Thursday, March 22, 2012
POSTER SESSION II: INSTRUMENT AND PAYLOAD CONCEPTS
6:00 p.m. Town Center Exhibit Area

Reach W. T.
Stratospheric Observatory for Infrared Astronomy: First Full Proposal Call **[#2753]**
The Stratospheric Observatory for Infrared Astronomy had first light in 2010 and during 2011 performed its first series of scientific observations. The Cycle 1 proposal call, with a due date of January 27, 2012, solicits a full year of observing.

Anderson R. C. Nesnas I. A.
Enabling New Exploration Opportunities on Planetary Surfaces **[#2907]**
Recent water ice discoveries emanate from sites that are currently inaccessible for in-situ exploration. The rich science return has motivated the investigation of novel robotic explorers that would be able to access, measure and sample such sites.

Palmer E. E. Gaskell R. W. Vance L. D. Sykes M. V. McComas B. K. Jouse W. C.
Location Identification Using Horizon Matching **[#2325]**
We developed a system that autonomously determines a rover's location. It uses a digital elevation model derived from orbital imagery. Then, it finds the best match between the synthetic panoramas generated by the DEM and a rover's panoramic image.

Kooshesh K. A. Lineberger D. H.
Automated Thermal Sample Acquisition with Applications **[#2524]**
We created an Arduino®-based robot to detect samples subject to an experiment, perform measurements once each sample is located, and store the results for further analysis. We then relate the robot's performance to an experiment on thermal inertia.

Lo A. S. Trinidad M. Guilmette T. Segura T.
Using the Mars Ascent Vehicle as a Stand-Alone Sample Return System **[#1570]**
Northrop Grumman is participating in a Phase I study of a Mars Ascent Vehicle (MAV) design. As part of internal R&D, we conducted a feasibility study of using the MAV as a stand-alone sample return vehicle for the Moon. We discuss our results.

Iwata T. Matsumoto K. Ishihara Y. Kikuchi F. Harada Y. Sasaki S.
A Study on the Satellite-to-Satellite Tracking to Detect Mars Rotation Variations **[#1308]**
We plan the precise observations of Mars rotation using the Doppler measurements by satellite-to-satellite tracking (SST) for the Japanese future exploration for Mars: MELOS (Mars Exploration with Lander-Orbiter Synergy).

Sollitt L. S. Beegle L. W.
Off-Nadir LIDAR to Detect Bouguer Anomaly on Airless Worlds **[#1236]**
We present a concept for a novel LIDAR to detect Bouguer anomalies and associated mass concentrations beneath the surfaces of planetary bodies. Our approach uses off-nadir beams at large angles into and away from the spacecraft direction of motion.

Ismail S. Clancy R. T. Sharma S. K. Refaat T.
A 3-D Aerosol Profiling Lidar for Planetary Rover Missions **[#1540]**
A conceptual study is presented for an advanced three-dimensional profiling lidar for aerosols and clouds. This instrument will have a form factor suitable for future Mars and other planetary lander and rover missions.

Abedin M. N. Bradley A. T. Hibberd J. Refaat T. F. Ismail S. Sharma S. K. Misra A. K. Garcia C. S. Mau J. Sandford S. P.
Planetary Surfaces and Atmosphere Characterization Using Combined Raman, Fluorescence, and Lidar Instrument from Rovers and Landers **[#1219]**
Develop a remote Raman-fluorescence spectroscopy and LIDAR multi-sensor instrument capable for investigation and identification of minerals, organics, and biogenic materials as well as conducting atmospheric studies of Mars from rovers and landers.

Du H. Wang A.
Raman Imaging of Extraterrestrial Materials **[#2221]**
We report the first Raman imagery study on a thin section of Apollo sample 14161-7062 and on a sawn rock slice from the new lunar meteorite Dhofar 1672, using a state-of-art Raman imaging system with five laser wavelengths.

Rull F. R. Martinez Frias J. Rodriguez-Losada J. A. Sanz A.
A Micro Raman Study of the Erupted Pyroclasts from El Hierro (Spain) **[#2822]**
A Raman spectroscopic analysis has been performed on the recent volcanic materials erupted in October 2011 at the El Hierro Island (Spain). This analysis is at our knowledge the first Raman study performed on such pristine materials.

Blacksberg J. Maruyama Y. Choukroun M. Charbon E. Rossman G. R.
New Microscopic Laser-Coupled Spectroscopy Instrument Combining Raman, Libs, and Fluorescence for Planetary Surface Mineralogy **[#1510]**
We present a time-resolved laser spectroscopic technique that can collect microscopic Raman spectra as well as additional and complementary elemental information (LIBS, fluorescence), all with the same instrument.

Wang A.
In Situ Laser Raman Spectroscopy for Mars Sample Return Mission **[#2149]**
We describe the scientific advantages brought by the four characters of Mars Microbeam Raman Spectrometer (MMRS), thus demonstrate a powerful technology with high TRL for in situ mineralogy and biomarker detection for the first MSR mission in 2018.

Wiens R. C. Maurice S. Clegg S. Sharma S. Misra A. Bender S. Newell R. Dallmann N. Lanza N. Forni O. Lasue J. Rull F.
Compact Remote Raman-LIBS Instrument for Mars or Titan **[#1699]**
A combined remote Raman and LIBS instrument is a natural outgrowth of ChemCam and the in situ Raman spectroscopy instruments currently being developed. It would be significantly lighter than ChemCam and would have the advantage of both techniques.

Schröder S. Pavlov S. Hübers H.-W. Jessberger E. K.
LIBS Studies of Ferric Salts in Frozen Solutions Under Martian Conditions **[#1980]**
Laser-induced breakdown spectroscopy (LIBS) is capable of investigating pure salts and frozen salt solutions. Ferric chloride can be distinguished from ferric sulfate by applying multivariate data analysis methods.

Ishibashi K. Arai T. Wada K. Kobayashi M. Ohno S. Senshu H. Namiki N. Matsui T. Kameda S. Cho Y. Sugita S.
Analysis Method for Minerals with Laser-Induced Breakdown Spectroscopy (LIBS) for In-Situ Lunar Mineral Measurement **[#1786]**
We confirmed that the elemental composition of olivine and plagioclase are predicted with LIBS by using PLS regression. It is important to prepare reference samples with various physical properties to achieve high precision and accuracy.

Dobosh P. A. Breves E. A. Dyar M. D. McCanta M.
LIBSSIM: Simulation of LIBS Sampling on Rock Surfaces **[#1480]**
A Javascript-HTML5 model has been built to simulate LIBS sampling of a rock surface. The model allows construction of arbitrary rock slabs of chosen grain size and laser beam size (both in pixels) and reports mineral and oxide percentages.

Lanza N. L. Wiens R. C. Newsom H. E. McInroy R. E. Clegg S. Bender S. C.
A Preliminary Examination of Meteorites with Laser-Induced Breakdown Spectroscopy (LIBS) **[#2780]**
A suite of meteorites are measured under low vacuum conditions with Laser-Induced Breakdown Spectroscopy (LIBS).

Clegg S. Sharma S. K. Misra A. K. Dyar M. D. Dallmann N. Wiens R. C. Vaniman D. T. Speicher E. A. Smrekar S. E. Wang A. Maurice S. Esposito L.
Raman and Laser-Induced Breakdown Spectroscopy (LIBS) Remote Geochemical Analysis Under Venus Atmospheric Pressure **[#2105]**
A remote Raman-LIBS spectrometer (RLS) is a rapid method to determine Venus surface chemistry and mineralogy without collecting samples and bringing them into the lander. The RLS results from 18 synthetic samples will be presented.

Hunter G. W. Ponchak G. E. Beheim G. M. Scardelletti M. C. Meredith R. D. Taylor B. Beard S. Kiefer W. S.
The Development of a High Temperature Venus Seismometer **[#1259]**
This paper describes efforts to design, fabricate, and demonstrate a proof-of-concept seismometer operating at Venus temperatures. Seismometer design and fabrication are discussed, as well as preliminary results.

Noda H. Kunimori H. Araki H. Fuse T. Hanada H. Katayama M. Otsubo T. Sasaki S. Tazawa S. Tsuruta S. Funazaki K. Taniguchi H. Murata K.
Lunar Laser Ranging Experiment for SELENE-2 **[#1855]**
We present the development status of the Lunar Laser Ranging experiment proposed for the Japanese SELENE-2 lunar landing mission.

Morse A. D. Barber S. J. Dewar K. R. Pillinger J. M. Sheridan S. Wright I. P. Gibson E. K. Merrifield J. A. Howe C. J. Waugh L. J. Pillinger C. T.
Searching for Lunar Sater: The Lunar Volatile Resources Analysis Package **[#2320]**
The Lunar Volatile Resources Analysis Package is a provisional payload for the ESA Lunar Lander. It is designed to analyse the chemical and isotopic composition of volatiles extracted from rock samples and the tenuous lunar atmosphere.

Gerasimov M. V.
Gas-Analytic Package for the Russian Lunar-Resource and Luna-Globe Missions **[#2223]**
The paper describes the architecture of the Gas Analytic Package, which is now under development for the Russian Lunar-Resource and Lunar-Globe missions. The package is a combination of thermal analyzer, gas chromatograph, and mass-spectrometer.

Anderson F. S. Nowicki K. Hamilton V. Whitaker T. J.
Portable Geochronology with LDRIMS: Learning to Date Meteorites like Zagami with the Boulder Creek Granite **[#2844]**
We demonstrate a rapid, portable in-situ dating technique on granite in preparation for dating lunar and martian materials.

Cohen B. A.
Development of the Potassium-Argon Laser Experiment (KArLE) Instrument for In Situ Geochronology **[#1267]**
How to date a rock? / Use potassium-argon / Or bring it flowers.

Young K. E. Evans C. A. Hodges K. V.
Evaluating Handheld X-Ray Fluorescence (XRF) Technology in Planetary Exploration: Demonstrating Instrument Stability and Understanding Analytical Constraints and Limits for Basaltic Rocks **[#2628]**
Handheld X-ray fluorescence instruments show great promise in enhancing the science return of planetary surface missions. Examining their stability and trace element detection limits is crucial in establishing this technology.

Jackson T. L. Farrell W. M. Bleacher J. E.
xPED: The Exploration Portable Electrostatic Detector **[#1545]**
The Exploration Portable Electrostatic Device (xPED) will allow astronauts to determine their charge state and characterize the electrical environment from their excursions. Testing at the DRATS site provided an opportunity to obtain new results.

Dove A. Robertson S. Wang X. Horanyi M.
Surface Effects on Photoelectron Sheath Characteristics **[#2421]**
Photoelectron sheaths are generated by shining ultraviolet radiation on Zr and CeO_2 surfaces. We use Langmuir probes to measure the electron density and temperature within the sheath and compare the results for the conducting and insulating surfaces.

Hobosyan M. A. Martirosyan K. S.
Sintering of Regolith by Activated Thermites: A Novel Approach for Lunar In-Situ Resource Utilization **[#1019]**
The concept of sintering of lunar regolith with activated thermites is provided. The thermodynamic calculations and experimental procedures are provided to demonstrate the effectiveness of new route of regolith sintering under the lunar environment.

Varga T. P. Szilágyi I. Bérczi Sz. Varga T. N.
Process for Producing Building Elements with Multilayer Structure from Lunar Regolith by Microwave Heating **[#1560]**
Arbitrarily large building elements can be created from lunar regolith, if the elements are produced layer by layer in a way that every layer is heated individually by microwave, and the newer layers are placed over the older ones.

Nagihara S. Zacny K. Hedlund M. Taylor P. T.
A Compact In-Situ Thermal Conductivity Probe as Part of a Lunar Regolith Excavation System **[#1135]**
We propose a design for a compact in situ thermal conductivity probe intended for lunar network geophysical missions. The probe is attached to the penetrating cone of the newly developed low-power, low-mass lunar regolith excavation system.

Skocki K. Seweryn K. Kuciński T. Grygorczuk J. Rickman H. Morawski M.
Experimental Determination of Geotechnical Parameters of Planetary Bodies — CHOMIK Sampling Device Example **[#2298]**
The CHOMIK planetary sampler designed for the Phobos-Soil mission was developed at the Space Research Centre PAS. Tests show the capability of in situ recognition of basic rock/soil types and parameters of planetary bodies.

Zacny K. Paulsen G. Mellerowicz B. Craft J. McKay C. Glass B. Davila A. Marinova M. Dave A. Thompson S.
The Icebreaker: Mars Drill and Sample Delivery System **[#1153]**
We present development and testing of a 1-meter-class rotary-percussive drill and associated sample delivery system for future Mars missions.

Paulsen G. Zacny K. Steele A. Conrad P. Chu P. Craft J. Hedlund M. McCarthy T. Schad C.
Demonstration of the Acquisition and Caching for the Mars Sample Return Missions **[#1151]**
We present results of the end-to-end demonstration of the core acquisition and caching for the Mars Sample Return mission.

Zacny K. Paulsen G. Mellerowicz B. Craft J. Beegle L. Bar-Cohen Y. Sheritt S. Badescu M.
Wireline Rotary-Percussive Coring Drill for Deep Exploration of Planetary Bodies **[#1173]**
We present a wireline drilling system for acquisition of core samples from great depths in planetary bodies containing water-ice deposits.

De Sanctis M. C. Coradini A. Ammannito E. Boccaccini A. Di Iorio T. Battistelli E. Capanni A.
Micro Imaging Spectrometer for Subsurface Studies of Martian Soil: Ma_Miss **[#2855]**
Ma_Miss (Mars Multispectral Imager for Subsurface Studies) is a spectrometer devoted to observe the lateral wall of the borehole generated by the drill installed on the ExoMars Pasteur Rover to perform in situ investigations in the Mars subsurface.

Li R. Li D. Lin L. Meng X. Di K. Paar G. Coates A. Muller J. P. Griffiths A.
Oberst J. Barnes D. P.
ExoMars: Pre-Launch PanCam Modeling and Accuracy Assessment **[#2437]**
The goal of this research is pre-launch quantitative analysis of the localization accuracy of the Panoramic Camera (PanCam) vision system designed to be carried onboard the European Space Agency (ESA) ExoMars rover mission for launch in 2018.

McElhoney K. Chaniotakis N. O'Neil G. D. Bauer J. Harjes D. Traviglia D.
Hecht M. H. Kounaves* S. P.
The In-Situ Wet Chemical Analysis Laboratory and Sensor Array (CHEMSENS): The Next Generation Mars Soil Chemistry Analyzer **[#2329]**
CHEMSENS builds on the heritage and success of the Phoenix wet chemistry laboratory (WCL). It will provide the ability to perform analyses over a variety of geological surfaces, materials, soil chemistry, and the lifetime of a rover or lander.

Lorenz R. D. Stofan E. Lunine J. I. Zarnecki J. C. Harri A.-M. Karkoschka E. Newman C. E.
Bierhaus E. B. Clark B. C. Yelland M. Leese M. R. Boldt J. Darlington E. Neish C. D. Sotzen K.
Arvelo J. Rasbach C. Kretsch W. Strohbehn K. Grey M. Mann J. Zimmerman H. Reed C.
MP3 —- A Meteorology and Physical Properties Package to Explore Air-Sea Interaction on Titan **[#2768]**
Neat gadget to gauge / Heat, moisture, and momentum / Sailing Ligeia.

Wolf A. Laufer R. Lightsey G. Herdrich G. Srama R. Röser H.-P. Hyde T. W.
Piezo Dust Detector (PDD) — A Modular Miniaturized In-Situ Measurement Instrument for Dust Research **[#2136]**
The Piezo Dust Detector (PDD) is a modular miniaturized in situ measurement instrument for submillimeter dust and orbital debris particles based on piezo sensor element technology, which can be flown on a large number of space-borne platforms.

Daly R. T. Kerby J. D. Austin D. E.
Steps Toward an Innovative Electrospray-Based Particle Source for Dust Accelerators **[#1917]**
We are developing a new particle source for dust accelerators that charges particles regardless of their electrical conductivity. This overcomes a major limitation of current dust accelerator particle sources.

Westphal A. J. Blum J. Gainsforth Z. Lee A. T. Sandford S. A.
Silicon Nitride Spiderwebs for Cometary Coma Dust Capture **[#1156]**
Here we describe a cometary coma dust collector based on silicon nitride "spiderwebs." The basic technology is already flight-proven on the Planck cosmic microwave background mission.

Kobayashi M. Miyachi T. Nakamura M. H.
Cosmic Dust Detector Using Piezoelectric PZT with Current-to-Voltage Conversion Amplifier **[#1411]**
This paper describes the concept of a dust monitor with a large detection area but less resource using PZT ceramics, and the possibility is experimentally demonstrated. We suggested the use of a current-to-voltage converting amplifier for it.

Kobayashi M. Senshu H. Wada K. Namiki N. Hirata N. Miyamoto H.
Circumasteroid Dust Monitor Instrument for Future Missions **[#1418]**
Dust particles may exist even on or around asteroids. We propose direct observations of such dust particles for future missions to asteroids.

Sternovsky Z. Gruen E. Horanyi M. Kempf S. Postberg F. Schmidt J.
Dust Spectroscopy of the Jovian Satellites **[#2929]**
Dust instruments can be used for surface composition measurements of Europa and Ganymede.

Amini R. B. Beegle L. Castillo-Rogez J. C. Giapis K. Snyder J. S.
Electric Propulsion Induced Secondary Mass Spectroscopy (EPI-SMS) **[#2781]**
We posit electric propulsion's ability to serve as a source for sputtering experiments at small bodies to determine surface composition. In the abstract we depict expected sputtering return and outline two validating experiments.

Zinovev A. Baryshev S. Tripa E. Veryovkin I.
Laser Setup for Multi-eElement RIMS of GENESIS Returned Samples **[#2911]**
Laser setup for multi-element RIMS analysis is described. This approach is the compromise between sensitivity and complexity of the instrument and allowed us to get more data within single experiment thereby decreasing the samples consumption.

Mahaffy P. R. Hodges R. R. Harpold D. N. King T. T. Jaeger F. Raaen E. Lyness E. Collier M. Benna M.
Calibration of the Neutral Mass Spectrometer for the Lunar Atmosphere and Dust Environment Explorer (LADEE) Mission **[#2144]**
The calibration of the Neutral Mass Spectrometer for the Lunar Atmosphere and Dust Environment Explorer Mission designed to measure the composition of the lunar exosphere has been completed prior to environmental tests and the results will be presented.

Wilson E. L. Georgieva E. M. Blalock G. W. Marx C. T. Heaps W. S.
Development of a Miniaturized Hollow-Waveguide Gas Correlation Radiometer for Trace Gas Measurements in the Martian Atmosphere **[#1603]**
We present the development of a miniaturized gas correlation radiometer (GCR) for column trace gas measurements in the martian atmosphere. Designed as an orbiting instrument, the GCR maps multiple gases to identify active regions on the surface.

Blaney D. L. Mouroulis P. Green R. Rodriquez J. Sellar G. Van Gorp B. Wilson D.
The Ultra Compact Imaging Spectrometer (UCIS): In Situ Imaging Spectroscopy for Mars, the Moon, and Asteroids **[#2593]**
The Ultra Compact Imaging Spectrometer (UCIS) can map mineralogy in situ on Mars, the Moon, asteroids, and comets.

Bowles N. E. Calcutt S. B. Reininger F. M.
The Asteroid Thermal Mapping Spectrometer: An Imaging Mid-IR Spectrometer for the Marco Polo–R NEO Sample Return Cosmic Vision Candidate Mission **[#2334]**
This paper describes the Asteroid Thermal Mapping Spectrometer (ATMS) development model currently under test at the Department of Physics, University of Oxford.

Edwards C. S. Christensen P. R.
Development of a Microscopic Thermal Emission Spectrometer: Analysis of Primary Igneous Materials for Planetary Analogs **[#2658]**
We present initial results from the development of a microscopic thermal emission spectrometer and its application to igneous planetary analog materials. Additionally, we also illustrate its utility as a non-destructive micro-analysis technique.

Okada T.
Reanalysis of Possible Degraded XRS and Remote X-Ray Spectroscopy in the Future Missions **[#2057]**
Planetary remote X-ray fluorescence spectroscopy is proposed by showing the new concept of XRS instrument using a standard sample by considering the lessons learned from the previous missions.

Schmanke D. Hasebe N. Blumers M. Heinl M. Klingelhöfer G. Brückner J.
Preliminary Experiments with a Pyroelectric X-Ray-Source for the Development of AXS for the Scientific Payload of the SELENE-2 Mission **[#2831]**
The further development of the successful APXS leads to the Active X-ray Spectrometer (AXS) as candidate for scientific payload for the JAXA SELENE-2 mission. A new on-demand X-ray generator source is examined by preliminary usability tests.

Kim K. J. Amano Y. Boynton W. V. Klingelhöfer G. Brückner J. Hamara D. Starr R. D. Lim L. F. Hasebe N. Ju G. Fagan T. J. Ohta T. Shibamura E.
Introduction to the Scientific Investigation of an Active X-Ray Spectrometer for the SELENE-2 Rover **[#1282]**
This presentation introduces the proposed Active X-ray Fluorescence Spectrometer for SELENE-2 rover mission using a pyroelectric crystal to generate X-rays; a silicon drift detector would minimize radiation hazard and provide good XRF performance.

Shanmugam M. Vadawale S. Acharya Y. B. Goyal S. K. Arpit Patel Bhumi Shah Murty S. V. S.
Solar X-Ray Monitor (XSM) On-Board Chandrayaan-2 Orbiter **[#1858]**
The Solar X-ray Monitor will provide real time X-ray spectra for the CLASS experiment on the Chandrayaan-2 Orbiter. In this experiment, the SDD detector has been used for the first time. The developmental status of XSM will be discussed in this paper.