

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)

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EMIRATES MARS MISSION 2020: EMIRATES MARS ULTRAVIOLET SPECTROMETER (EMUS)  
OVERVIEW**Abstract**

The Emirates Mars Ultraviolet Spectrometer (EMUS) instrument is one of three science instruments on board the “Hope Probe” of the Emirates Mars Mission (EMM). EMM the United Arab Emirates’ (UAE) mission to Mars, launched successfully on July 20th 2020 and arrived successfully at Mars on February 9th 2021, to explore the global dynamics of the Martian atmosphere, while sampling on both diurnal and seasonal timescales. The EMUS instrument is a far-ultraviolet imaging spectrometer that measures emissions in the spectral range 100-170 nm. Using a combination of its one-dimensional imaging and spacecraft motion, it will build up two-dimensional far-ultraviolet images of the Martian disk and near-space environment at several important wavelengths: the Lyman beta atomic hydrogen emission (102.6 nm), the Lyman alpha atomic hydrogen emission (121.6 nm), two atomic oxygen emissions (130.4 nm and 135.6 nm), and the carbon monoxide fourth positive group band emission (140 nm-170 nm). Radiances at these wavelengths will be used to derive the column abundance of atomic oxygen, and carbon monoxide in the Martian thermosphere, and the density of atomic oxygen and atomic hydrogen in

the Martian exosphere both with spatial and sub-seasonal variability. The EMUS instrument consists of a single telescope mirror feeding a Rowland circle imaging spectrograph with selectable spectral resolutions of 1.3 nm or 1.8 nm for science observations, and a photon-counting and locating detector (provided by the Space Sciences Laboratory at the University of California, Berkeley). The EMUS spatial resolution of less than 300 km on the disk is sufficient to characterize spatial variability in the Martian thermosphere (100-200 km altitude) and exosphere ( $>200$  km altitude). The instrument is jointly developed by the Mohammed Bin Rashid Space Centre (MBRSC) in Dubai, UAE and the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder. In this presentation the status and performance of the EMUS Instrument post-launch will also be discussed.