

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Space Systems Engineering - Methods, Processes and Tools (1) (4A)

Author: Mr. Ali AlSuwaidi

Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, ali.alsuwaidi@mbrsc.ae

Mr. Suhail AlDhafri

Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, suhail.aldhafri@mbrsc.ae

Mr. Mohammed AlEmadi

Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, Mohammad.Alemadi@mbrsc.ae

EMIRATES MARS MISSION FLIGHT SIMULATOR: FLATSAT RISK-REDUCTION

Abstract

The Emirates Mars Mission (EMM) is an interplanetary space exploration mission to Mars. The mission plays a vital role in the region by inspiring the youth generation and reviving their optimism. Towards achieving those goals, the observatory has been called “Hope” to ensure that aspiration and faith are spread in the Arab region to further scientific exploration and accomplishment. The mission was started in July 2014 and successfully entered Mars orbit in February of 2021. The mission is led by Mohammed Bin Rashid Space Center (MBRSC). Several international partners have contributed to accomplishing the mission, from the University of Colorado - Laboratory for Atmospheric and Space Physics (LASP), Arizona State University (ASU), and the University of California at Berkeley’s Space Sciences Laboratory (UCB). When it comes to designing, manufacturing, building, and operating a spacecraft, several activities must be thought about. FlatSat has been developed to tackle those issues at the early stages of the program. FlatSat is used as a representation of the observatory. That could be utilized to ease the process of designing, building, and testing. In addition, it has been an invaluable resource for requirement verification and training purposes. At the early phases of the mission, FlatSat has been used as a test bench, allowing the understanding of the entire system by integrating different units. This gave engineers the insight needed to develop the right hardware for the observatory after ironing out any wrinkles observed on FlatSat. Spacecraft integration and testing is a risky process, in which FlatSat comes to aid. As a risk reduction methodology, EMM uses FlatSat to test out all applicable integration and test procedures and products reducing risk and overlooks that could occur. After launch FlatSat has been utilized throughout Early Operations, Cruise and Mars Orbit Insertion phases. To fully understand how the spacecraft will react to certain activities FlatSat has been used to deploy the activities and simulate the spacecraft in that environment giving both the Spacecraft and Operation team insight to what outcomes could be achieved. FlatSat has shown to be a beneficial asset to the mission. Not only did it help ensure that observatory designs and integration came together. But also ensured the safety of the mission through the different operation phases after launch. FlatSat has become a safety net in a sense, used by the spacecraft and operation team when it comes to products and activities.