



Emirates Mars Infrared Spectrometer (EMIRS) Overview from the Emirates Mars Mission

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Emirates Mars Infrared Spectrometer (EMIRS) instrument is one of three scientific instruments aboard the Emirate Mars Mission (EMM), with the name of “Hope”. EMM is United Arab Emirates’ (UAE) mission to be launched in 2020, with the aim of exploring the dynamics of the atmosphere of Mars on a global scale with sampling on a diurnal and sub-seasonal time-scales. EMM has three scientific instruments selected to provide an improved understanding of circulation and weather in the Martian lower atmosphere as well as the thermosphere and exosphere. The EMIRS instrument is an interferometric thermal infrared spectrometer that is jointly developed by Arizona State University (ASU) and Mohammed Bin Rashid Space Centre (MBRSC), Dubai, UAE. It builds on a long heritage of thermal infrared spectrometers designed, built, and managed, by ASU’s Mars Space Flight Facility, including the Thermal Emission Spectrometer (TES), Miniature Thermal Emission Spectrometer (Mini-TES), and the OSIRIS-REx Thermal Emission Spectrometer (OTES).

EMIRS operates in the 6-40+ μm range with 5 cm^{-1} spectral sampling, enabled by a Chemical Vapor-Deposited (CVD) diamond beam splitter and state of the art electronics. This instrument utilizes a 3×3 line array detector and a scan mirror to make high-precision infrared radiance measurements over most of the Martian hemisphere. The EMIRS instrument is optimized to capture the integrated, lower-middle atmosphere dynamics over a Martian hemisphere, using a scan-mirror to make ~ 60 global images per week (~ 20 images per orbit) at a resolution of $\sim 100\text{-}300$ km/pixel while requiring no special spacecraft maneuvers.