



U.S. support of Mars Express

T. W. Thompson, R. L. Horttor, C. H. Acton, Jr., P. Zamani, W. T. K. Johnson, J. J. Plaut, D. P. Holmes, S. M. No, S. W. Asmar, and G. L. Goltz,

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA
91109-8099

Thomas.W.Thompson@jpl.nasa.gov / Fax: +18183935285

Introduction: ESA's Mars Express Mission is an international collaboration between the European Space Agency (ESA), European space agencies and the National Aeronautics and Space Administration with NASA as a junior partner. Most of the U.S. participation in ESA's Mars Express Mission is conducted via the Mars Express/NASA Project at the Jet Propulsion Laboratory (JPL) in Pasadena, California with U.S. participation in the ASPERA experiment supported by NASA's Discovery Program. A key objective is to archive Mars Express science investigation data in a format compatible with the Planetary Data System (PDS) via ESA's Planetary Science Archive and NASA's Planetary Data System.

U.S. Participation in Mars Express Experiments: ESA selected seven experiments for the Mars Express orbiter with eleven U.S. investigators selected as instrument/experiment Co-Investigators. NASA and the Italian Space Agency (ASI - Agenzia Spaziale Italiana) are jointly supporting an advanced radar sounder (MARSIS). Also, NASA is funding data reduction, and archiving tasks for the ASPERA instrument via NASA's Discovery Mission of Opportunity.

The United States has Co-Investigators on the following Mars Express experiments:

- ASPERA (Analyser of Space Plasmas and Energetic Atoms)
- HRSC (High-Resolution Stereoscopic Camera)
- MARSIS (Mars Advanced Radar for Subsurface and Ionospheric Sounding)
- OMEGA (Observatoire pour la Minéralogie, l'Eau, les Glaces et l'Activité)

- PFS (Planetary Fourier Spectrometer)
- MaRS (Mars Radio Science Experiment)
- SPICAM (Spectroscopic Investigation of the Characteristics of the Atmosphere of Mars)

Mars Express/NASA Project Overview

- Provide the Radio Frequency (RF) subsystem (integrated transmitter, antenna, and receiver) for MARSIS. Alenia Spazio (ALS), Italy is responsible for the digital subsystem and instrument integration and test, under direction of the JPL Instrument Manager. A MARSIS Co-Principal Investigator from JPL serves as the lead scientist for the NASA side of the experiment.

- Assist in achieving Mars Express science objectives through support of the U.S. Co-Investigators on Mars Express Experiments

- Support the HRSC experiment with image processing, image display and archive generation software

- Deploy NASA's SPICE (Spacecraft, Planet, Instrument, C-matrix, Events) System to ESA and Instrument Teams

- Secure Deep Space Network (DSN) tracking support

- Conduct DSN radio science observations

- Conduct an OMEGA – Mars Reconnaissance Orbiter HIRISE collaboration

- Conduct UHF relay experiments between the Mars Exploration Rovers (MERs) and Mars Express.

NASA Discovery Program:

Two ASPERA sensors, the Electron Spectrometer and the Ion Mass Analyzer, were built by Southwest Research Institute. ASPERA will address how interplanetary plasma and electromagnetic fields affect the Martian atmosphere, which is directly related to the questions about water on Mars.