

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 1 (3A)

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EXOMARS 2016 MISSION – SYSTEM INTEGRATION AND VERIFICATION PHASE

Abstract

Comprising two missions that will be launched to Mars in 2016 and 2018, respectively, ExoMars will address the outstanding scientific question of whether life has ever existed on Mars and demonstrate key technologies for entry, descent, landing, drilling and roving on the Martian surface. For the 2016 mission ESA is building a large Spacecraft Composite (SCC) consisting of a Trace Gas Orbiter (TGO) and an EDL Demonstrator Module (EDM), named Schiaparelli. The Spacecraft Composite will be launched in January 2016 by a Proton Launcher, to arrive at Mars in mid-October of 2016. TGO will search for evidence of methane and other atmospheric gases that could be signatures of active biological or geological processes on Mars and will provide communications relay for the 2018 surface assets.

The purpose of this paper is to provide a complete overview of the ExoMars 2016 mission activities with particular focus on the Assembly Integration and Testing (AIT) of the EDM and TGO modules which will be implemented in the year 2014, in preparation of the following environmental test campaign leading to the proto-flight acceptance of the SCC foreseen in the first half of the year 2015.

EDM PFM subassemblies manufacturing started after consolidation of the test results performed on the Structural Model (SM). The EDM flight unit integration is held in the ISO 7 HC area built in TAS-I Turin, then the EDM is closed and sent to TAS-I Cannes for the environmental test campaign in a standard ISO 8 area. In parallel the Avionics Test Bench is gradually completed with inclusion of the avionic units: using SW validated in the SW Validation Facility.

The Avionics Electronic and Radiofrequency (AER) flight equipment are integrated onto the TGO Mechanical Thermal Propulsion (MTP) unit at TAS-F Cannes. In parallel the Avionics Test Bench activity is carried on with integration of the avionic units to achieve the functional qualification; finally the TGO-EDM interface test is run using the EDM CTPU and RTPU.

The Main Separation Assembly (MSA) activities are completed with a “separation” acceptance test using the flight mechanisms and an EDM dummy. The MSA flight unit is mounted onto the TGO right before the TV/TB test.

After separated TVTB and EMC acceptance, the EDM and TGO are mated together for the final mechanical acceptance and Launch Vehicle interface check that is planned in the second half of the year 2015.