



Emirates eXploration Imager (EXI) Overview from the Emirates Mars Mission

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The Emirates eXploration Imager (EXI) instrument is one of three scientific instruments aboard the Emirate Mars Mission (EMM) spacecraft, “Hope”. The planned launch window opens in the summer of 2020, with the goal of this United Arab Emirates (UAE) mission to explore the dynamics of the Martian atmosphere through global spatial sampling which includes both diurnal and seasonal timescales. A particular focus of the mission is the improvement of our understanding of the global circulation in the lower atmosphere and the connections to the upward transport of energy of the escaping atmospheric particles from the upper atmosphere. This will be accomplished using three unique and complementary scientific instruments. The subject of this presentation, EXI, is a multi-band camera capable of taking 12 megapixel images, which translates to a spatial resolution of better than 8 km with a well calibrated radiometric performance. EXI uses a selector wheel mechanism consisting of 6 discrete bandpass filters to sample the optical spectral region: 3 UV bands and 3 visible (RGB) bands. Atmospheric characterization will involve the retrieval of the ice optical depth using the 300-340 nm band, the dust optical depth in the 205-235nm range, and the column abundance of ozone with a band covering 245-275 nm. Radiometric fidelity is optimized while simplifying the optical design by separating the UV and VIS optical paths. The instrument is being developed jointly by the Laboratory for Atmospheric and Space Physics (LASP), University of California, Boulder, USA, and Mohammed Bin Rashid Space Centre (MBRSC), Dubai, UAE.