemented based on HUT study

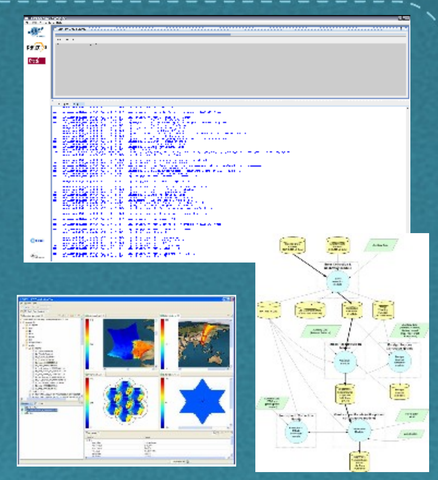
• SEPS-GS internal database is synchronized with the latest instrument parameters as measured by CASA

• Output L0 products are in standard DPGS format and can be processed with L1PP (processor prototype) or L1OP (operational processor)

L1PP Processor Prototype

• The SMOS L1PP Implements state-of-the-art algorithm to process SMOS L0 data up to Geo-Located Brightness Temperature ToA. It is very configurable via a dedicated GUI. It allows the processing of the image reconstruction by removal different condition (Sun, Sun glint, Moon, backlobes) and with several algorithm baseline (ideal/real reconstruction, gibss-1, gibss-2)

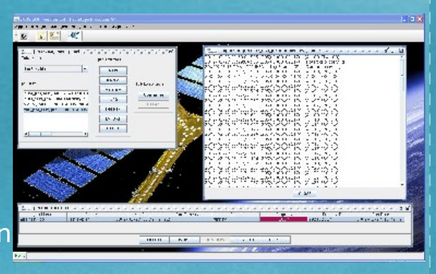
• Binary for Linux 32/64 and Mac OS platform and source code is also available.Output products are in standard Ground Segment format, ascii breakpoints and dedicated Visualization tools are available



L2PP Sea Surface Salinity (SSS) Processor Prototype

• The SMOS L2PP SSS Implements state-of-the-art algorithm to retrieve Sea Surface Salinity from L1c Brightness temperature obtained as output of the L1PP. It is very configurable via a dedicated GUI. It allows the processing of data over a specific area defined by the user. Source code will be also available.

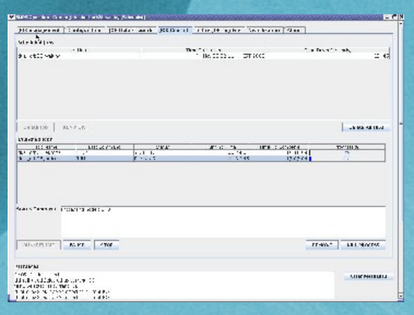
• A user defined forward model can be easy integrated in the code. A tutorial is available in the Software User Manual providing guidelines for the integration. Input &Output products are in standard Ground Segment format, dedicated Viewer for the breakpoints is available.



L2PP Soil Moisture (SM) Processor Prototype

• The SMOS L2PP SM Implements state-of-the-art algorithm to retrieve Soil Moisture from L1c Brightness temperature obtained as output of the L1PP
• It is very configurable via a dedicated GUI. It allows the processing of data over a specific area defined by the user. Source code will be also available.

• A user defined forward model can be easy integrated in the code. A tutorial is available in the Software User Manual providing guidelines for the integration. Input &Output products are in standard Ground Segment format

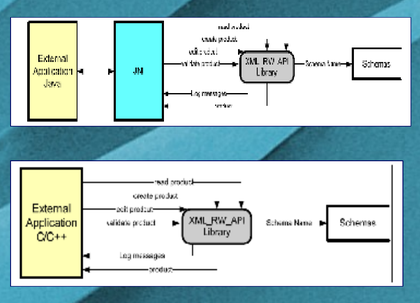


SMOS XML Read/Write API

The SMOS XML R/W API is a library in C++ to read and write SMOS Products and auxiliary file

The main function of the XML Read/Write API is to equip the DPGS with an efficient, uniform, stable and tested mechanism for the access and creation of the SMOS products in order to ensure their reliability.

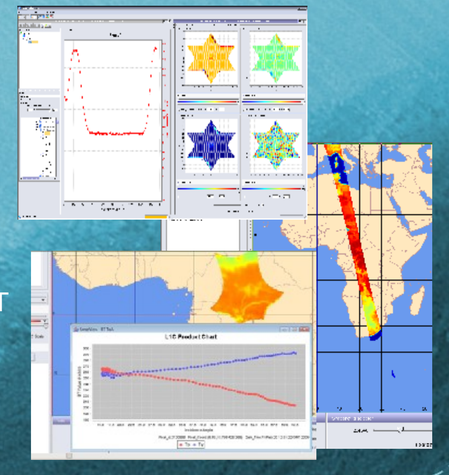
The use of the XML Read/Write API is not restricted to the development of the DPGS and its subsystems, it is a public software, freely available to those users interested in accessing the SMOS products.



SMOS Data Viewer (SDV)

• The SMOS Data Viewer provides a microscopic & detailed view for Products and Auxiliary data file. It supports Data Browser and Data Export (ascii table and IDL) functionality and generic Data plotting

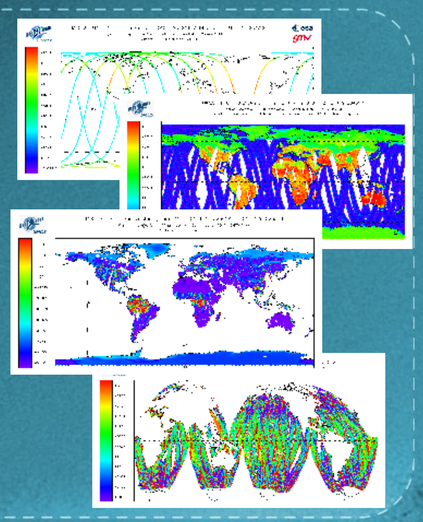
•Specific Visualization for SMOS data are available: L1a Calibrated visibilities in the Star domain L1b Fourier Components of Tb in Star domain. Map of FFT of L1b Fourier components on antenna grid, L1c Map of Tb in a selected incidence angle range. L2 Ocean salinity and Soil Moisture Maps



SMOS Global Mapping Tool (GMT)

• The SMOS GMT provides a macroscopic view for L1 and L2 Products. GMT plots on geographic maps all the L1c and L2 data fields. GMT plots on geographic maps selected HKTL, L1a and L1b fields

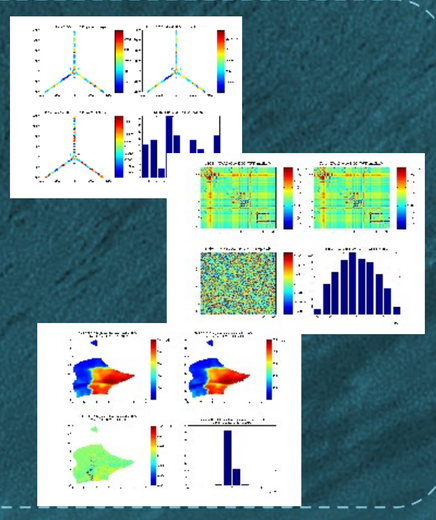
• GMT plots on geographic maps derived values from BT measurements like the First Stokes parameter, the Polarization Index. GMT has different option to manage data overlap over geographic maps
Option to filter-out data by incidence angle, by polarization, by antenna number



SMOS L1 Comparison Tool (SCoT)

• The SMOS SCoT provides a “Delta” view for L1 Products. It plots and compares values from two input L1 Products and plots the differences as well as the computation of the statistics (bias and STD)

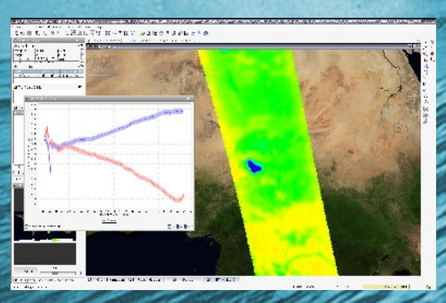
•To be used by the CEC team to compare L1PP and L1OP products and by Calibration team to compare calibration parameters computed with different processor configuration or algorithm baseline. To be also used by Validation team to compare BT produced with different L1PP processor configuration or algorithm baseline



SMOS Tool Box for BEAM

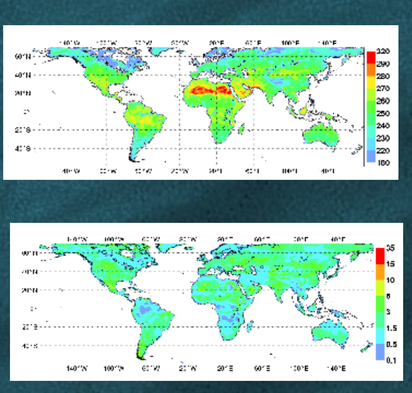
• The SMOS Tool Box for BEAM Enables reading, visualization and basic analysis of SMOS L1c & 2 products . It supports the scientific data exploitation primarily after commissioning phase (focus on L2) Scientific algorithms shall be developed later as Plug-ins based on user requirements

• Users can actively contribute to the further toolbox evolution by providing their own algorithms and prototype codes as plug-ins to the SMOS-Box. SMOS-Box is not only a tool, it is an open and flexible platform for joint development and interaction with the scientific community responding efficiently to their needs



SMOS Community Microwave Emission Model (CMEM)

• The SMOS CMEM has been developed by ECMWF. It is a forward model for low frequencies passive microwave to compute ToA Brightness Temperature of the Earth surface. Physics parameterizations is based on the used in the L-Band Microwave Emission of the Biosphere (LMEB, Wigneron et al., 2007) and Land Surface Microwave Emission Model (LSMEM, Drusch et al., 2007). Potentially, CMEM can also become a useful tool during the SMOS calibration and validation phase, when individual SMOS Validation and Retrieval Team (SVRT) members modify parameterizations, develop new algorithms and calibrate existing ones



The Interactive Analysis Tools (IAT) is a set of software elements that ESA has developed in the context of the SMOS mission ground segment. The IAT presented in this poster will be available for SMOS data users and will be used off-line by different SMOS team according to their specific needs like: sensor monitoring (instrument commissioning team), problem investigation (Data Processing Ground Segment team), calibration and validation support (Expert Support Laboratories), long term monitoring and data analysis (Calibration and Expertise Centre team). To know more about the IATs please contact:

Raffaele Crapolicchio Serco spa c/o ESA-ESRIN raffaele.crapolicchio@esa.int Michele Zundo ESA/ESTEC michele.zundo@esa.int Steven Delwart ESA/ESTEC steven.delwart@esa.int