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Jet Propulsion Laboratory

Scientific Sponsor

[Image of Politecnico di Torino]
Tuesday 4 September 2012

Session 1: Programmatic
08:50  A&R and AI at ESA
       Visentin G.
       European Space Agency, (NETHERLANDS)
09:15  Automation and Robotics in the German Space Program
       Sommer, B.
       German Aerospace Center, DLR, (GERMANY)
09:40  An Overview of Recent Canadian Space Agency Activities in Space Robotics
       DUPUIS, E. ; MARTIN, E.
       Canadian Space Agency, (CANADA)
10:05  Development of an Astronaut Support Robot and its Precursor REX-J, to be tested on the International Space Station
       ODA, M.
       JAXA, (JAPAN)

Session 2a: Rover Systems
10:45  The Canadian Mars Exploration Science Rover Prototype
       Langley, C. 1; Chappell, L. 1; Ratti, J. 1; Ghafoor, N. 1; Ower, C. 1; Gagnon, C. 2; Barfoot, T. 3; Orr, N. 3
       1MacDonald, Dettwiler, and Associates, (CANADA); 2Bombardier Recreational Products Centre for Advance Technology, (CANADA); 3University of Toronto Institute for Aerospace Studies, (CANADA); 4Canadian Space Agency, (CANADA)
11:10  RIMRES: A Modular Reconfigurable Heterogeneous Multi-Robot Exploration System
       Cordes, F. 1; Roehr, T. M. 1; Kirchner, F. 2
       1DFKI Robotics Innovation Center Bremen, (GERMANY); 2DFKI Robotics Innovation Center Bremen AND University of Bremen, (GERMANY)
11:35  Mobile Payload Element (MPE): Concept Study for a Sample Fetching Rover for the ESA Lunar Lander Mission
       Dr. Hofmann, Peter /; Dr. Stuffler, Timo /; Haarrmann, Richard /; R. Kayser-Threde GmbH, (GERMANY)
12:00  A Canadian Lunar Exploration Light Rover Prototype
       McCoubrey, R 1; Langley, C. 1; Ratti, J. 1; Ghafoor, N 1; Ower, C 1; Gagnon, C 2; Barfoot, T 3; Lamarche, T 4; Moroso, F 4; Picard, M 4
       1MDA, (CANADA); 2Bombardier Recreational Products - Centre for Advanced Technology, (CANADA); 3University of Toronto Institute for Aerospace Studies, (CANADA); 4Canadian Space Agency, (CANADA)

Session 2b: Orbital Robotics Testing
10:45  Evaluation Analysis of the S-520-25 Rocket Experiment for a Tethered Space Robot
       NOHMI, M. ; TANIKAWA, Jun ; Hosoda, Takayuki ; Uchida, Atsuko
       Kagawa University, (JAPAN)
11:10  Localization and Fuel Management Techniques for the NTUA Space Servicer Emulator System
       FLESSA, Th. ; Paraskevas, I. ; Papadopoulos, E.
       NTUA, (GREECE)
11:35  End-To-End Concept Demonstration For On-Orbit Servicing Type Missions
       PLURA, M. 1; STELZER, M. 2; OHDORF, A. 3
       1SCISYS Deutschland GmbH, (GERMANY); 2German Aerospace Center (DLR), Robotics and Mechatronics Center (RMIC), (GERMANY); 3German Aerospace Center (DLR), Space Operations and Astronaut Training (RB), (GERMANY)
12:00  Robotics Space Systems and Subsystems for Advanced Future Programmes
       Dr. Hofmann, Peter /; Dr. Stuffler, Timo /; Dr. Kaiser, Clemens /; Turrini, Donatella /; D. Kayser-Threde GmbH, (GERMANY)
Session 2c: AI for Satellite Operation
10:45 Planning Coverage Campaigns for Mission Design and Analysis: CLASP for the Proposed DESDynl Mission
Knight, R.; McLaren, D.; Hu, S.
California Institute of Technology, Jet Propulsion Laboratory, (UNITED STATES)
11:10 Automated Space-based Monitoring of Flooding in Thailand
Chien, S. ; McLaren, D. ; Doubleday, J. ; Tran, D. ; Tanpipat, V. ; Chitradon, R. ; Boonya-aroonnet, S. ; Thanapapawin, P. ; Mandal, D
Jet Propulsion Laboratory, (UNITED STATES); Thaiflood.net, (THAILAND); Hydro Agro Informatics Institute, (THAILAND); Goddard Space Flight Center, (UNITED STATES)
11:35 Planning Acquisitions for an Ocean Global Surveillance Mission
Olive, X. ; Verfaillie, G. ; Pralet, C. ; Rainonneau, S. ; Sebbag, I.
TAS, Toulouse, (FRANCE); ONERA, Toulouse, (FRANCE); CNES, Toulouse, (FRANCE)
12:00 Allocation of Downlink Windows for a Constellation of Satellites
Pralet, C. ; Verfaillie, G. ; Olive, X. ; Rainonneau, S. ; Sebbag, I.
ONERA, Toulouse, (FRANCE); TAS, Toulouse, (FRANCE); CNES, Toulouse, (FRANCE)
12:25 Lunch Break

Session 3a: Rover Localisation
13:35 Design and Validation of an Absolute Localization System for the Lunar Analogue Rover "Artemis"
Hamel, J.-F.; Langelier, M.-K.; Alger, M.; Iles, P.; MacTavish, K.
NGC Aerospace Ltd, (CANADA); Neptec Design Group, (CANADA)
14:00 Exploiting Orbital Images to Define Space Exploration Rover Localization
Boukas, E.; Kostavelis, I.; Nalpantidis, L.; Gasteratos, A.
Production and Management Engineering Dept. Democritus University of Thrace, (GREECE); Centre for Autonomous Systems, Royal Institute of Technology - KTH, (SWEDEN)
14:25 Terrain Aided Navigation for Planetary Exploration Missions
Schwendner, J.
German Research Center for Artificial Intelligence (DFKI), (GERMANY)
14:50 A Localization Framework for the Planning, Analysis, and Execution of Mobile Robot Missions
Rossmann, J.; Jochemm, G.
Institute for Man-Machine Interaction, RWTH Aachen University, (GERMANY); Dortmund Center for Computer Integrated Manufacturing, (GERMANY)

Session 3b: Robot Dynamics
13:35 A new Contact Dynamics Model Tool for Hardware-in-the-Loop docking Simulation
Zebenay, M.; Lampariello, R.; Boge, T.; Choukroun, D
Germany Aerospace Center, (GERMANY); TU Delft, (NETHERLANDS)
14:00 Contact Dynamics Simulation for Capture Operation by Snare Wire Type of End Effector
Abiko, Satoshi; Uyama, Naohiro; Ikuta, Tetsuya; Nagaoka, Kenji; Yoshida, Kazuya; Nakanishi, Hiroki
Tokyo University, (JAPAN); Japan Aerospace Exploration Agency (JAXA), (JAPAN); Tokyo Institute of Technology
14:25 Measurement and Analysis of the Solar Array Paddle’s Dynamic Displacements for GOSAT
Honda, A.; Suzuki, S.; Hagiwara, Y.; Oda, M
Tokyo Institute of Technology, (JAPAN); Advanced Engineering Service, Japan, (JAPAN); Mitsubishi Heavy Industries Ltd., (JAPAN); Japan Aerospace Exploration Agency, Japan, (JAPAN)
14:50 Experimental Evaluation of Contact/Impact Dynamics between a Space Robot with a Compliant Wrist and a Free-Flying Object
Uyama, N.; Fujii, Y.; Nagaoka, K.; Yoshida, K.
Tohoku University, (JAPAN)
Session 3c: Spacecraft Autonomy
13:35 Satisfying Resource Constraints in Space Missions by On-line Task Reconfiguration
Micalizio, R.; Scala, E.; Torasso, P.
Università di Torino, (ITALY)
14:00 Onboard Mission Replanning using Operation Script and Orthogonal Design Algorithm
Fukushima, Y.
Institute of Space and Astronautical Science, JAXA, (JAPAN)
14:25 Continuous Planning and Execution with Timelines
Cesta, A.; Fratini, S.; Orlandini, A.; Rasconi, R.
1CNR - National Research Council of Italy, (ITALY); 2ESA/ESOC, (GERMANY)
Codetta-Raiteri, D.; Portinale, L.; Guiotto, A.; Yushstein, Y.
1University of Piemonte Orientale, (ITALY); 2Thales Alenia Space, (ITALY); 3ESA, (NETHERLANDS)
15:15 Coffee Break

Session 4a: LIDAR for Rovers
15:30 Compact fast scanning lidar for planetary rover navigation
Bakambu, J.; Nimelman, M.; Tripp, J.; Kujelev, A.
1MDA, (CANADA); 2Optech Inc., (CANADA); 3CSA, (CANADA)
15:55 A 2D LIDAR System for Space Applications
Ehrenreich, S.; Henkel, H.
von Hoerner und Sulger GmbH, (GERMANY)
16:45 Pose Refinement Using ICP Applied to 3-D LIDAR Data for Exploration Rovers
Gemme, Sebastien; Gingras, David; Salerno, Alessio; Dupuis, Erick; Pomereleau, Francois; Michaud, Francois
1Canadian Space Agency, (CANADA); 2ETH Zurich, (SWITZERLAND); 3Universite de Sherbrooke, (CANADA)
16:20 LIDAR-based Terrain Mapping and Navigation for Planetary Exploration Rover
Ishigami, G.; Otsuki, M.; Kubota, T.
JAXA, (JAPAN)

Session 4b: Localisation
15:30 Tracking and Pose Estimation of a Non-cooperative Satellite Using Stereo Images for On-orbit Servicing
Oumer, N.; Panin, G.
German Aerospace Center (DLR), (GERMANY)
15:55 The SPHERES VERTIGO Goggles: Vision Based Mapping and Localization Onboard the International Space Station
Tweedle, B. E.; Saenz-Otero, A.; Miller, D. W.
Massachusetts Institute of Technology, (UNITED STATES)
16:20 Quaternion-based EKF-SLAM from Relative Pose Measurements: Analysis and Applications
Carlone, L.; Macchia, V.; Tibaldi, F.; Bona, B.
1Politecnico di Torino, (ITALY); 2Istituto Superiore Mario Boella, (ITALY)
16:45 TriDAR Test Results Onboard Final Shuttle Mission, Applications For Future Of Non-Cooperative Autonomous Rendezvous & Docking
Luu, T.; Ruel, S.; Berube, A.
Neptec Design Group, (CANADA)
Session 4c: Onboard Autonomy

15:30  Embedding Planning Technology into Satellite Systems
Kortenkamp, D ¹; Hudson, M.B. ¹; Bell, S ²; Musliner, D ²; Pelican, M ²; Hamell, J ²; Zetocha, P ³
¹TRACLabs, (UNITED STATES); ²SIFT LLC, (UNITED STATES); ³AFRL, (UNITED STATES)

15:55  Onboard Autonomy and Ground Operations Automation for the Intelligent Payload Experiment (IPEX) CubeSat Mission
Chien, S ¹; Doubleday, J ¹; Shao, E ¹; Tran, D ¹; Bellardo, J ²; Williams, A ²; Piug-Suari, J ³; Crum, G ³; Flatley, T ³
¹Jet Propulsion Laboratory, (UNITED STATES); ²California Polytechnic State University, San Luis Obispo, (UNITED STATES); ³Goddard Space Flight Center, (UNITED STATES)

16:20  Improving Decision Support Systems through development of a Modular Autonomy Architecture
Center, Kenneth B. ¹; Courtney, Phillip ²; Adams, Richard ³; Musliner, David J. ⁴; Pelican, Michael J. ⁴; Hammel, Josh ⁴; Kortenkamp, David ⁴; Hudson, Mary Beth ⁵; Jurenko, Robert ⁶; Zetocha, Paul ⁷
¹PnP Innovations, (UNITED STATES); ²SRA, Inc., (UNITED STATES); ³Barron Associates, Inc., (UNITED STATES); ⁴SIFT, (UNITED STATES); ⁵TRACLabs, (UNITED STATES); ⁶SAIC, (UNITED STATES); ⁷RVSC, AFRL, (UNITED STATES)

16:45  Using Ontology to Improve Autonomous Interactions between Space Vehicles: Application to Multi-vehicles Planetary Exploration Missions
Bensana, Eric
ONERA, (FRANCE)

17:10  Welcome Cocktail and Opening of Poster Session

19:15  End of Day 1
Wednesday 5 September 2012

Plenary Talk
08:45-09:15 Developing a Framework for Reliable Autonomous Surface Mobility
Wettergreen, D.; Wagner, M
Carnegie Mellon University, (UNITED STATES)

Session 5a: Alternative Mobility 1
09:25 Dynamic Running Quadruped for Crater Exploration
Kontolatis, I.; Papadopoulos, E.
NTUA, (GREECE)

09:50 Active Spine and Feet with Increased Sensing Capabilities for Walking Robots
Kühn, D.; Beinersdorf, F.; Bernhard, F.; Fondahl, K.; Schilling, M.; Simnofske, M.; Stark, T.; Kirchner, F.
1DFKI - German Research Center for Artificial Intelligence, (GERMANY); 2University of Bremen, (GERMANY)

10:15 Kinematics Modeling of a Hybrid Wheeled Leg Planetary Rover
Hidalgo Carrió, J.; Cordes, F.
DFKI - Robotics Innovation Center, (GERMANY)

10:40 Non-gravity Under-actuated Control Methods of Tether Based Locomotion for Astronaut Support Robot
Yamazumi, M.; Oda, M
Tokyo Institute of Technology, (JAPAN)

Session 5b: Robot Hardware
09:25 Reconfigurable Space Manipulators for In-orbit Servicing and Space Exploration
Aghili, F.
Canadian Space Agency, (CANADA)

09:50 Development of Wrist Interface Mechanism for Modularized Dexterous Robotic Hand on Astronaut Supporting Robot
Takei, Y.; Oda, M.
Tokyo Institute of Technology, (JAPAN)

10:15 A High-powered Four-finger Robotic Hand with MEMS Tri-axial Tactile Sensors
Ueta, A.; Oda, M.; Nakai, A.; Endo, Y.
1Japan Aerospace Exploration Agency, (JAPAN); 2University of Tokyo, (JAPAN); 3THK CO., LTD., (JAPAN)

10:40 Development of a Lightweight Manipulator Arm using Heterogeneous Materials and Manufacturing Technologies
Manz, M.; Hilljegerdes, J.; Dettmann, A.; Kirchner, F.
DFKI Bremen - Robotics Innovation Center, (GERMANY)

Session 5c: Operation Technologies 1
09:25 Telemetry Monitoring By Dimensionality Reduction and Learning Hidden Markov Model
Yairi, T.; Tagawa, T.; Takata, N.
1University of Tokyo, (JAPAN); 2JAXA, (JAPAN)

09:50 Finding Images of Terrain Features in Large Databases Collected by Rovers
Schreckenghost, D.; Milam, T.; Lees, D.; Fong, T.
1TRACLabs, (UNITED STATES); 2Carnegie Mellon University, (UNITED STATES); 3NASA Ames Research Center, (UNITED STATES)

10:15 Intelligent Agents for Scheduling Space Communications
Bonasso, P.; Schreckenghost, D.; Milam, T.
TRACLabs, Inc, (UNITED STATES)
10:40  Perception Engine for Activity Recognition and Logging using Manual Procedure Instructions
Beeson, P. †; Barrash, N. †; Burns, B. †; Bolles, B. ‡
†TRAC Labs Inc., (UNITED STATES); ‡SRI International, (UNITED STATES)

10:55  Coffee Break

Session 6a: Alternative Mobility 2
11:10  Advanced Robotic System of Hopping Rovers for Small Solar System Bodies
Adachi, Tadashi †; Kubota, Takashi †; Kuroda, Yoji ‡; Yoshimitsu, Tetsuo ‡
†Seccia Co Ltd., (JAPAN); ‡ISAS/JAXA, (JAPAN); ‡Meiji University, (JAPAN)

11:35  Novel Hopping Mechanism using Permanent Magnets for Tiny Asteroid Exploration Rover
Kurisu, M.
Tokyo Denki University, (JAPAN)

12:00  Study on a Reasonable Locomotion of a Multi-Legged Rover Using its Dynamic Motion
Nishikori, S. †; Hokamoto, S. †; Kubota, T. ‡
†Graduate School of Engineering, Kyushu University, (JAPAN); ‡Faculty of Engineering, Kyushu University, (JAPAN); ‡Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, (JAPAN)

12:25  Ciliary Micro-hopping Locomotion of an Asteroid Exploration Robot
Nagaoka, K. †; Takano, R. ‡; Izumo, T. ‡; Yoshida, K.
Tohoku University, (JAPAN)

Session 6b: Robotics and Crew
11:10  Robotic Arm Control in EVA Scenario
Tedone, D. †; Ferraris, S. †; Gualano, M. ‡; Grunig, J. ‡
†Thales Alenia Space Italia, (ITALY); ‡SEAC-02, (ITALY)

†Space Applications Services N.V., (BELGIUM); ‡Space Applications Services N.V., (GERMANY); ‡Universite Paris Descartes, (FRANCE); ‡Universite Libre de Bruxelles, (BELGIUM); ‡ESA, (NETHERLANDS)

12:00  DYNASUIT, an Intelligent Space Countermeasure Suit Based on new Artificial Muscles Technologies and Biofeedback
†Space Applications Services, (BELGIUM); ‡Wyle GmbH, (GERMANY); ‡CSEM, (SWITZERLAND); ‡EMPA, (SWITZERLAND); ‡RMIT University, (AUSTRALIA); ‡Space Biomedical Association, (UNITED KINGDOM); ‡ESA/ESTEC, (NETHERLANDS)

12:25  Situational Awareness Enhancement for Crew Robotics Operaiton by Image Recognition
Ueno, H
Japan Aerospace Exploration Agency, (JAPAN)

Session 6c: Autonomous Science
11:10  Mawson the Astrobiologist Rover: Towards Automatic Recognition of Stromatolites
Peyton, T. †; Li, R. †; Flannery, D. ‡
†The University of Sydney, (AUSTRALIA); ‡The University of New South Wales, (AUSTRALIA)

11:35  Mars Terrain Image Classification using Cartesian Genetic Programming
Leitner, J.; Harding, S.; Schmidhuber, J.
Dalle Molle Institute for Artificial Intelligence (IDSIA)/SUPSI/USI, (SWITZERLAND)

12:00  Planetary Lake Lander - Adaptive Robotic Monitoring of Remote Lake Systems
Pedersen, L. †; Smith, T. ‡; Lee, S.Y. ‡; Cabrol, N. ‡
†Carnegie Mellon University, (UNITED STATES); ‡Stinger Ghaffarian Technologies, (UNITED STATES); ‡SETI Institute, (UNITED STATES)
12:25 A Comparison of Declarative and Hybrid Declarative-Procedural Models for Rover Operations
Knight, R.; Rabideau, G.; Lenda, M.; Maldague, P.
Jet Propulsion Laboratory, California Institute of Technology, (UNITED STATES)

12:50 Lunch Break

Plenary Talk
14:00-14:30 2012 Robotics Activities at JPL
Volpe, R.
Jet Propulsion Laboratory, Caltech, (UNITED STATES)

Session 7a: Rover Field Testing 1
14:40 ESTEC-CNES Remote Experiment #2 With PanCam, WISDOM and CLUPI
1ESA/ESTEC, (NETHERLANDS); 2CNES, (FRANCE); 3Joanneum Research, (AUSTRIA); 4Aberystwyth University, (UNITED KINGDOM); 5LATMOS/IPSL, (FRANCE); 6Space Exploration Institute, (SWITZERLAND)

15:05 Development and Field Test of Longer Lasting Volcano Rover
1Meiji University, (JAPAN); 2Japan Aerospace Exploration Agency, (JAPAN)

15:30 Planetary Surface Exploration using a Network of Reusable Paths: A Paradigm for Parallel Science Investigations
1University of Toronto Institute for Aerospace Studies, (CANADA); 2University of Western Ontario, Depts. of Earth Science, Physics and Astronomy, (CANADA); 3York University, Dept. of Earth and Space Science and Engineering, (CANADA); 4MacDonald Dettwiler and Associates Ltd. (MDA), Space Missions, (CANADA)

15:55 3D Surface Mapping Using a Semi-Autonomous Rover: A Planetary Analog Field Experiment
Merati, R. S.; Tong, C. H.; Gammell, J.; Bakambu, J.; Dupuis, E.; Barfoot, T. D.
1University of Toronto, (CANADA); 2MDA Space Missions, (CANADA); 3Canadian Space Agency, (CANADA)

Session 7b: Orbital Robotics Missions
14:40 An Intelligent Building Blocks Concept for On-Orbit-Satellite Servicing
Weise, J.; Briess, K.; Goeller, M.; Dillmann, R.; Adomeit, A.; Reimerdes, H.-G.
1Technische Universität Berlin, (GERMANY); 2FZI Forschungszentrum Informatik, (GERMANY); 3RWTH Aachen, (GERMANY)

15:05 STARS-II Mission for Orbital Experiment of a Tethered Space Robot
Uchida, A.; Nohmi, M
Kagawa University, (JAPAN)

15:30 On the Application of Robotics to On-orbit Spacecraft Servicing - The Next Generation Canadarm Project
Osinowo, L.; Ogilvie, A.; Lyn, C.; Lamarche, L.; Bilodeau, G.; Ismail, A.; Rey, D.
1MDA Space Missions, (CANADA); 2Canadian Space Agency, (CANADA)

15:55 Mission DEOS - Proofing the Capabilities of German's Space Robotic Technologies
Wolf, T.; Reintsema, D.; Sommer, B.
DLR Space Administration, (GERMANY)
Session 7c: Soil/Wheel Interaction
14:40 Wheel Level Test Data Generation and Utilization to Predict Locomotion Performances of Planetary Rovers and Validate Simulation Tools
Michaud, S.; Oettershagen, P.
RUAG Space, (SWITZERLAND)
15:05 Bayesian Updating of Planetary Rover Wheel-Soil Contact Model
Galli, A.; Krenn, R.; Scharrerhausen, M.; Schäfer, B
DLR German Aerospace Center, (GERMANY)
15:30 Evaluation of Influence of Wheel Surface Shapes on Ttractive Efficiencies of Planetary Rovers in Various Soil Environments
Sutoh, M.; Nagaoka, K.; Nagatani, K.; Yoshida, K
Tohoku University, (JAPAN)
16:20 Coffee Break

Session 8a: Rover Field Testing 2
16:35 Field Tested Service Oriented Robotic Architecture: Case Study
Fluckiger, L.; Utz, H.
Carnegie Mellon University, (UNITED STATES)
17:00 AUPE - A PanCam Emulator for the ExoMars 2018 Mission
Pugh, S.; Barnes, D.; Tyler, L.; Gunn, M.; Schmitz, N.; Paar, G.; Bauer, A.; Cousins, C.; Pullan, D.; Coates, A.; Griffiths, A.
1 Aberystwyth University, (UNITED KINGDOM); 2 German Aerospace Centre (DLR), (GERMANY); 3 Joanneum Research, (AUSTRIA); 4 Birkbeck College, University of London, (UNITED KINGDOM); 5 University of Leicester, (UNITED KINGDOM); 6 UCL, Mullard Space Science Laboratory, (UNITED KINGDOM)
17:25 Seeker - Autonomous Long Range Rover Navigation for Remote Exploration
Woods, M.; Shaw, A.; Maddison, B.; Tiday, E.; Pham, B.; Artan, U.; Cross, G.
1 SciSys, (UNITED KINGDOM); 2 RAL, (UNITED KINGDOM); 3 Roke Manor Research, (UNITED KINGDOM); 4 LAAS, (FRANCE); 5 MDA, (UNITED KINGDOM); 6 BAE Systems, (UNITED KINGDOM)

Session 8b: Debris Capturing
16:35 Active Orbital Debris Removal Using Space Robotics
Aghili, F.
Canadian Space Agency, (CANADA)
17:00 Debris Removal Mechanism based on Tethered Nets
Lavagna, M.; Bombelli, A.; Benvenuto, R.; Carta, R.
Politecnico di Milano, (ITALY)
17:25 Control of a Space Robot for Capturing a Tumbling Object
Ma, O.; Abad-Flores, Angel
New Mexico State University, (UNITED STATES)

Session 8c: Engineering Robot Systems
16:35 Development and Validation of a Modular Parametric Analytical Tool for Planetary Exploration Rovers
Oettershagen, P.; Michaud, S.
RUAG Space, (SWITZERLAND)
17:00 Reconfigurable Automation System Architecture Model for Space Systems (RASAMS)
Domse, N.; Schäfer, F.; Maier, C.; Fink, M.
1 Fraunhofer-Institut für Kurzzeitdynamik - Ernst-Mach-Institut (EMI), (GERMANY); 2 ZSICK AG, Chip Design, Central Unit Research & Development, (GERMANY)
17:25  A Class Structured Software Development Platform for On-board Computers of Small Satellites
       Kamijo, T.; Kimura, S.; Aoki, Y.; Kobayashi, S
       Tokyo University of Science, (JAPAN)

17:50  Simulation of High Speed Digital Control for Robotic Arms
       Jameux, D.
       ESA/ESTEC, (NETHERLANDS)

18:05  Coffee Break

18:20  Demonstrations

19:20  Departure for Conference Dinner
Thursday 6 September 2012

Plenary Talk
08:45-09:15 Hyperspectral Feature Detection onboard the Earth Observing One Spacecraft using Superpixel Segmentation and Endmember Extraction
Thompson, D R ; Bornstein, B ; Bue, B ; Tran, D ; Chien, S ; Castano, R
Jet Propulsion Laboratory, (UNITED STATES)

Session 9a: Vision for Navigation
09:25 A SIFT-Based Method for Matching Desired Keypoints on Mars Rock Targets
Gui, C ; Barnes, D ; Pan, L.L.
Department of Computer Science of Aberystwyth University, (UNITED KINGDOM)
09:50 Advanced Visual Odometry for Planetary Exploration Rover
Otsu, K 1 ; Otsuki, M 1 ; Ishigami, G 1 ; Kubota, T 1
1The University of Tokyo, (JAPAN); 2JAXA/ISAS, (JAPAN)
10:15 A Vision-based Pose Estimation System for the Lunar Analogue Rover "Artemis"
Simard Bilodeau, V. 1 ; Beaudette, D. 1 ; Hamel, J.-F. 1 ; Alger, M. 2 ; Iles, P. 2 ; MacTavish, K. 2
1NGC Aerospace Ldt., (CANADA); 2Neptec Design Group Ltd., (CANADA)
10:40 Interest Point Sampling for Range Data Registration in Visual Odometry
Panwar, Vivek 1 ; Lam, Joseph 1 ; Jasiobedzki, Piotr 1 ; Greenspan, Michael 1
1Queens University, (CANADA); 2MDA Space Missions, (CANADA); 3Queen’s University, (CANADA)

Session 9b: Drills, Moles and Penetrators
09:25 Robotics and Automation for "Icebreaker"
Glass, B. 1 ; Dave, A 2 ; McKay, C. 1 ; Paulsen, G. 2
1NASA Ames Research Center, (UNITED STATES); 2Honeybee Robotics, (UNITED STATES)
09:50 Self-Turning Screw Mechanism for Burying Geophysical Sensors under Regolith
Yasuda, S.; Komatsu, K.; Tanaka, S.
JAXA, (JAPAN)
10:15 Development of a Propulsion Mechanism for a Lunar Subsurface Excavation Robot with Peristaltic Crawling Mechanism
Kitamoto, H 1 ; Omori, H 1 ; Nagai, H 1 ; Nakamura, T 1 ; Osumi, H 1 ; Kubota, T 2
1Chuo University, (JAPAN); 2JAXA, (JAPAN)
10:40 Casting Manipulator System for Lunar Exploration - Launching Penetrator by Rotation of Boom -
Arisumi, H. 1 ; Otsuki, M. 1 ; Nishida, S. 1
1National Institute of Advanced Industrial Science and Technology(AIST), (JAPAN); 2Japan Aerospace Exploration Agency, (JAPAN)

Session 9c: Robot Simulation
09:25 Virtual Reality applications as design&validation support for A&R Exploration
Basso, V. 1 ; Marello, M. 2 ; Bar, C. 2 ; Rabaioli, M. 3
1Thales Alenia Space Italia S.p.A., (ITALY); 2Softier System Engineering S.p.A, (ITALY); 3Computer Science Department, University of Turin, (ITALY)
09:50 Distributed and Cooperative Satellites Simulation Tool
Lombardi, R.; Lavagna, M.
Politecnico di Milano, (ITALY)
10:15 Validating the Camera and Light Simulation of a Virtual Space Robotics Testbed by means of Physical Mockup Data
Rossmann, J.; Springer, M.; Steil, T.
RWTH Aachen University, (GERMANY)
10:40 Testing and Validation of Autonomous Navigation for Planetary Exploration Rover, Cuatro, using Opensource Simulation Tools
Jayasekara, P. G. ¹; Ishigami, G. ²; Kubota, T. ¹
¹University of Tokyo, (JAPAN); ²Institute of Space and Astronautical Science, JAXA, (JAPAN)

10:55 Coffee Break

Session 10a: Rover Control
11:10 Towards Goal-oriented Space Robotics Operations using Autonomous Controllers
Ceballos, C. ¹; Medina, Alberto ²; Ocón, Jorge ²; van Winnendael, Michel ¹
Antonio, (SPAIN); ²GMV, (SPAIN); ³ESA, (NETHERLANDS)
11:35 Path Planning using State Lattices Primitives for Planetary Surface Rovers
Guixé, Pol; Binet, Giovanni; Medina, Alberto
GMV, (SPAIN)
12:00 Fast Path-planning Algorithms for Future Mars Exploration
Muñoz, P.; R-Moreno, M.D.
Universidad de Alcalá, (SPAIN)
R-Moreno, M. ¹; Cesta, A. ²; Oddi, A. ²; Rasconi, R. ³; Diaz, D. ¹
¹Universidad de Alcalá, (SPAIN); ²CNR – Italian National Research Council, (ITALY)

Session 10b: Teleoperation Technology
11:10 Augmented Reality Job Planning Interface for Robotic Construction on the Moon or Mars
Halbach, E.; Halme, A.
Aalto University, (FINLAND)
11:35 RACOON – A Hardware-in-the-Loop Simulation Environment for Teleoperated Proximity Operations
Fleischner, A.; Wilde, M.; Harder, J.; Pietras, M.
Technical University Munich, (GERMANY)

Session 10c: Smart Landers
11:10 Monocular SLAM-based Navigation for Autonomous Approach Descent and Landing on Small Celestial Bodies
Cocaud, C. ¹; Kubota, T. ²
¹The University of Tokyo, (JAPAN); ²ISAS-JAXA, (JAPAN)
11:35 Trade-off Study in Possible Scenarios for Precise Landing of Asteroid Probe using Multiple Markers
Ogawa, N.; Terui, F.; Kawaguchi, J.
Japan Aerospace Exploration Agency, (JAPAN)
12:00 Generating Semi Global Elevation Maps from Planetary Descent Imagery using Bundle Adjustment
Mueller, H.; Mannel, C.
SCISYS Deutschland GmbH, (GERMANY)
12:25 Computational Time Reduction of Evolutionary Spacecraft Location Estimation toward Smart Lander for Investigating Moon
Harada, T ¹; Usami, R ¹; Takadama, K ¹; Kamata, H ²; Ozawa, S ³; Fukuda, S ³; Sawai, S ⁴
¹The University of Electro-Communications, (JAPAN); ²Meiji University, (JAPAN); ³Aichi University of Technology, (JAPAN); ⁴Japan Aerospace Exploration Agency, (JAPAN)
12:50 Lunch Break
Plenary Talk
14:00-15:10 Lidar Based Tele-operated Lunar Rover Navigation
Pedersen, L.1; Allan, M.2; Utz, H.3; Deans, M.4; Nefian, A.5; Kim, Taemin3; Choi, Yoonhyuk5
1Carnegie Mellon University, (UNITED STATES); 2SGT (NASA ARC), (UNITED STATES); 3Carnegie Mellon University (NASA ARC), (UNITED STATES); 4NASA ARC, (UNITED STATES); 5KAIST, (KOREA, REPUBLIC OF)

Session 11a: GNC 2
15:20 Model Predictive Control Applications for Planetary Rovers
Binet, G.1; Krenn, R.2; Bemporad, A.3
1GMV, (SPAIN); 2DLR, (GERMANY); 3IMT, (ITALY)
15:45 Motion Control with Modification of Acceleration for planetary Rover on soft Terrain
Otsuki, Masatsugu; Ishigami, Genya; Narita, Shinichiro; Wakabayashi, Sachiko
Japan Aerospace Exploration Agency, (JAPAN)
16:10 New Slippage Sensing System and Path Control System for Lunar Rover
Nishida, Shin-Ichiro / S.1; Nishimura, Takeshi / T.2
1JAXA, (JAPAN); 2University of Electro Communications, (JAPAN)
16:35 Fine-turning Kalman Filters using Star Trackers Data for Micro Satellite Attitude Estimation
Le Huy, X.1; Matunaga, S.2
1Tokyo Institute of Technology, (JAPAN); 2Tokyo Institute of Technology, ISAS/JAXA, (JAPAN)

Session 11b: Testing and Facilities
15:20 Use of COTS Robotics for On-ground Validation of Space GNC Systems: Platform Dynamic Test Bench
Suatoni, M.1; Barrena, V.1; Mollinedo, L.1; Colmenarejo, P.1; Voirin, T.2
1GMV S.A., (SPAIN); 2ESA/ESTEC, (NETHERLANDS)
15:45 PESSEF: a Concept of a Ground Facility for Planetary Exploration
Pognant, P.; Drovandi, S.
ALTEC SpA, (ITALY)
16:10 The use of Neutral Buoyancy Test Facility in Support to Space Robots Design and Operations
Bellomo, ; Benassai, M.
ALTEC, (ITALY)
16:35 Grounds Simulation of an Autonomous Satellite Rendezvous and Tracking System using Dual Robotic Systems
Carignan, C.R.; Easley, J.; Hyslop, A.; Strube, M.
NASA Goddard Space Flight Center, (UNITED STATES)
17:00 Coffee Break
17:30 Closing Session
Posters

Efficient Integration of Software in virtual Testbeds by use of Generic GML-Data Management Technology
Ellsiepen, M.
CPA Systems GmbH, (GERMANY)

Autonomous Control of Operative Constrains during Real-Time Teleoperation of Space Robots
Pietras, Markus
Technische Universitaet Muenchen, (GERMANY)

Test Bench for Robotics and Autonomy: Advancements in Navigation for Space Exploration
Biggio, A ; Merlo, A ; Tramutola, A
Thales Alenia Space Italy, (ITALY)

Miniaturized Motor Controller for Space Robotic and Rover Applications
Löfgren, H. ; Bruhn, F. ; Ljunggren, A. ; Häll, K. ; Gunnarsson, M.
ÅAC Microtec AB, (SWEDEN)

Building Robust Component-based Systems with Rock
Joyeux, S. ; Roehr, T.
DFKI, (GERMANY)

A Generic Domain Configurable Planner Using HTN for Autonomous Multi-agent Space Systems
Kandiyil, R ; Gao, Dr. Y
Surrey Space Centre, University of Surrey, Guildford, (UNITED KINGDOM)

Visual Odometry for the Lunar Analogue Rover "Artemis"
Wagner, Michael ¹ ; Wettergreen, David ² ; Iles, Peter ²
¹ProtoInnovations, (UNITED STATES); ²Neptec Design Group, (CANADA)

Automating Mid- and Long-Range Scheduling for NASA's Deep Space Network
Johnston, M. ; Tran, D.
JPL/California Inst. of Technology, (UNITED STATES)

Autonomous Onboard Science Data Analysis for Comet Missions
Jet Propulsion Laboratory, California Institute of Technology, (UNITED STATES)

TextureCam: A Smart Camera for Astrobiology
Thompson, D. R. ¹ ; Abbey, W. ¹ ; Allwood, A ¹ ; Bekker, D. ¹ ; Bornstein, B. ¹ ; Cabrol, N. A. ² ; Estlin, T. ² ; Fuchs, T. ² ; Wagstaff, K. L. ¹
¹California Institute of Technology, (UNITED STATES); ²SETI Institute, (UNITED STATES);

Software and System Health Management for Autonomous Robotics Missions
Schumann, J. ¹ ; Mbaya, T. ² ; Mengshoel, O. ³
¹SGT, INC. NASA Ames, (UNITED STATES); ²RIACS/USRA, (UNITED STATES); ³CMU-SV, (UNITED STATES)

Lander-Based Localization System for the Lunar Analogue Rover "Artemis"
Molina, Pablo ; Iles, Peter ; MacTavish, Kirk
Neptec Design Group, (CANADA)
EMG Feedback Control to Ensure Safe and Effective Extra Vehicular Activities (EVAs)
Margaria, V. ; Ariano, P. ; Paleari, M.
CSHR @IIT, (ITALY)

HExEC: Project of a Hand Exoskeleton Designed to be Embedded in the Astronaut's EVA Glove
Ambrosio, E. P. ; Appendino, S. ; Ariano, P. ; Battezzato, A. ; Calignano, F. ; Manfredi, D. ; Margaria, V. ; Paleari, M. ; Pescarmona, F.
Istituto Italiano di Tecnologia, (ITALY)

Vision-based Detection and Tracking for Space Navigation in a Rendezvous Context
Petit, A. ; Marchand, E. ; Kanani, K.
1Inria, (FRANCE); 2Astrium, (FRANCE)

Using Validation and Verification Techniques for Robust Plan Execution
Cesta, A. ; Finzi, A. ; Orlandini, A.
1ISTC CNR, (ITALY); 2University of Naples "Federico II", (ITALY); 3ISTC ITIA CNR, (ITALY)

Device-Centered Ontology Driven Information Modeling for the Easily-Serviceable Satellite
Kim, J. ; Nakasuka, S.
The University of Tokyo, (JAPAN)

A Prototype of Percussive Rock Surface Crusher Using Solenoid for Lunar and Planetary Exploration
1Toyota Technological Institute, (JAPAN); 2Japan Aerospace Exploration Agency, (JAPAN); 3Osaka University, (JAPAN); 4University of Aizu, (JAPAN); 5Japan Agency for Marine-Earth Science and Technology, (JAPAN)

Design and Mechanical Analysis about a New Kind of Hooping Spherical Planetary Exploration Robot
Zhao, Wei ; Sun, Hanxv ; Jia, Qingxuan ; Zhang, Yanheng ; Yu, Tao
1BUPT, (CHINA); 2Beijing University of Posts and Telecommunications, (CHINA)

Environment Driven Rover for Asteroid Exploration
Tsumaki, Y. ; Akaike, T. ; Mineta, T. ; Tadakuma, R.
Yamagata University, (JAPAN)

Mechanical Design and Analysis of Sample Conveyance System for the Next Minorbody Explorers
Mori, S. ; Morishita, H. ; Matunaga, S. ; Yano, H.
1Tokyo Institute of Technology, (JAPAN); 2ISAS/JAXA, (JAPAN); 3JSPEC/JAXA, (JAPAN)

Control and Stabilization of a Pendulum-driven Spherical Mobile Robot on an Inclined Plane
Yu, Tao ; Sun, Hanxu ; Jia, Qingxuan ; Zhang, Yanheng ; Zhao, Wei
Beijing University of Posts and Telecommunications, (CHINA)

Treatments For Image Degradation Problem Of Ultra-small Satellite Via Machine Learning Techniques
Kuwabara, J. ; Shioi, H. ; Eto, R. ; Sako, N. ; Yairi, T.
1Univ. of Tokyo, (JAPAN); 2Shinshu Univ., (JAPAN)

Design of a Modularized Dual-joint Servo Controller for Space Manipulator System based on FPGA
Wei, N.Z. ; Sun, H.X. ; Jia, Q.X. ; Ye, P. ; Hou, K.
Beijing University of Posts and Telecommunications, (CHINA)
Two Years Onboard the MER Opportunity Rover
Estlin, T. 1; Anderson, R.C. 1; Bornstein, B. 1; Burl, M. 1; Castano, R. 1; Gaines, D. 1; Judd, M. 1; Thompson, D.R. 1; Johnson, J.R. 2
1 Jet Propulsion Laboratory, (UNITED STATES); 2 John Hopkins University, (UNITED STATES)

An Approach For System-Compliant Steering Synchronization Of Over-Actuated Rovers
Schwesinger, U.; Pradalier, C.; Siegwart, R.
Autonomous Systems Lab, ETH Zurich, (SWITZERLAND)

Terrain Relative Orbit Determination
Peterson, K 1; Jones, H 1; Vassallo, C 1; Welkie, A 2; Whittaker, W L 1
1 Carnegie Mellon University, (UNITED STATES); 2 Swarthmore College, (UNITED STATES)