AN INCOHERENT SCATTER RADAR MISSION TO MARS (ISR2M). Majd Mayyasi[1], Phil Erickson[2], Frank Lind[2], Mary Knapp[2], Lenny Paritsky[2], John Swoboda[2], Josh Semeter[3]. [1]Center for Space Physics, Boston University, Boston, MA USA (majdm@bu.edu), [2] MIT, Haystack Observatory, MA, USA, [3]College of Engineering, Boston University, Boston, MA USA.

Abstract: We propose a lander-based implementation of incoherent scatter radar mission to Mars, building upon an instrument technique that has been extensively proven on Earth. By measuring the thermal properties of the Martian atmosphere in regions that orbiting spacecraft cannot explore, the ISR2M will determine the abundance and temperatures of ionospheric species that directly affect atmospheric composition, dynamics, and escape rates. This will allow identification of heating sources and sinks that determine Mars' atmospheric energy budget. Pragmatically, understanding the properties of the ionosphere will facilitate surface-to-space communications, particularly during entry, descent, and landing, and will aid in the interpretation of data from past and present orbiting spacecraft.