

IFAC Workshop - Navigation, Guidance and Control of Underwater Vehicles NGCUV 2012 – Programme

PROGRAMME AT-A-GLANCE

| Tuesday April 10 2012 | Wednesday April 11 2012 | Thursday April 12 2012 |
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| | 9.00 – 11.00 Parallel sessions Wed1A and Wed1B | 9.00 – 11.00 Parallel sessions Thu1A and Thu1B |
| 9.20 - 9.30 Opening remarks | | |
| 9.30 - 10.30 Plenary 1 | | |
| 10.30 – 11.00 Coffee break | | |
| 11.00 – 11.30 Formal opening session | 11.00 – 11.30 Coffee break | |
| 11.30 – 12.30 Plenary 2 | 11.30 – 12.30 Plenary 4 | 11.30 – 12.30 Plenary 6 |
| | 12.30 – 14.00 Lunch break | |
| 14.00 – 16.00 Parallel sessions Tu1A and Tu1B | 14.00 – 16.00 Parallel sessions Wed2A and Wed2B | 14.00 – 16.00 Parallel sessions Thu2A and Thu2B |
| | 16.00 – 16.30 Coffee break | |
| 16.30 – 17.30 Plenary 3 | 16.30 – 17.30 Plenary 5 | 16.30 – 17.30 Plenary 7 |
| | 17.30 - 18.00 Break | |
| | 18.00 – 19.00 Discussion | |
| | 19.00 – 19.30 Bus to banquet | |
| | 19.30 – 22.00 Banquet | |

DETAILED PROGRAMME

Technical Program for Tuesday April 10, 2012

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| 9.30 – 10.30. Plenary 1, Room B032 | |
| Prof. Thor I. Fossen, Norwegian University of Science and Technology, NO Nonlinear observers for integration of position and IMU measurements | |
| 11.00 – 11.30. Formal opening session, Room B032 | |
| Prof. Manuel Pinto de Abreu, Secretary of State for Sea-related Affairs | |
| 11.30 – 12.30. Plenary 2, Room B032 | |
| Dr. João Fonseca Ribeiro, Director-General Maritime Policy Ministry of Agriculture, Sea, environment and Spatial Planning, PO Robotic Cities: on Oceans Opportunities and Challenges | |
| 14.00 – 16.00. Tu1A - Vehicle Modeling and Control I, Room B032 | |
| 14.00 – 14.20 Robust Control of a Micro-Autonomous Underwater Vehicle (uAUV) Using Low-Tolerance Components | |
| Simon A. Watson | University of Manchester |
| Peter N. Green | University of Manchester |
| 14.20 – 14.40 Strategies for Control of Energy on a Simplified Model of a Robotic Fish | |
| Daniel Roper | Plymouth University |
| Sanjay Sharma | Plymouth University |
| Robert Sutton | Plymouth University |
| Philip Culverhouse | Plymouth University |
| 14.40 – 15.00 Simulation of an under-actuated fish-like robot controlled by an adaptive frequency oscillator inside a Karman Vortex Street | |
| Cecilia Tapia-Siles | University of Dundee |
| Ryad Chellali | Italian Institute of Technology |
| 15.00 – 15.20 Control of an Underactuated Underwater Vehicle in 3D Space under Field-of-View Constraints | |
| Dimitra Panagou | National Technical University of Athens |
| Spyros Maniatopoulos | National Technical University of Athens |
| Kostas J. Kyriakopoulos | National Technical University of Athens |
| 15.20 – 15.40 Controlling Minimally-Actuated Vehicles for Applications in Ocean Observation | |
| Ryan Smith | Queensland University Of Technology |
| Van T. Huynh | Queensland University Of Technology |
| 15.40 – 16.00 Phased Array Velocity Sensor Operational Advantages and Data Analysis | |
| Matt Burdyny | Teledyne RD Instruments |
| 14.00 – 16.00. Tu1B - Navigation, Room I-105 | |
| 14.00 – 14.20 Navigation Solutions for Low-Cost, Man-Portable AUVs: Iver2 Lightweight NSW AUV | |
| Michael L. Incze | Naval Undersea Warfare Center |
| 14.20 – 14.40 Acoustically aided HMI for ROV navigation | |
| Antonio Vasilijevic | University of Zagreb |
| Edin Omerdic | University of Limerick |
| Bruno Borovic | University of Zagreb |
| Zoran Vukic | University of Zagreb |
| 14.40 – 15.00 An Origin State Method for Lossy Synchronous-clock Acoustic Navigation | |
| Jeffrey M. Walls | University of Michigan |
| Ryan M. Eustice | University of Michigan |
| 15.00 – 15.20 Low Cost Navigation for Unmanned Underwater Vehicles Using Line of Soundings | |
| Liam Miller | University of Limerick |
| Daniel Toal | University of Limerick |
| Gerard Dooly | University of Limerick |
| Edin Omerdic | University of Limerick |
| Joseph Coleman | University of Limerick |
| Garrett Duffy | National University of Ireland |
| 15.20 – 15.40 Navigation Scheme for the LSTS SEACON Vehicles: Theory and Application | |
| José Braga | LSTS - Faculdade de Engenharia da Universidade do Porto |
| Anthony J. Healey | Naval Postgraduate School |
| João Borges de Sousa | LSTS - Faculdade de Engenharia da Universidade do Porto |
| 15.40 – 16.00 Complementary Terrain/Single Beacon-Based AUV Navigation | |
| Pramod Maurya | ISR - Instituto Superior Técnico |
| Francisco Curado Teixeira | University of Aveiro |
| António Pascoal | ISR - Instituto Superior Técnico |
| 16.30 – 17.30. Plenary 3, Room B032 | |
| Dr. Yanwu Zhang, Monterey Bay Aquarium Research Institute, US Autonomous Detection and Targeted Sampling of Oceanographic Features by AUVs | |

Technical Program for Wednesday April 11, 2012

| 9.00 – 11.00. Wed1A - Cooperation in Multi-Vehicle Systems, Room B032 | |
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| 9.00 – 9.20 On the dependence of cooperative algorithms on underwater communication performance | |
| Andrea Caiti | University of Pisa |
| Vincenzo Calabro | University of Pisa |
| Andrea Munafo | University of Pisa |
| 9.20 – 9.40 Cooperative 3D Exploration under Communication Constraints | |
| Ravi K. Rathnam. | Jacobs University Bremen |
| Andreas Birk | Jacobs University Bremen |
| 9.40 – 10.00 Fault Tolerant Area Coverage Using Underwater Vehicles | |
| José Braga | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Pedro Calado | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Sujit Baliyarasimhuni | LSTS – Faculdade de Engenharia da Universidade do Porto |
| 10.00 – 10.20 Implementation of a Control Architecture for Networked Vehicle Systems | |
| José Pinto | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Pedro Calado | LSTS – Faculdade de Engenharia da Universidade do Porto |
| José Braga | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Paulo Dias | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Ricardo Martins | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Eduardo Marques | LSTS – Faculdade de Engenharia da Universidade do Porto |
| 10.20 – 10.40 On the Limit Behavior for Multi-Agent Dynamical Systems | |
| Ionela Prodan | Supélec |
| Georges Bitsoris | University of Patras |
| Sorin Olaru | Supélec |
| Cristina Stoica | Supélec |
| Silviu-Iulian Niculescu | Supélec |
| 10.40 – 11.00 Triangular formation control using range measurements: An application to marine robotic vehicles | |
| Jorge M. Soares | ISR – Instituto Superior Técnico |
| António Pedro Aguiar | ISR – Instituto Superior Técnico |
| António Pascoal | ISR – Instituto Superior Técnico |
| Marco Gallieri | University of Cambridge |

| 9.00 – 11.00. Wed1B - SLAMs and Localization, Room I-105 | |
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| 9.00 – 9.20 Navigational Error Reduction of Underwater Vehicles with Selective Bathymetric SLAM | |
| Roger Stuckey | Defence Science and Technology Organization, Australia |
| 9.20 – 9.40 MbpIC -SLAM: Probabilistic Surface Matching for Bathymetry Based SLAM | |
| Simone Zandara | University of Girona |
| Pere Ridao | University of Girona |
| Angelos Mallios | University of Girona |
| David Ribas | University of Girona |
| 9.40 – 10.00 A Novel Particle Filter Formulation with Application to Terrain-Aided Navigation | |
| Francisco Curado Teixeira | Universidade de Aveiro |
| António Pascoal | ISR – Instituto Superior Técnico |
| Pramod Maurya | ISR – Instituto Superior Técnico |
| 10.00 – 10.20 Fixed Target 3D Localization Based on Range Data Only: a Recursive Least Squares Approach | |
| Giovanni Indiveri | Università del Salento |
| Paola Pedone | Università del Salento |
| M. Cuccovillo | ICAM S.r.l. |
| 10.20 – 10.40 Accurate Ranging in a Stratified Underwater Medium with Multiple Iso-gradient Sound Speed Profile Layers | |
| Hamid Ramezani | Delft University of Technology |
| Leus Geert | Delft University of Technology |
| 10.40 – 11.00 Location System for Autonomous Underwater Vehicle during Operations in Lakes of Hydroelectric Dams | |
| Breno Pinheiro | Universidade Federal de Santa Catarina |
| Ubirajara F. Moreno | Universidade Federal de Santa Catarina |
| Carlos H. F. dos Santos | Universidade Estadual do Oeste do Paraná |

| 11.30 – 12.30. Plenary 4, Room B032 | |
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| Prof. António Pascoal, ISR – Instituto Superior Técnico, PO | |
| Cooperative Navigation and Motion Control of Multiple Autonomous Marine Vehicles | |

| 14.00 – 16.00. Wed2A - Vehicle modeling and control II, Room B032 | |
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| 14.00 – 14.20 Evaluation of Three Dynamic Ship Positioning Controllers: from Calm to Extreme Conditions | |

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| Vahid Hassani | ISR – Instituto Superior Técnico |
| Asgeir J. Sorensen | Norwegian University of Science and Technology |
| António Pascoal | ISR – Instituto Superior Técnico |
| 14.20 – 14.40 Experimental results with value function based control of an AUV | |
| Jorge Estrela da Silva | Instituto Superior de Engenharia do Porto |
| João Borges de Sousa | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Fernando Lobo Pereira | ISR – Faculdade de Engenharia da Universidade do Porto |
| 14.40 – 15.00 A Task & Subsystem Priority Based Control Strategy for Underwater Floating Manipulators | |
| Giuseppe Casalino | University of Genova |
| Enrica Zereik | University of Genova |
| Enrico Simetti | University of Genova |
| Sandro Torelli | University of Genova |
| Alessandro Sperindè | University of Genova |
| Alessio Turetta | University of Genova |
| 15.00 – 15.20 Action-Perception Trade-Offs for Anguilliform Swimming Robotic Platforms with an Electric Sense | |
| Yannick Morel | École Polytechnique Fédérale de Lausanne |
| Mathieu Porez | Ecole Centrale de Nantes |
| Auke J. Ijspeert | École Polytechnique Fédérale de Lausanne |
| 15.20 – 15.40 Topics on Current Compensation for Path Following Applications of Underactuated Underwater Vehicles | |
| Walter Caharija | Norwegian University of Science and Technology |
| Kristin Y. Pettersen | Norwegian University of Science and Technology |
| Jan Tommy Gravdahl | Norwegian University of Science and Technology |
| Asgeir J. Sorensen | Norwegian University of Science and Technology |
| 15.40 – 16.00 PCH-Based L₂ Disturbance Attenuation and Control of Autonomous Underwater Vehicle | |
| Sami El Ferik | King Fahd University of Petroleum and Minerals |
| Muhammad Emzir | King Fahd University of Petroleum and Minerals |

14.00 – 16.00. Wed2B - Planning, guidance and cooperation, Room I-105

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| 14.00 – 14.20 AUV Guidance System for Dynamic Trajectory Generation | |
| Francesco Scibilia | Norwegian University of Science and Technology |
| Ulrik Jorgensen | Norwegian University of Science and Technology |
| Roger Skjetne | Norwegian University of Science and Technology |
| 14.20 – 14.40 Homotopic Path Planning for an AUV on Maps Improved with Scan Matching | |
| Emili Hernandez | University of Girona |
| Marc Carreras | University of Girona |
| Pere Ridao | University of Girona |
| Angelos Mallios | University of Girona |
| 14.40 – 15.00 Trajectory optimization for data retrieval applications: it is all about where/who loads the mule | |
| Jorge Estrela da Silva | Instituto Superior de Engenharia do Porto |
| Daniel E. Lucani | IT - Faculdade de Engenharia da Universidade do Porto |
| Sujit Baliyarasimhuni | LSTS – Faculdade de Engenharia da Universidade do Porto |
| João Borges de Sousa | LSTS – Faculdade de Engenharia da Universidade do Porto |
| 15.00 – 15.20 Reference Model for High Performance and Low Energy Consumption Motions | |
| Daniel de Almeida Fernandes | Norwegian University of Science and Technology |
| Fredrik Dukan | Norwegian University of Science and Technology |
| Asgeir J. Sorensen | Norwegian University of Science and Technology |
| 15.20 – 15.40 Robust Mission Planning for Underwater Applications: Issues and Challenges | |
| Mangal Kothari | LSTS – Faculdade de Engenharia da Universidade do Porto |
| José Pinto | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Vinayak S. Prabhu | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Pedro Calado | LSTS – Faculdade de Engenharia da Universidade do Porto |
| João Borges de Sousa | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Sujit Baliyarasimhuni | LSTS – Faculdade de Engenharia da Universidade do Porto |
| 15.40 – 16.00 Attitude Filter for Intervention-AUVs working in Tandem with Autonomous Surface Craft | |
| Marco Morgado | ISR – Instituto Superior Técnico |
| Pedro Batista | ISR – Instituto Superior Técnico |
| Paulo Oliveira | ISR – Instituto Superior Técnico |
| Carlos Silvestre | ISR – Instituto Superior Técnico |

16.30 – 17.30. Plenary 5, Room B032

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| Prof. Rafael Garcia, University of Girona, SP |
| Challenges and limitations of high-resolution sea-floor optical mapping using UUVs |

18.00 – 19.00. Discussion, Room B032

Technical Program for Thursday April 12, 2012

| 9.00 – 11.00. Thu1A - Industry Developments, Room B032 | |
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| 9.00 – 9.20 Obstacle Avoidance of Autonomous Underwater Vehicle by Using Streamline Function | |
| Jooni Sur | Samsung Thales |
| Yongook Lee | Samsung Thales |
| Hyun-Taek Choi | Korean Ocean R&D Institute |
| 9.20 – 9.40 Interesting (?) Applications for Acomms | |
| Dale Green | Teledyne Benthos |
| Justin Manley | Teledyne Benthos |
| 9.40 – 10.00 Experimental Performance of a Hydro-Acoustic USBL-aided LBL Positioning and Communication System | |
| Konstantin Kebkal | EvoLogics GmbH |
| Oleksiy G. Kebkal | EvoLogics GmbH |
| Sergei G. Yakovlev | EvoLogics GmbH |
| Rudolf Bannasch | EvoLogics GmbH |
| 10.00 – 10.20 Communications Architecture of the Liquid Robotics Wave Glider | |
| Robert A. Olson | Liquid Robotics |
| 10.20 – 10.40 Lowered ADCP Techniques Applied to Real-Time Navigation of a Descending UUV | |
| Brandon Strong | Teledyne RD |
| Blair Brumley | Teledyne RD |
| 10.40 – 11.00 Acoustic Guidance for Gavia Inertial Navigation System | |
| Helgi Thorgilsson | Teledyne Gavia |
| Eggert Magnusson | Teledyne Gavia |
| 11.00 – 11.20 LAUV: The Man-Portable Autonomous Underwater Vehicle | |
| Alexandre Sousa | OceanScan – MST |
| Luis Madureira | OceanScan – MST |
| Jorge Coelho | OceanScan – MST |
| José Pinto | LSTS - Faculdade de Engenharia da Universidade do Porto |
| João Pereira | LSTS - Faculdade de Engenharia da Universidade do Porto |
| João Borges de Sousa | LSTS - Faculdade de Engenharia da Universidade do Porto |
| Paulo Dias | LSTS - Faculdade de Engenharia da Universidade do Porto |
| 9.00 – 11.00. Thu1B - Operations, Room B016 | |
| 9.00 – 9.20 Experimental Verification of a Depth Controller using Model Predictive Control with Constraints onboard a Thruster Actuated AUV | |
| Leo V. Steenson | University of Southampton |
| Alexander B. Philips | University of Southampton |
| Eric Rogers | University of Southampton |
| Maaten E. Furlong | University of Southampton |
| Stephen R. Turnock | University of Southampton |
| 9.20 – 9.40 Smart ROV LATIS in Action: Sea Trials | |
| Edin Omerdic | University of Limerick |
| Daniel Toal | University of Limerick |
| Gerard Dooly | University of Limerick |
| Liam Miller | University of Limerick |
| Joseph Coleman | University of Limerick |
| 9.40 – 10.00 AUV Based Multi-vehicle Collaboration: Salinity Studies in Mar Menor Coastal Lagoon | |
| Julian Gonzalez | Universitat Politècnica de Catalunya |
| Joaquin del Rio | Universitat Politècnica de Catalunya |
| Javier Gilabert | Universitat Politècnica de Catalunya |
| Marc Carreras | University of Girona |
| João Borges de Sousa | LSTS – Faculdade de Engenharia da Universidade do Porto |
| Kanna Rajan | Monterey Bay Aquarium Research Institute |
| 10.00 – 10.20 Joystick in Closed-loop Control of ROVs with Experimental Results | |
| Fredrik Dukan | Norwegian University of Science and Technology |
| Asgeir J. Sorensen | Norwegian University of Science and Technology |
| 10.20 – 10.40 Triennial Appraisal of the ROV LUSO Project | |
| António Calado | Estrutura de Missão para os Assuntos do Mar |
| Andreia Afonso | Estrutura de Missão para os Assuntos do Mar |
| Nuno Lourenço | Estrutura de Missão para os Assuntos do Mar |
| Manuel Pinto de Abreu | Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território |
| 10.40 – 11.00 A Real-time Underwater Object Detection Algorithm for Multi-beam Forward Looking Sonar | |
| Enric Galceran | University of Girona |

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| Vladimir Djapic Marc Carreras | NATO Undersea Research Centre University of Girona |
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11.30 – 12.30. Plenary 6, Room B032

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| Dr. Kanna Rajan, Monterey Bay Aquarium Research Institute, US The Role of Artificial Intelligence based Inference for AUV Sampling, Command and Control |
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14.00 – 16.00. Thu2A - Vision and Estimation, Room B032

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| 14.00 – 14.20 Limitations of Vision Guided Underwater Navigation | |
| Maria E. Angelopoulou | Imperial College London |
| Chourmouziou Tsotsios | Imperial College London |
| Maria Petrou | Imperial College London |
| 14.20 – 14.40 Texture Segmentation Applied to P. Oceanica Beds" Upper Boundary Tracking by ROVs | |
| Matko Barisic | University of Zagreb |
| Dula Nad | University of Zagreb |
| Antonio Vasilijevic | University of Zagreb |
| 14.40 – 15.00 A comparison between different feature-based methods for ROV vision-based speed estimation | |
| Fausto Ferreira | National Research Council of Italy |
| Gianmarco Veruggio | National Research Council of Italy |
| Massimo Caccia | National Research Council of Italy |
| Gabriele Bruzzone | National Research Council of Italy |
| 15.00 – 15.20 Optimal Number of Image Keypoints for Real Time Visual Odometry | |
| Volker Nannen | Universitat de les Illes Balears |
| Gabriel Oliver | Universitat de les Illes Balears |
| 15.20 – 15.40 GAS ocean current estimation with limited velocity readings | |
| Pedro Batista | ISR - Instituto Superior Técnico |
| Carlos Silvestre | ISR - Instituto Superior Técnico |
| Paulo Oliveira | ISR - Instituto Superior Técnico |
| 15.40 – 16.00 Analysis of a Multi-Objective Observer for UUVs | |
| Mauro Candeloro | Norwegian University of Science and Technology |
| Fabio Dezi | Università Politecnica delle Marche |
| Asgeir J. Sorensen | Norwegian University of Science and Technology |
| Sauro Longhi | Università Politecnica delle Marche |

14.00 – 16.00. Thu2B - EU FP7 Projects in Marine Robotics, Room B016

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| 14.00 – 14.20 The European R&D-Project MORPH: Marine robotic systems of self-organizing, logically linked physical nodes | |
| Joerg Kalwa | Atlas Elektronik |
| António Pascoal | ISR - Instituto Superior Técnico |
| Pere Ridao | University of Girona |
| Andreas Birk | Jacobs University Bremen |
| Mike Eichhorn | Ilmenau University of Technology |
| Lorenzo Brignone | L'Institut Français de Recherche pour l'Exploitation de la Mer |
| 14.20 – 14.40 TRIDENT: Recent Improvements about Autonomous Underwater Intervention Missions | |
| Pedro J. Sanz | Universitat Jaume-I |
| Pere Ridao | University of Girona |
| Gabriel Oliver | Universitat de les Illes Balears |
| Giuseppe Casalino | University of Genova |
| Carlos C. Insaurralde | Heriot-Watt University |
| Carlos Silvestre | ISR – Instituto Superior Técnico |
| 14.40 – 15.00 Cooperative Cognitive Control for Autonomous Underwater Vehicles (CO3AUVs): overview and progresses in the 3rd project year | |
| Andreas Birk | Jacobs University Bremen |
| António Pascoal | ISR - Instituto Superior Técnico |
| Gianluca Antonelli | University of Cassino and Southern Lazio |
| Andrea Caiti | University of Pisa |
| Giuseppe Casalino | University of Genova |
| Andrea Caffaz | Graaltech |
| 15.00 – 15.20 PANDORA: Persistent Autonomy through Learning, Adaptation, Observation and Re-planning | |
| Dave M Lane | Heriot-Watt University |
| Francesco Maurelli | Heriot-Watt University |
| Tom Larkworthy | Heriot-Watt University |
| Darwin Caldwell | Italian Institute of Technology |
| Joaquim Salvi | University of Girona |
| Maria Fox | King's College London |

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| 15.20 – 15.40 The NOPTILUS project: Autonomous Multi-AUV Navigation for Exploration of Unknown Environments | |
| Savvas Chatzichristofis | The Centre for Research & Technology |
| Athanasios Kapoutsis | The Centre for Research & Technology |
| Elias Kosmatopoulos | The Centre for Research & Technology |
| Lefteris Doitsidis | The Centre for Research & Technology |
| Dimitrios Rovas | The Centre for Research & Technology |
| João Borges de Sousa | LSTS – Faculdade de Engenharia da Universidade do Porto |
| 15.40 – 16.00 Further results on selective tidal stream transport for Lagrangian profilers | |
| Dongwei Han | University of Southern Denmark |
| Jerome Jouffroy | University of Southern Denmark |

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| 16.30 – 17.30 Plenary 7, Room B032 | |
| Dr. Alexander Scherbatyuk, Institute for Marine Technology Problems, RU | |
| Some Algorithms of AUV Positioning Based on One Moving Beacon | |