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ExoMars TGO Archive Interface – Table and Map Interoperability

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Abstract

The ExoMars programme is a joint endeavor between ESA and the Russian Space Agency Roscosmos, it comprises two missions. The first launched in March 2016 and consists of the Trace Gas Orbiter (TGO) and Schiaparelli, an entry, descent and landing demonstrator module. The second was planned for launch in 2022 and comprises a ESA Rover and Roscosmos Surface Platform (now cancelled).

The Trace Gas Orbiter carries a scientific payload capable of addressing this scientific question, namely the detection and characterisation of trace gases in the Martian atmosphere. From its approximately 400-km-altitude science orbit, the instruments onboard the Trace Gas Orbiter detects a wide range of atmospheric trace gases (such as methane, water vapour, nitrogen oxides, acetylene), with an improved accuracy of three orders of magnitude compared to previous measurements. Its instruments also provide an imaging of the map surface, and the subsurface hydrogen to a depth of a metre.

Understanding the similarity of the TGO orbit and its measurements with near earth observation satellites approach we came with an idea of the adaptation of our LEO map-based interfaces and tools to the ExoMars TGO measurements.

In addition to the traditional table data selection interface we have developed a map-based interface to the mission archive on the base of our LEO data system. This allows user to select the data based on the nadir point, and vice versa – see the subsatellite points on the map. This approach also bring us the possibility to compare measurements from the different Mars missions archives (e.g. ESA Mars Express) with ExoMars TGO on the same map.

The work was done in frame of development of the Russian Science Ground Segment (NNK) for the ExoMars Mission.

The paper describes design and tools for the table and map interface interoperability for the Russian part ExoMars TGO Mission Archive.

Acronyms/Abbreviations

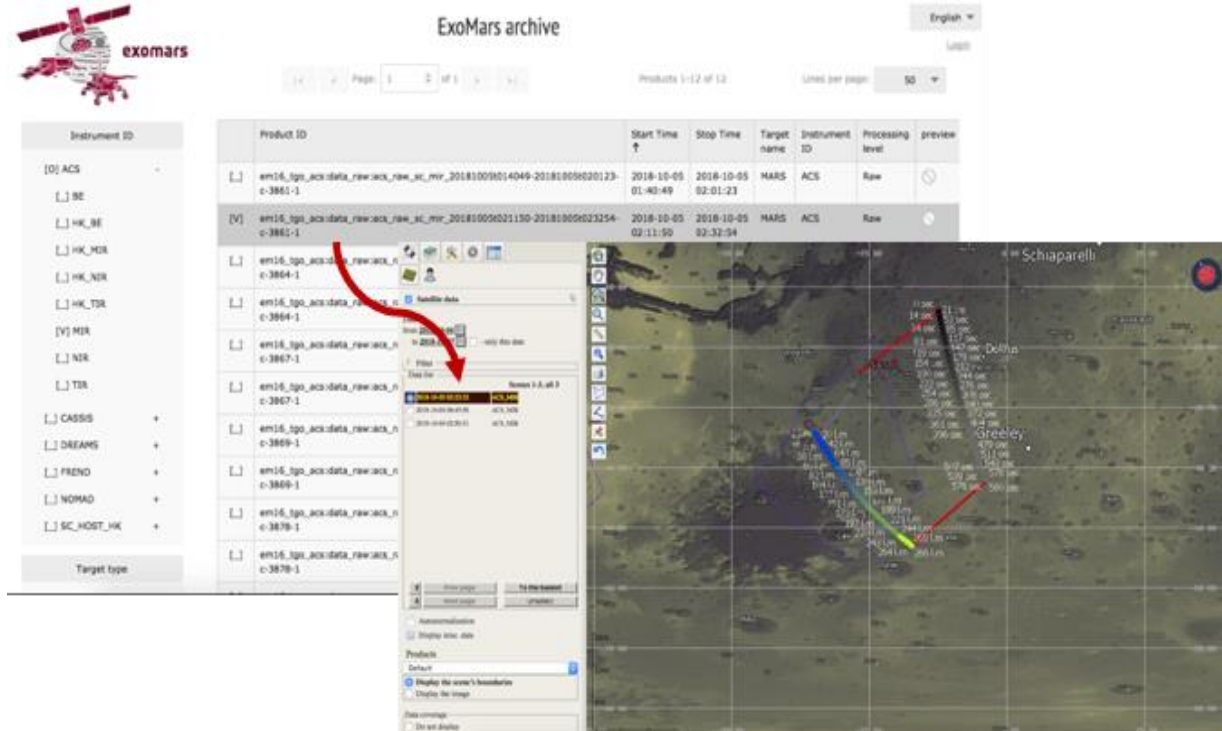
Russian Space Science Archive (RSSA), Trace Gas Orbiter (TGO), Low Earth Orbit (LEO), Russian Science Ground Segment (NNK), Medium Infrared (MIR), Atmospheric Chemistry Suite (ACS), High Resolution Stereo Camera (HRSC).

1. Description

The traditional interface for the data access uses a table interface with a number of filters. We use the same approach for selecting instruments, channels, dates of measurement etc. After selecting the datasets we provide ability to easily switch to the map-based interface. It allows to see the selected data over the map, e.g. satellite footprint point of the particular dataset.

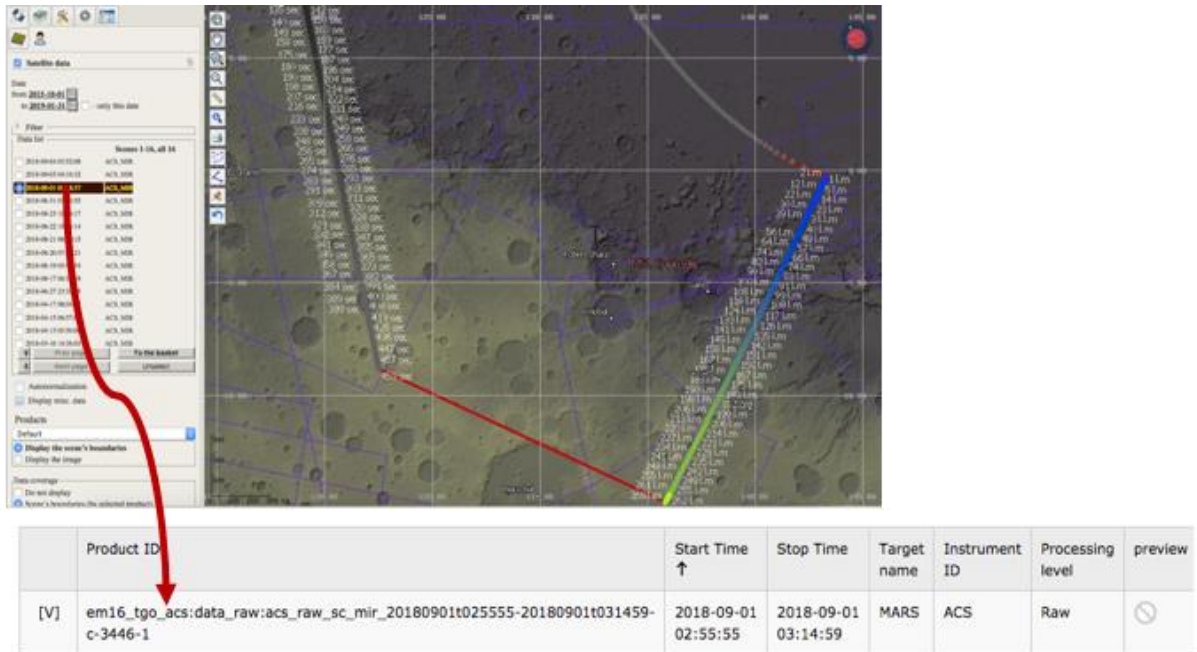
After switching to the map-based interface we can use its dedicated abilities, such as searching for the other measurements over or at the same point of Mars surface.

The example is presented at the Picture 1. First we select TGO measurement of the MIR channel of the ACS instrument onboard TGO during its observation, and then switch to the map interface. At the interface we can track the subsatellite point of the TGO.



Picture 1. From selected dataset to the map

Another possibility is to select the desired place on the map and see, what data do we have for the particular location. Example is presented at the Picture 2. We can select the region on the map and then switch to the table interface, then filter the instrument, channel, date, processing level, etc., and then download the selected data.



Picture 2. Switching from the map to the table

