



CARO3 – 3<sup>rd</sup> CONFERENCE ON AEROSPACE ROBOTICS

CONFERENCE PROGRAMME

DAY 1

17 November 2015

08:00 - 09:00	Registration
09:00 - 09:10	Welcome Iwona Stanisławska and Jerzy Sasiadek
Session I – Invited Session 1	
09:10 - 09:40	European Space Robotics 2015: Opportunities for R&D G. Visentin
09:40 - 10:20	Robotics & GNC Technologies for Orbital Servicing and Planetary Exploration Missions D. Wilde, J. Sommer, B. Mädiger
10:20 - 10:40	Coffee break
Session II – Surface & Subsurface Robotics	
10:40 - 11:00	The Resource Prospecting Mission Drill K. Zacny and G. Paulsen
11:00 - 11:20	C Shape Tubular Booms as a Key Element of the Drill String K. Seweryn, A. Biedrzycka, T. Buratowski, M. Getka, A. Gonet, K. Grassmann, P. Paško, K. Rutkowski, W. Teper, T. Uhl, R. Wawrzaszek, A. J. Zwierzyński, B. Żyliński
11:20 - 11:40	Accurate Image Depth Determination for Autonomous Vehicle Navigation J. Sasiadek and M. Walker
11:40 - 12:00	In Situ Resource Utilization on the Moon: Gravity Impact on Technological Processes K. Seweryn
12:00 - 13:20	Lunch Break And LMRS Lab Visit

Session III – Invited Session 2		
13:20 - 14:00	Implementation of the UAV in Biological Monitoring and Photogrammetry Missions in Antarctica M. Rodzewicz	
14:00 - 14:20	Coffee break	
Session IV - Orbital Robotics		
14:20 - 14:40	Application of Nonlinear Model Predictive Control (NMPC) for Free-Floating Space Manipulator T. Rybus, K. Seweryn, J. Sąsiadek	
14:40 - 15:00	Prototype, Mathematical Model and Simulations of a Model-Making Rocket J. Drewniak and I. Duleba	
15:00 - 15:20	Parallel Hamiltonian Formulation for Forward Dynamics of Free-Flying Manipulators P. Malczyk, K. Chadaj and J. Frączek	
15:20 - 15:40	Parabolic Flight Validation of Simulator for Space Debris Removal Deployable Nets W. Gołębiowski, R. Michalczyk, M. Dyrek	
15:40 - 16:00	Coffee break	
Session V – Sensors		
16:00 - 16:20	Rendering of Satellite Rotary Motion in Infrared and Visible Range B. Kunicka, K. Seweryn, S. Ulrich	
16:20 - 16:40	Multispectral Laser Scanner for Terrain Analyses Intended for Use on Unmanned Aerial Vehicles M. Kaszczuk, Z. Mierczyk, M. Zygmunt, T. Drozd, A. Gawlikowski, A. Gietka, M. Jakubaszek, P. Knysak, A. Młodzianko, M. Muzal, R. Ostrowski, W. Piotrowski, J. Wojtanowski	
16:40 - 17:00	A Possible Method of Exact Positioning of the Robotic Arm Tip F. Dudkin, V. Korepanov	
17:20	Bus leaves for the evening event	For registered participants
18:00 - 19:00	Presentation in the Heavens of Copernicus Planetarium	
19:30 - 22:00	Conference dinner	



## CARO III – CONFERENCE ON SPACE ROBOTICS

DAY 2  
18 November 2015

08:00 - 08:30	Morning coffee
Session VI – Invited Session 3	
08:30 – 09:10	Space Robotics: Challenges and Ongoing Research E. Papadopoulos
9:10 - 9:30	Coffee break
Session VII - Control Systems	
9:30 - 9:50	Performance Control of a Spacecraft-Robotic Arm System – Desired Motion Tracking E. Jarzębowska
9:50 - 10:10	Implementation of Madgawick Algorithm to LEO Conditions J. Chrobrowski, K. Tarenko, T. Barciński, T. Rybus and M. Getka
10:10 - 10:30	Pose Estimation for Mobile Robot via Visual Navigation M. Al-Isawi and J. Sasiadek
10:30 - 10:50	Attitude Control System for Nanosatellite Scientific Missions Class of BRITE-PL R. Wawrzaszek, P. Zagórski, G. Juchnikowski, T. Barciński, T. Dziwiński, J. Lisowski, A. Tutaj
10:50 - 11:10	The Dynamics Aspects of Modeling and Control of the Flying Robot with Attached 2 DOF Manipulator G. Chmaj, K. Seweryn, T. Rybus, T. Buratowski, M. Musioł, T. Uhl, M. Banaszkiwicz
11:10 - 11:30	Coffee break
Session VIII - Phobos Return Mission	
11:30 - 11:50	Vision-Based Absolute Localization for Descent and Landing on Phobos – Constraints and Challenges P. Wittels, J. Jaworski, M. Maciaś, A. Michalska, M. Wolski
11:50 - 12:10	Landing Gear Operation on Phobos Surface: Control System and Dynamics Simulations T. Barciński, T. Muresan, J. Galipienzo, K. Seweryn, C. Chitu, C. Oretega, G. Visentin
12:10 - 12:30	PACKMOON Sampling Tool: Effective Solution to Reliably Collect Large Sample in Low Gravity Conditions P. Paško, J. Stelmachowski, K. Seweryn, G. Visentin
12:30 -13:20	Lunch break

Session IX – Invited Session 4	
13:20 - 14:00	Design and Optimization Aspects of UAV Platforms Used in Surveillance Missions Z. Goraj
14:00 - 14:20	Coffee break
Session X - Mechatronic Design & Prototypes	
14:20 - 14:40	Satellite Methods of Detection and Identification of Vessels R. Wawrzaszek, M. Waraksa, J. Żurek, M. Kalarus, A. Foks-Ryznar
14:40 - 15:00	Mechatronic Design Methods for Mobile Robot Adjusted to Simulated Martian Mission B. Żyliński and W. Krzeszewski
15:00 - 15:20	Student Extraterrestrial Technology Evaluation J. Mnich, J. Szuniewicz, W. Nitka, P. Polański, J. Aniulis, J. Morze, T. Różański, K. Grzybek
15:20 - 15:40	Project FREDE as a Stratospheric Experiment with Semi-Autonomous Control System J. Górski
15:40 - 16:00	Coffee break
Panel discussion: Space robotics in POLSA and ESA programs	
16:00 - 16:20	Space Mechatronics and Space Robotics Patent Inventions - the Way to Protect the Space Heritage in the CBK PAN M. E. Wachowicz and M. Bury
16:20 - 17:20	Moderator:  Panelists:
17:20 - 19:00	Industry Poster Session & Farewell Reception