SAR, SARIN, RDSAR AND FF-SAR ALTIMETRY PROCESSING ON DEMAND FOR CRYOSAT-2, SENTINEL-3 & SENTINEL-6 AT ESA'S ALTIMETRY VIRTUAL LAB

Jérôme Benveniste[(1)], *Salvatore Dinardo*[(2)], *Christopher Buchhaupt*[(3)], Michele Scagliola[(4)], *Marcello Passaro*[(5)], *L. Fenoglio-Marc*[(6)], *Giovanni Sabatino*[(7)], *Marco Restano*[(8)], *Américo Ambrózio*[(9)], *Carla Orrù*[(7)]

[(1)]*ESA-ESRIN, Largo Galileo Galilei, Frascati, Italy,* ***Email: jerome.benveniste@esa.int***
[(2)]*Collecte Localisation Satellites, Toulouse, France (sdinardo@groupcls.com)*
[(3)]*University of Maryland, College Park, MD, US (cbuchhau@umd.edu)*
[(4)]Aresys Srl, now with *RHEA/ESRIN, Largo Galileo Galilei, Frascati, Italy (Michele.Scagliola@ext.esa.int)*
[(5)]*DGFI, Technische Universität München, Germany (marcello.passaro@tum.de)*
[(6)]Institute of Geodesy and Geoinformation, University of Bonn, Germany (fenoglio@uni-bonn.de)
[(7)]*Progressive Systems/ESRIN, Largo Galileo Galilei, Frascati, Italy (giovanni.sabatino@progressivesystems.it, carla.orru@progressivesystems.it)*
[(8)]*SERCO/ESRIN, Largo Galileo Galilei, Frascati, Italy (Marco.Restano@ext.esa.int)* and [(9)]*DEIMOS/ESRIN, Largo Galileo Galilei, Frascati, Italy (Americo.Ambrozio@ext.esa.int)*

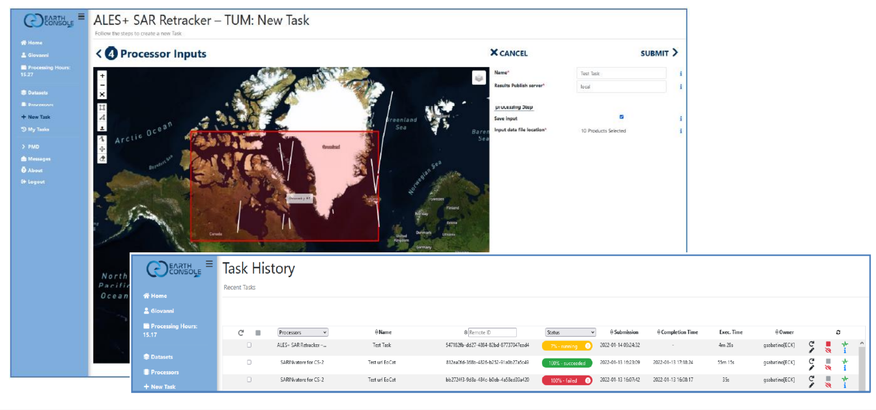
Introduction: The **EarthConsole® Altimetry Virtual Lab (AVL)**, funded by **ESA**, aims at providing a virtual space to: 1) Support the Altimetry community in the development & operation of new Earth Observation applications and 2) Foster collaboration by leveraging on knowledge-sharing tools. The Altimetry Virtual Lab has been developed on the new **EarthConsole®** platform (https://earthconsole.eu/) and hosts the SARvatore (SAR Versatile Altimetric TOolkit for Research & Exploitation) family of processors which was previously available in the ESA Grid Processing On-Demand (G-POD) environment.

The Altimetry Virtual Lab ensures service continuity following the recent termination of the G-POD environment. In the I-SHARE section, registered AVL members can interact through a forum, access an altimetry library & a data repository to download the already processed datasets. Information on how to access the service can be found in the quick reference guide accessible from this QR code →

Recommendation: Maintain and enhance the capability to process high-resolution SAR Altimetry in the coastal zone with dedicated processors like those made available in the EarthConsole® Altimetry Virtual Lab (AVL).

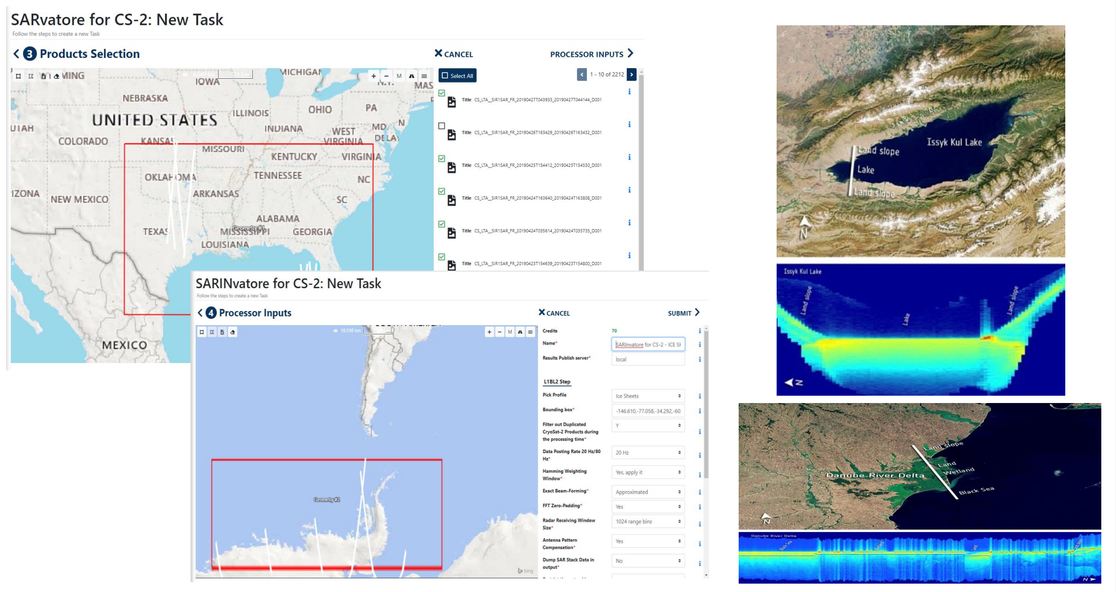
Objective: The scope of this presentation is to feature and provide an update on the **SARvatore** family of altimetry services portfolio for the exploitation of **CryoSat-2, Sentinel-3 & Sentinel-6** data from L1A (FBR) data products up to SAR/SARin Level-2 geophysical data products.

The **AVL graphical interface** allows users to select, in all the services, a geographical area of interest within the time-frame related to the L1A (FBR) & L1b data products availability in the service catalogue. **After the task submission**, users can follow, in **real time**, the status of the processing. The **output data** products are generated in standard **NetCDF format**, therefore being compatible with the multi-mission "Broadview Radar Altimetry Toolbox" (**BRAT**, http://www.altimetry.info) and typical tools. At present, the following on-line & on-demand services compose the **portfolio**:

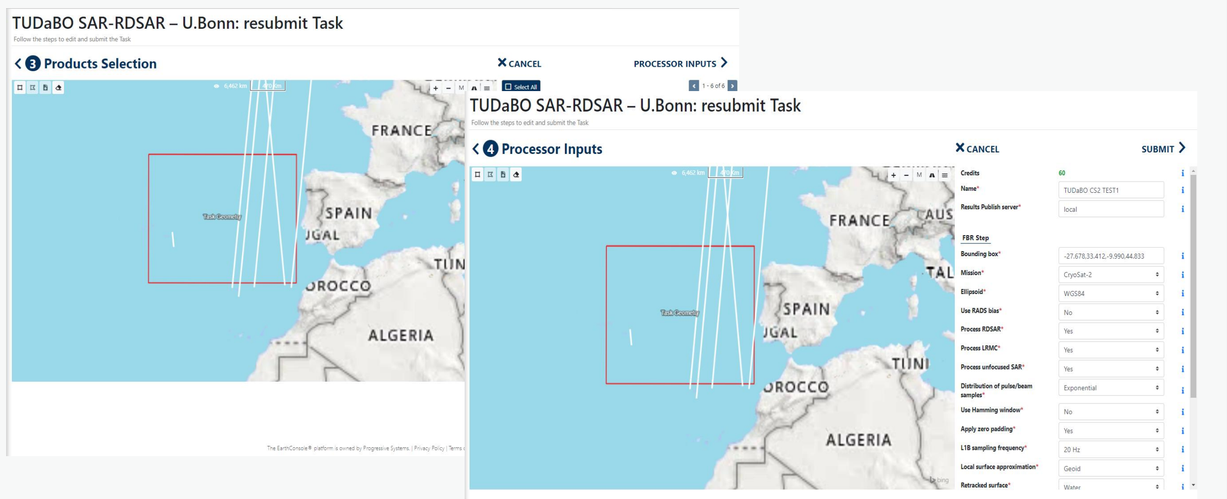


The **SARvatore** (SAR Versatile Altimetric TOolkit for Research & Exploitation) for **CryoSat-2** and **Sentinel-3** services developed by the Altimetry Team in the R&D division at ESA-ESRIN. These processor prototypes are versatile and allow the **users to customize and adapt the processing at L1b & L2** according to their specific requirements by setting a list of configurable options. The scope is to provide users with specific **processing options not available in the operational processing chains** (e.g. range walk correction, stack sub-setting, extended receiving window, zero padding, high-posting rate and burst weighting at L1b & SAMOSA+, SAMOSA++ and ALES+ SAR retrackers at L2).

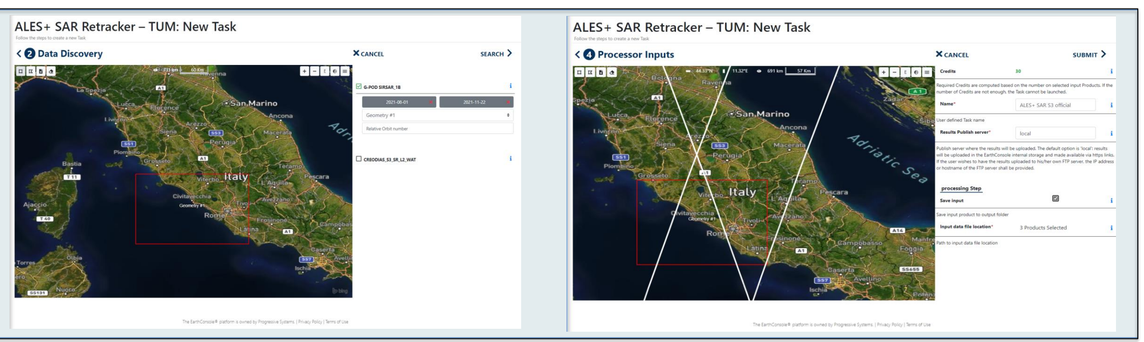
The new **SAMPY for CryoSat-2** service, developed within the ESA Cryo-TEMPO project and enhanced by the ESA-ESRIN Altimetry Team, allows appending the output of the SAMOSA+ retracker to official CryoSat-2 Level-2 GOP products.



The **TUDaBo SAR-RDSAR** (Technical University Darmstadt – University Bonn SAR-Reduced SAR) for **CryoSat-2** and **Sentinel-3** service. It allows users to generate reduced SAR, unfocused SAR & LRMC data. Several **configurable L1b & L2 processing options and retrackers** (BMLE3, SINC2, TALES, SINCS) are available. The processor will be extended during an additional activity related to the ESA HYDROCOASTAL Project (https://www.satoc.eu/projects/hydrocoastal/) to account in the open ocean for the vertical motion of the wave particles (VMWP) in unfocused SAR (retracker SINCS-OV) and in a simplified form of the fully focused SAR called here Low Resolution Range Cell Migration Correction-Focused (LRMC-F).



The **ALES+ SAR** for **CryoSat-2** and **Sentinel-3** service. It allows users to process **official** L1b data and produces L2 NetCDF products by applying the **empirical ALES+ SAR sub-waveform retracker**, including a **dedicated SSB solution**, developed by DGFI-TUM in the frame of the ESA Sea Level CCI (http://www.esa-sealevel-cci.org/) & BALTIC+ SEAL Projects (http://balticseal.eu/).



The **Aresys Fully Focused SAR for CryoSat-2, Sentinel-3 & Sentinel-6** services. They provide the capability to produce **FF-SAR L1b** products thanks to the Aresys 2D transformed frequency domain AREALT-FF1 processor prototype. **Output products** will also include geophysical corrections and **threshold peak & ALES-like empirical sub-waveform retracker estimates (ALES+FF-SAR)**.