

Mass Spectroscopy Based Instrument Development at the Jet Propulsion Laboratory

Richard Kidd¹, Murray Darrach¹, Stojan Madzunkov¹, Evan Neidholdt¹, Madadeva Sinha¹, Jurij Simcic¹, Janine Captain²

¹*Jet Propulsion Laboratory, Pasadena, CA*

²*Kennedy Space Center*

Mass spectrometer (MS) based instruments provide unique capabilities for fundamental planetary science investigations whose major themes are: Noble Gas Studies (measuring atmospheric noble gas abundances & isotopic ratios); Atmosphere Surveys (studying the composition of atmospheric gases & aerosols); Organic Material Analyses (determining the organic composition/structure of surface materials); Geochronology (determining geologic ages of rocks by measuring isotope ratios); and Environmental Monitoring on manned space missions. Because of the broad range of future missions requiring MS-based instrumentation, JPL's Solar System Exploration Directorate has supported developing in-house Miniature Magnetic Sector (MMS) and Quadrupole Ion Trap (QIT) mass spectrometers. As a result of this support JPL is developing state-of-the-art MS instrumentation and supporting technologies that can be employed on future Discovery, New Frontiers, and Flagship missions such as a Venus probe or lander, Saturn, Uranus or Neptune probe, Titan lander, Mars Sample Return, Mars Geochronology Mission, and icy moon and small body landers.