PLANS FOR THE EXOMARS 2020 ROVER DATA ARCHIVE WITHIN THE PSA

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Introduction: The ExoMars (Exobiology on Mars) programme is a joint programme of the European Space Agency and Roscosmos with a contribution from NASA. It is comprised of two missions. The first mission, ExoMars 2016, was launched in March 2016. Its primary component is a Trace Gas Orbiter (TGO) which is aimed both at studying trace gasses in the Mars atmosphere and as a relay spacecraft for landed assets. The spacecraft also carried the test lander Schiaparelli mainly aimed at demonstrating landing technology but carrying a small science payload. The second mission, the ExoMars 2020 Rover and Surface Platform (RSP) mission, is due to be launched in July 2020. This will carry full scientific payloads on both the landing platform and a rover. The mission will investigate the Mars surface and sub-surface context for biological signatures for a duration of six months.

After arrival of the Exomars 2016 mission at Mars in October 2016 the TGO and Schiaparelli separated and a landing attempt was made. Successful demonstrations of many technologies resulted but the landing failed at the final stages due to a sensor error. In January 2017 the TGO transitioned to its aerobraking phase, then in March 2018 it reached a final 400 Km, circular, 2 hour, science orbit inclined at around 74 degrees. Since April 2018 TGO has been operating nominally with both science and relay operations ongoing.

ExoMars in the PSA: The ESA Planetary Science Achive (PSA) hosts two PDS4 archives comprising ExoMars 2016 data and early mission Bepi Colombo data. The new PSA, which serves both PDS3 and PDS4 data through common interfaces, was released publicly in January 2017.

It currently has two guided user interfaces which allow cross-mission searches of both proprietary and public data, with results either being displayed as a table, or in an image gallery. These interfaces also allow scripted searches of additional metadata to those listed in the interface menus. Data can be downloaded directly or via a download manader and a log-in is required for proprietary data download. An FTP interface is also available which allows users to browse public data. Furthermore the PSA supports machine interfaces using the PDAP and EPN-TAP protocols.

The ExoMars 2020 Surface Platform long term archive is being produced at the Space Research Institute of the Russian Academy of Sciences (IKI), and the Rover long term archive is being produced at the European Space Astronomy Centre (ESAC) in Spain. Both archives will be mirrored and hosted at both centres. The Rover mission in particular will produce different types of data to the existing orbital missions within the PSA, therefore it is planned to expand the PSA capability with several new data views dedicated to the Rover Mission. These are in the detailed design stage and initial work will commence this year.

The entry point for an archive user will be the existing PSA user interfaces (at psa.esa.int), plus the option to view, from above, the Rover Traverse. This view will be interactive and will allow the archive user to view various overlays giving information about the Rover mission activities at a location or on a given Sol. From this view a user may then move to a view of Rover images at a selected location or an interactive 3D view of the local Digital Elevation Model (DEM). The Rover is equipped with a 2 metre drill and around six drill sites are expected to be explored during the nominal mission. The drill itself includes a spectrometer which will inspect the drill hole at different depths and there are three instruments which will perform sample analysis. Therefore a dedicated interface has been designed which will allow exploration of all data associated with a particular drill site including all data associated with a given sample. The Rover also has two instruments which will map the subsurface and a dedicated viewer for these data will also be produced and accessible from the Rover Traverse view.

Summary: This presentation will describe the plans for new Rover data views in the PSA to support the ExoMars 2020 mission. These interfaces will work with and from existing PSA user interfaces so the full ability to search and filter data is included.