Development of a Dual Ion Source Hyperbolic Linear Ion Trap Mass Spectrometer for *In Situ* Detection of Organic Molecules on Mars

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The Mars Organic Molecule Analyzer (MOMA) is a joint venture between NASA and the European Space Agency to develop a lightweight, low power, dual source (GC and LDI) mass spectrometer based investigation of organics on Mars. MOMA's unique capabilities make it a key analytical instrument on the ExoMars rover, set to launch in 2018. The main ExoMars goal is to search for molecular "signs of life" in the martian environment. Details, along with comparisons to the Sample Analysis at Mars (SAM) mass spectrometer on NASA's Curiosity rover, will be presented. The MOMA mass spectrometer consists of a custom hyperbolic linear ion trap mass spectrometer with two modes of operation: laser desorption ionization (LDI) at Mars ambient conditions (5-7 Torr of mainly CO2) and electron ionization (EI) of gas chromatograph effluent. Three laboratory prototypes have been used to optimize key aspects of the flight instrument design and to assess our capability for meeting critical performance requirements. An engineering test unit is currently under construction to reach a final, flight-like form and function. The prototypes are being operated with a mixture of commercial and custom electronics as well as breadboard electronics of the flight circuit designs. Experience gained building previous mass spectrometers for space, especially SAM, is being leveraged for MOMA.