

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Mars Exploration – missions current and future (3A)

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## EMIRATES MARS MISSION (EMM) FAULT PROTECTION SYSTEM DESIGN OVERVIEW

**Abstract**

Emirates Mars Mission program is responsible for the definition, design, development, integration, and test of the spacecraft that orbits Mars. The spacecraft provides the capabilities required to achieve and maintain the Mars orbit post-launch, supply the payloads, which are:

- The Emirates eXploration Imager, an instrument that is dual-channel spectral imager capable of producing full-disk, 12.6 megapixel images of Mars in 6 spectral bands.
- The Emirates Mars InfraRed Spectrometer, this instrument is a Fourier transform spectrometer based on a Michelson 2-port design.
- The Emirates Mars Ultraviolet Spectrometer, an instrument that is an imaging spectrograph that measures emission from the Mars atmosphere and corona in the spectral range 100-170 nm.

In order to provide the highest probability of mission success within the constraints of the system (cost, mass, schedule, etc.), the EMM requires a simple yet robust fault protection system. As a deep space mission with limited ground contact, EMM must be able to autonomously respond to faults that might compromise the safety of the Observatory. However, as a non-operational mission, the extent of that autonomy can be limited to ensure the Observatory is in a safe configuration and then wait for the ground to intervene. This paper describes the philosophy, the analysis, the design approach, and the concept of operations of the EMM fault protection system.