Advanced Search in the PSA for ExoMars TGO Data Discovery

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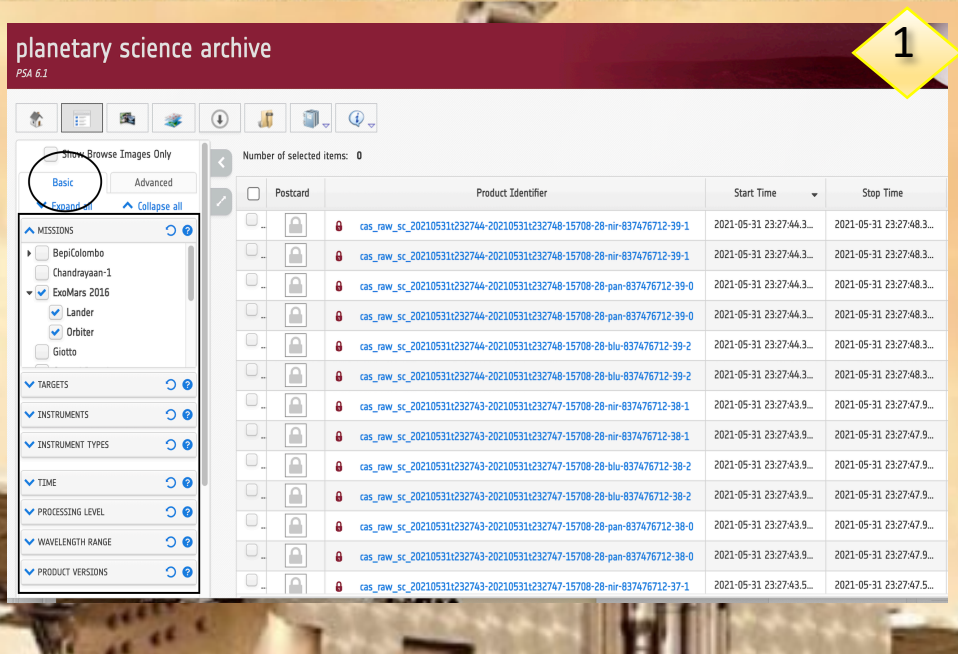
Introduction

The Planetary Science Archive (PSA) offers 'Basic' search functions common to all hosted missions via a filter menu (1). The archive content can be filter by the most common metadata in product labels such as instrument types, target, wavelength range and the results visualised in one of the three views currently available (Table, Image and Map views).

However given the plethora of very different missions archived in the PSA the need for a more advanced search type is arising. This 'Advanced' search panel is mission specific and can be used to restrict the search to very specific metadata for an extremely focussed search down to instrument and sub-instrument level

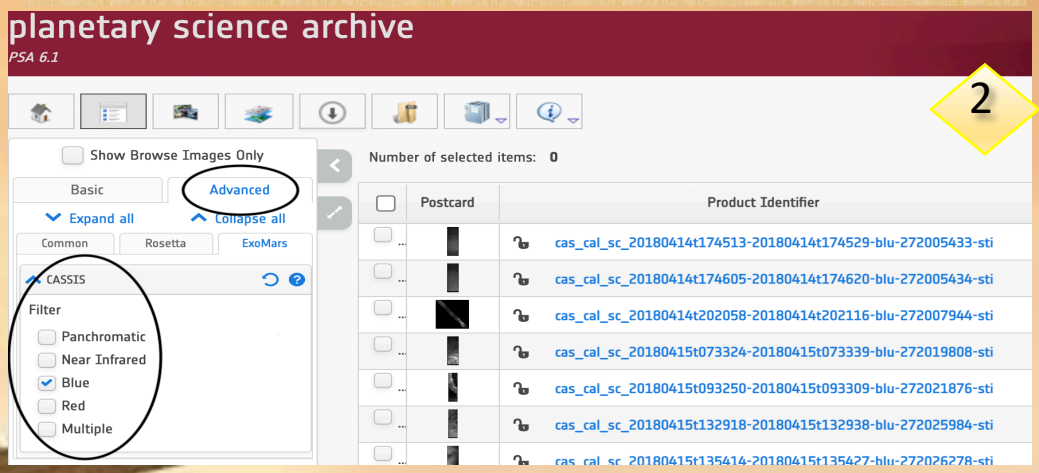
The current implementation of the 'Advanced' search panel includes three tabs: Rosetta, ExoMars and a third tab for parameters common to all the missions.

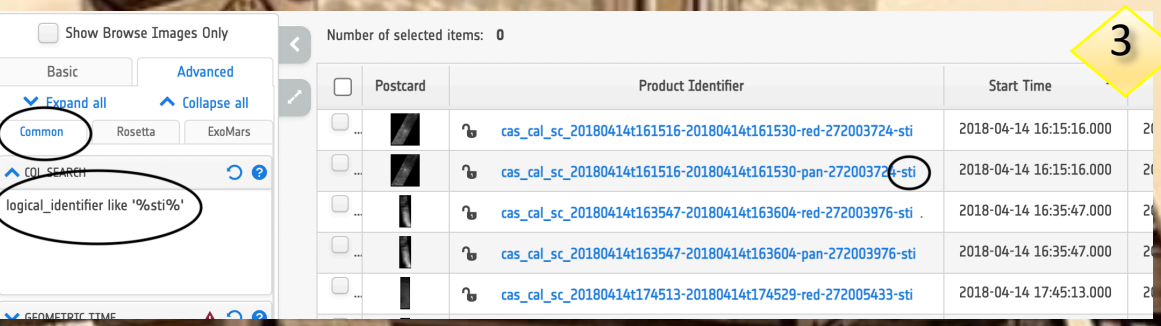


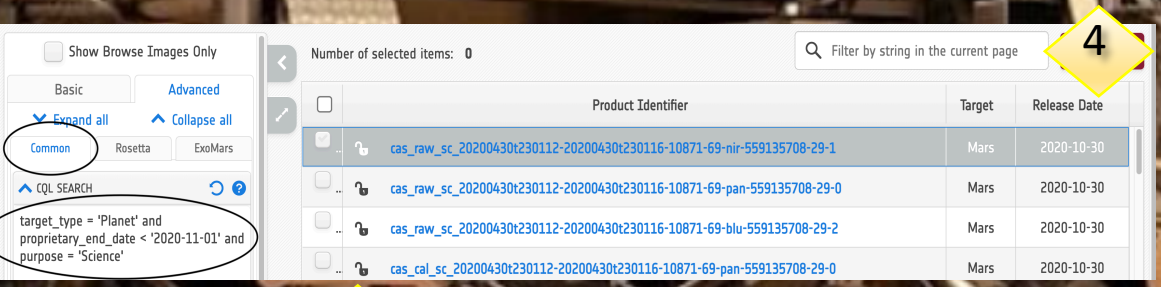
The PSA UI and the ExoMars Panel

An 'Advanced' search panel developed for ExoMars is currently limited to the Colour and Stereo Surface Imaging System instrument (CaSSIS) on board ExoMars Trace Gas Orbiter (TGO).

The specific metadata for the wavelengths used by the camera's filters are provided in the PDS4 product labels and ingested in the PSA database as part of the regular product deliveries. The users can then sift through CaSSIS data products based on one or more of the filter wavelengths available in the 'Advanced' search panel in addition to all other filters in the 'Basic' search. The example below (2) is restricting the list of CaSSIS products found via the 'Basic' search to only those observations made with the Blue filter. See also the CaSSIS Quick Start Guide for reference (https://issues.cosmos.esa.int/socciwiki/display/PSAPUB1/CaSSIS+Quick+Start+Guide).







Using CQL to Refine Searches

It is also possible to refine a search using Common Query Language (CQL) commands on a number of metadata in the product labels. CQL is integrated in the PSA user interface and can be used in combination with other types of searches in both the 'Basic' and 'Advanced' panels. The relevant tab in the 'Advanced' search panel is called "Common'.

For example it is possible to restrict the search to only a particular category of CaSSIS products called stitched images (3) by looking for a particular component ('st') of the product's logical identifier:

logical_identifier like '%sti%'

It is of course possible to perform searches on multiple elements simultaneously. The example below is by restricting the search to *Science* (i.e. not engineering) observations that have a *planet* as target and that are *public after* 2020-11-01 (4):

target_type = 'Planet'
and
proprietary_end_date < '2020-11-01'
and
purpose = 'Science'

Note that this is a very interesting search as the publication date is not contained in the product labels but it is computed at ingestion, stored in the PSA database and made available.

More information on queryable parameters is given in the PSA User Guide (https://www.cosmos.esa.int/web/psa/documentation).

Future Plans

The 'Advanced' search capabilities will be extended to other ExoMars instruments both for TGO, in Science Phase since 2018, and the Rover and Surface Platform (RSP) due to be launched in 2022.

Instrument labels contain many very specific metadata that can't be exposed directly in the filter menu of PSA User Interface for practical reasons. They are or will be however ingested in the archive and therefore made available for searches through the 'Advanced' panel.

In addition, it will be possible to perform or restrict searches based on a selection of SPICE based geometry parameters computed on the fly by the Geogen[1] software integrated in the PSA. This functionality is under development for ExoMars but is already available for some instruments on MEX and Rosetta (5).

[1] For more information on Geogen, see http://geogen.spacefrog.design/