

# **21st International Symposium on Measurement and Control in Robotics (ISMCR 2018)**

Mons, Belgium  
26 - 28 September 2018

ISBN: 978-1-5108-9011-4

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2018) by the International Measurement Confederation (IMEKO)  
All rights reserved.

Printed by Curran Associates, Inc. (2019)

For permission requests, please contact the International Measurement Confederation (IMEKO)  
at the address below.

IMEKO Secretariat  
Dalszinhaz utca 10, 1st floor, Office room No. 3  
H-1061 Budapest (6th district)  
Hungary

Phone/Fax: +36 1 353 1562

imeko@t-online.hu

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: curran@proceedings.com  
Web: www.proceedings.com

# TABLE OF CONTENTS

<b>EFFECTIVENESS TEST OF SIMULATOR FOR E-TRAINING IN CARRYING OUT MISSIONS WITH USE OF TELE-OPERATED VEHICLES</b> .....	1
<i>I. Ostrowski, A. Maslowski</i>	
<b>DEDICATED SIMULATOR FOR E-TRAINING OF ROBOT "DROMADER"</b> .....	7
<i>I. Ostrowski, A. Maslowski</i>	
<b>A NOVEL DATA FUSION ARCHITECTURE FOR UNMANNED VEHICLES</b> .....	13
<i>I. Ermolov</i>	
<b>PRE-FILTER TO ROBUSTIFY THE EXACT LINEARIZATION BASED TRACKING CONTROLLER OF A SCARA TYPE ROBOT<sup>1</sup></b> .....	17
<i>N. Wang, B. Kiss</i>	
<b>AUTOMATED MAGNETIC FIELD RECONSTRUCTION STAND FOR MOBILE ROBOT NAVIGATION ALGORITHMS DEBUGGING WHICH USE MAGNETOMETER DATA</b> .....	22
<i>S. Goll, A. Borisov</i>	
<b>AN ACTIVE BEACON-BASED TRACKING SYSTEM TO BE USED FOR MOBILE ROBOT CONVOYING</b> .....	29
<i>S. Goll, E. Zakharova</i>	
<b>ULTRASONIC RANGEFINDER WITH THE SUBMILLIMETER RESOLUTION AS A PART OF THE RESCUE ROBOT'S SENSOR SYSTEM</b> .....	37
<i>S. Goll, J. Maximova</i>	
<b>SEMANTIC GRID MAPPING BASED ON SURFACE CLASSIFICATION WITH SUPERVISED LEARNING</b> .....	45
<i>T. Engler, F. Ebert, H.J. Wuensche</i>	
<b>ENHANCING BODILY EXPRESSION AND COMMUNICATION CAPACITY OF TELEEXISTENCE ROBOT WITH AUGMENTED REALITY</b> .....	49
<i>Y. Inoue, M.Y. Saraiji, F. Kato, S. Tachi</i>	
<b>IMU BASED GESTURE RECOGNITION FOR MOBILE ROBOT CONTROL USING ONLINE LAZY NEIGHBORHOOD GRAPH SEARCH</b> .....	53
<i>P. Kulkarni, B. Illing, B. Gaspers, B. Bruggemann, D. Schulz</i>	
<b>COVERAGE PATH PLANNING BY SWARM OF UAVS FOR UGV TRAVERSABILITY ANALYSIS</b> .....	57
<i>L. Cantelli, D.C. Guastella, D. Longo, C.D. Melita, G. Muscato</i>	
<b>TRAINING OF ROBOTS' OPERATORS WITH USE OF MULTIROBOT SIMULATORS: COMMUNICATION ON THE WORK IN PROGRESS</b> .....	61
<i>M. Kacprzak</i>	
<b>HUMAN ARM MOTION TRACKING USING IMU MEASUREMENTS IN A ROBOTIC ENVIRONNEMENT</b> .....	65
<i>R. Pellois, O. Bruls</i>	
<b>FEEDFORWARD COMMAND COMPUTATION OF A 3D FLEXIBLE ROBOT</b> .....	69
<i>A. Lismonde, O. Bruls</i>	
<b>RADAR BASED THROUGH-WALL MAPPING</b> .....	73
<i>S. Dogru, L. Marques</i>	
<b>DEVELOPMENT OF THE MODULAR PLATFORM FOR EDUCATIONAL ROBOTICS</b> .....	77
<i>A. Semenyaka, Y. Poduraev</i>	
<b>ROBSIM SOFTWARE FOR MOBILE ROBOTS MODELING</b> .....	86
<i>O.P. Goidin, S.A. Sobolnikov</i>	
<b>IN-FLIGHT LAUNCH OF UNMANNED AERIAL VEHICLES</b> .....	90
<i>N. Nauwynck, H. Balta, G. De Cubber, H. Sahli</i>	
<b>QUALITATIVE AND QUANTITATIVE VALIDATION OF DRONE DETECTION SYSTEMS</b> .....	94
<i>D. Doroftei, G. De Cubber</i>	
<b>ELROB 2018 – CONVOY AND MULE OF TEAM MUCAR</b> .....	98
<i>F. Ebert, P. Berthold, P. Burger, T. Engler, A. Frericks, B.C. Heinrich, J. Kallwies, M. Kusenbach, T. Luettel, K. Metzger, M. Michaelis, B. Naujoks, A. Sticht, H.J. Wuensche</i>	
<b>RPAS -UGV: A GROWING MARKET FOR MILITARY AND CIVILIAN APPLICATIONS</b> .....	103
<i>Y. Baudoin</i>	
<b>UNMANNED VEHICLE SYSTEMS IN UNSTRUCTURED ENVIRONMENTS: CHALLENGE AND CURRENT STATUS</b> .....	110
<i>V. Gradetsky, M. Knyazkov</i>	

<b>ELROB 2018 - TEAM DIEHL THEMIS PARTICIPATING IN MULE SCENARIO .....</b>	<b>132</b>
<i>J. Koberle, S. Bullmer, J. Henzler, B. Steurer, A. Wolf, S. Ruedel, F. Meilinger, C. Seidl, D. Skuddis, M. Hentschel</i>	
<b>ELROB 2018 - TEAM PATRIA PARTICIPATING IN CONVOY SCENARIO .....</b>	<b>141</b>
<i>M. Saarikko, J. Koskimaa, P. Penttinen, J. Ali-Kovero, J. Koberle, S. Bullmer, J. Henzler, B. Steurer, A. Wolf, S. Ruedel, F. Meilinger, C. Seidl, M. Hentschel</i>	
<b>Author Index</b>	