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Author: Mrs. Mariam AlShamsi
Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, mariam.alshamsi@mbrsc.ae

Dr. Michael Wolff
Space Science Institute, United States, mjwolff@spacescience.org
Dr. Andrew Jones
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, andrew.jones@lasp.colorado.edu
Mr. Christopher Jeppesen
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, Chris.Jeppesen@lasp.colorado.edu
Dr. Mikki Osterloo
Space Science Institute, United States, mosterloo@SpaceScience.org
Mr. Ralph Shuping
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, rshuping@SpaceScience.org
Mr. Charles Fisher
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, charles.fisher@lasp.colorado.edu
Mr. Mohammad Khoory
Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, Mohammed.Abdulla@mbrsc.ae
Mr. David Summers
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, david.summers@lasp.colorado.edu
Mr. Justin Knavel
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, justin.knavel@lasp.colorado.edu
Mr. Suhail AlDhafri
Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, suhail.aldhafri@mbrsc.ae
Mrs. Ginger Drake
Laboratory for Atmospheric and Space Physics (LASP) at University of Colorado, United States, Ginger.Drake@lasp.colorado.edu

EMIRATES MARS MISSION 2020: EMIRATES EXPLORATION IMAGER (EXI) OVERVIEW

Abstract

The Emirates eXploration Imager (EXI) instrument is one of three scientific instruments onboard the Emirate Mars Mission (EMM) spacecraft, “Hope”. Hope was launched on the 20th of July 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 on improving 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 complementary scientific instruments. The subject of this presentation, the Emirates eXploration Imager (EXI), is a multi-band camera capable of taking 12 megapixel images, which translates to a spatial resolution of better than 8 km with well characterized 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 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 was developed jointly by Mohammed Bin Rashid Space Centre (MBRSC), Dubai, UAE and the Laboratory for Atmospheric and Space Physics (LASP), University of Colorado, Boulder, USA. We will present the instrument design, current instrument status in space and a brief overview of the atmospheric retrieval algorithms.