IAF SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies (3)

Author: Mr. Hamed Alhashmi
UAE Space Agency, United Arab Emirates, h.alhashmi@space.gov.ae

SOLAR ARRAYS DESIGN OF THE EMIRATES MARS MISSION (HOPE PROBE)

Abstract

United Arab Emirates has entered the space exploration race with the announcement of Emirates Mars Mission (EMM), the first Emirati mission to another planet, in 2014. Through this mission, UAE will be sending an unmanned probe, called Hope probe, to be launched in July 2020 and reach Mars by 2021 to coincide with UAE's 50th anniversary. The mission is unique and aimed for novel and significant discoveries that contributed to the ongoing work of the global space science community. The design of the Hope Probe observatory will include 3 instruments to study the Martian atmosphere named EXI, EMUS, and EMIRS. Emirates eXploration Imager (EXI) will measure the properties of water ice and dust aerosols, and abundance of ozone in Mars' atmosphere using a visible imager; 2) Emirates Mars Ultraviolet Spectrometer (EMUS) will measure the global characteristics of hydrogen and oxygen coronae; and 3) Emirates Mars InfraRed Spectrometer (EMIRS) will measure the global thermal structure and abundances of water ice, and water vapor in Mars' atmosphere.

The success of the mission relies on varying aspects, including the Electrical Power System (EPS) and more specifically the Solar Panels where the Sun radiation converted to be in energy form to feed up the other subsystems. This paper will outline the design consideration of the EMM from the starting point for the solar array sizing taken from the satellite power budget, the impact of the power conditioning architecture on the solar array as well as the configuration of the solar array with respect to the spacecraft. The paper will also include some of the analysis that have been performed during all mission phases, including: Cruise, Mars Orbit Insertion, and Science phase.