AUV 2016 STUDENT POSTER - Imaginary AUV

(Titles and authors as recorded at the time of abstract submission. Only the affiliation of the first author is included.)

Student Poster Session - Monday, November 7
16:15-18:00

Student Poster 1 (1033)
AUV for Search & Rescue at Sea – An Innovative Approach
Sathyaram Venkatesan
SRM University, India

Student Poster 2 (1049)
Simultaneous Wide Area Scan Purpose AUV with Tethered Multi-Agent (SWAN)
Hyunwoo Roh, Son-cheol Yu
Pohang University of Science and Technology, Republic of Korea

Student Poster 3 (1053)
Surveillance of Coral Reef Development by Using AUV
Mohammad Fahmi Amri Mohd Murad, Mohamed Idzham Samah, Zool H. Ismail
Universiti Teknologi Malaysia, Malaysia

Student Poster 4 (1054)
Pipefish AUV: The flight style AUV delivering small purpose built hover capable AUVs
Sophia M Schillai
University of Southampton, United Kingdom

Student Poster 5 (1069)
Mini-ROV based Anchoring AUV System; TreeBot AUV
Minsung Sung, Soncheol Yu
Pohang University of Science and Technology, Republic of Korea

Student Poster 6 (1071)
Underwater Marking AUV Using Paraffin Wax
Seokyong Song, Son-Cheol Yu
Pohang University of Science and Technology, Republic of Korea

Student Poster 7 (1079)
Ship Hull Inspection based on Omnidirectional Path and View Method for an Autonomous Underwater Vehicle
Mohamad Syakir Mohamad Soberi, Muhammad Zahiruddin Zakaria, Zool Hilmi Ismail
University Technology of Malaysia, Malaysia

Student Poster 8 (1086)
Iceberg Worm: Biomimetic AUV for Sea Ice Thickness Survey using Non-contact Laser Ultrasonic Method
Hangil Joe, Son-Cheol Yu
Pohang University of Science and Technology, Republic of Korea

Student Poster 9 (1095)
Hunting Ghost Fishing Gear for Fishery Sustainability using Autonomous Underwater Vehicles
Jia-En Chang, Sheng-Wei Huang, Jenhwa Guo
National Taiwan University, Taiwan

Student Poster 10 (1120)

Development of AUV (M:I) for Strong Ocean Current and Zero-Visibility Condition

Juhyun Pyo, Son-cheol Yu
POSTECH, Republic of Korea

Student Poster 11 (1122)

The Possibility of "Train type AUV" about its Mobility and Endurance

Yoshinori Kuranaga, Toshihiro Maki
University of Tokyo, Japan

Student Poster 12 (1134)

Development of a Biomimetic Underwater Gliders using Undulating Fin Propulsion System

Daiwei Li, Zheng Zeng, Junjun Cao, Di Lu, Lian Lian
Shanghai Jiao Tong University, China

Student Poster 13 (1099)

Autonomous Air & Underwater Vehicle 06 (AAUV 06)

Vikranth Teppala
Saveetha University, India

AUV 2016 PRELIMINARY PROGRAM

(Titles and authors as recorded at the time of abstract submission. Only the affiliation of the first author is included.)

Monday, November 7
9:00-10:30
Session 1 Field Applications

1.1 **Starbug X AUV: Field Trials and Analysis of in-situ Multi-Channel AUV Data**
(1062) Andreas Marouchos, Mark Underwood, Russ Babcock
CSIRO, Australia

1.2 **Development and Sea Trial of an Autonomous Underwater Vehicle Equipped with a Sub-Bottom Profiler for Surveying Mineral Resources**
(1005) Saori Yokota, Kangsoo Kim, Motonobu Imasato, Kenichi Sawada, Hisashi Koyama, Kenji Nagahashi, Tadamasa Obata, Kenji Nakane, Yuji Oyabu
National Maritime Research Institute, Japan

1.3 **Real-Time Anomaly Detection in Side-Scan Sonar Imagery for Adaptive AUV Missions**
(1008) Jeffrey W. Kaeli
Woods Hole Oceanographic Institution, United States

1.4 **Test results and applications of an AUV-borne controlled source electromagnetic (CSEM) system**
(1037) Steve Bloomer, Peter Kowalczyk, Steven Constable, Enmoto Keisuke
Ocean Floor Geophysics, Canada

1.5 **Development of Propeller Driven Long Range Autonomous Underwater Vehicle (LRAUV) for Under-Ice Mapping of Oil Spills and Environmental Hazards**
(1105) Amy L. Kukulya, Jim G. Bellingham, Jeff W. Kaeli, Chris M. Reddy
Woods Hole Oceanographic Institution, United States

1.6 **Towards Autonomous Underwater Iceberg Profiling using a Mechanical Scanning Sonar on a Underwater Slocum Glider**
(1083) Mingxi Zhou, Ralf Bachmayer, Brad deYoung
Memorial University of Newfoundland, Canada

Monday, November 7
10:45-12:15
Session 2 Navigation / Localization 1

2.1 **Technologies for Under-Ice AUV navigation**
(1051) Dinuka Doupadi Bandara Herath Mudiyanselage, Shantha Jayasinghe, Zhi Leong, Hung Nguyen, Alexander L Forrest
Australian Maritime College, University of Tasmania, Launceston, Australia, Australia

2.2 **Terrain Aided AUV Navigation System for Long Range Operations at Arctic Latitudes**
(1077) Georgios Salavasidis, Catherine Harris, Eric Rogers, Stephen McPhail, Alexander Phillips
National Oceanography Centre / University of Southampton, United Kingdom

2.3 **Attitude and Gyro Bias Estimation Using Range-difference and IMU Measurements**

(1025) Erlend K Jørgensen
Norwegian University of Science and Technology, Norway

2.4 **Effects of Kalman Based Underwater Tracking Due to Ocean Current Uncertainties**

(1027) Zhongben Zhu, Sau-Lon J Hu, Huajun Li
Ocean University of China, China

2.5 **High-Precision Underwater Navigation using Model-Referenced Pose estimation with Monocular Vision**

(1030) Jisung Park, Jinwhan Kim
Korea Advanced Institute of Science and Technology, Republic of Korea

2.6 **End-to-End Object Detection and Recognition in Forward-Looking Sonar Images with Convolutional Neural Networks**

(1040) Matias Valdenegro-Toro
Heriot-Watt University, United Kingdom

Monday, November 7
13:15 - 14:45
Session 3 Payload / Components / Actuators

3.1 **Design of a General Autonomy Payload for Low-Cost AUV R&D**

(1100) Oscar A. Viquez, Erin M. Fischell, Nicholas R. Rypkema, Henrik Schmidt
Massachusetts Institute of Technology, United States

3.2 **Differential Pressure Sensor Based Speedometry for Underwater Vehicles: Preliminary Results**

(1026) Juan Francisco Fuentes-Perez, Kaia Kalev, Jeffrey A. Tuhtan, Maarja Kruusmaa
Tallinn University of Technology, Estonia

3.3 **AUV IRSAS for Submarine Hydrothermal Deposits Exploration**

(1136) Mitsuhiro Kojima, Akira Asada, Kenji Nagahashi, Katsunori Mizuno, Yuta Saito, Fuyuki Katase, Aritoshi Mio, Tamaki Ura
University of Tokyo, Japan

3.4 **Development of Fuel Cell System for Long Cruising Range Autonomous Underwater Vehicle**

(1016) Tadahiro Hyakudome, Takeshi Nakatani, Hiroshi Yoshida, Toshihiro Tani, Hideki Ito, Koki Sugihara
JAMSTEC, Japan

3.5 **Evaluating the Use of Lithium Sulphur Batteries for a Deep Ocean Pressure Balanced AUV Energy Source**

(1121) Daniel T Roper, Maaten E Furlong
National Oceanography Center, United Kingdom

3.6 **Underwater Wireless Power Transfer for Non-Fixed Unmanned Underwater Vehicle in the Ocean**

(1130) Shuhei Yoshida, Masahiro Tanomura, Yasuhiro Hama, Tomoya Hirose, Akane Suzuki, Yauhiro Matsui, Norio Sogo, Ryuichi Sato
NEC Corporation, Japan

Monday, November 7
15:00-16:00
Session 4 Mapping / SLAM

4.1 **Terrain Sub-map SLAM using Structured Light in Underwater Environments**
(1014) Miquel Massot Campos, Gabriel Oliver-Codina, Adrian Bodenmann, Blair Thornton
University of the Balearic Islands, Spain

4.2 **Efficient Visual SLAM using Selective Image Registration for Autonomous Inspection of Underwater Structures**
(1015) Seonghun Hong, Jinwhan Kim
KAIST, Republic of Korea

4.3 **Side Scan Sonar Based Onboard SLAM System for Autonomous Underwater Vehicles**
(1020) Konstantinos Siantidis
ATLAS ELEKTRONIK GmbH, Germany

4.4 **A Model of AUV survey Feature Resolution and Error Estimation for Deployment Optimization**
(1081) Damien Guihen, Peter King, Vanessa Lucieer
University of Tasmania, Australia

Tuesday, November 8
9:00-10:30
Session 5 Multi Vehicle 1

5.1 **Cooperative Multi-AUV Localization Using Distributed Extended Information Filter**
(1003) Rui Gao, Mandar Chitre
National University of Singapore, Singapore

5.2 **Sea Experiments and Tank Tests of the Alternating Landmark Navigation by Multiple AUVs - Toward Accurate and Efficient Survey of Seafloor by AUVs-**
(1115) Takumi Matsuda, Toshihiro Maki, Yoshiki Sato, Takashi Sakamaki
University of Tokyo, Japan

5.3 **MERLIN - A Decade of Large AUV Experience at Memorial University of Newfoundland**
(1131) Ron Lewis, Nick Ridgley, Peter King, Sara Lewis, Neil Bose, Rodolphe Devillers, Tahir Husain, James Munroe, Andrew Vardy, Dan Walker
Marine Institute of Memorial University of Newfoundland, Canada

5.4 **Design of an Autonomous Surface Vehicle (ASV) for Swarming Application**
(1116) Mad Helmi Ab. Majid Mad Helmi Ab. Majid, Mohd Rizal Arshad
Universiti Sains Malaysia, Malaysia

5.5 **Goby3: A New Open-Source Middleware for Nested Communication on Autonomous Marine Vehicles**
(1010) Toby E. Schneider
GobySoft, LLC, United States

5.6 **Transmitting Internet Protocol Packets Efficiently on Underwater Networks using Entropy-Encoder Header Translation**

(1011) Toby E. Schneider
GobySoft, LLC, United States

Tuesday, November 8
10:45-12:00
Session 6 Vehicle Design 1

6.1 **Landing-sleep and Drifting-sleep Experiments of the Underwater Glider for Long-term Observation**

(1055) Kenichi Asakawa, Masahiko Nakamura, Yosaku Maeda, Tadahiro Hyakudome, Yasuhisa Ishihara
Japan Agency for Marine-Earth Science and Technology, Japan

6.2 **The Autonomous Underwater Vehicle Sentry: How a One of a Kind Research Platform can be Turned into a 200 Operational Day Per Year Customer Focused Asset**

(1078) Carl L. Kaiser, Dana R. Yoerger, James C. Kinsey, Sean Kelley, Andrew Billings, Justin Fujii, Stefano Suman, Michael Jakuba, Zachary Berkowitz, Albert M. Bradley
Woods Hole Oceanographic Institution, United States

6.3 **UW MORSE - The UnderWater Modular Open Robot Simulation Engine**

(1082) Eirik H Henriksen
Norwegian University of Science and Technology, Norway

6.4 **Autonomous Hovering Profiler**

(1056) Pramod Kumar Maurya, Elgar De Sa, Awanish Chandra Dubey, Nitin Dabholkar, Antonio Pascoal
National Institute of Oceanography, India

6.5 **Seabed Resident Event driven Profiling System (SREP). Concept, Design and Tests**

(1067) Antonio Mascarenhas, Sanjeev Afzulpurkar, Pramod Maurya, Llewellyn Fernandes, Madhan R, Elgar Desa, Nitin Dabholkar, Gajanan Navelkar, Lakshadeep Naik, Vidish G Shetye
CSIR-National Institute of Oceanography, India

Tuesday, November 8
13:15-14:30
Session 7 Risk Management / ROV / ASV

7.1 **Uncertainty Management During Hybrid Autonomous Underwater Vehicle Missions**

(1106) M. P. Brito
University of Southampton, United Kingdom

7.2 **Risk and Reliability Modelling for Multi-Vehicle Marine Domains**

(1018) Catherine A Harris, Carolina Dopico-Gonzalez, Mario P Brito, Alexander B Phillips
National Oceanography Centre, United Kingdom

7.3 **Risk Analysis of an Autonomous Surface Craft for Operation in Harsh Ocean Environments**

(1101) Zhi Li, Ralf Bachmayer, Andrew Vardy
Memorial University of Newfoundland, Canada

7.4 ASV MAINAMI for AUV Monitoring and its Sea Trial

(1118) Takeshi Nakatani, Tadahiro Hyakudome, Takao Sawa, Yoshiyuki Nakano, Yoshitaka Watanabe, Tatsuya Fukuda, Hiroshi Matsumoto, Ryotaro Suga, Hiroshi Yoshida
Japan Agency for Marine–Earth Science and Technology (JAMSTEC), Japan

7.5 Modeling and Controller Design of Moor-Less Buoy System Utilizing Wave Energy

(1047) Hyunwoo Roh, Hangil Joe, Son-cheol Yu
Pohang University of Science and Technology, Republic of Korea

Tuesday, November 8
14:45-16:15
Session 8 Navigation / Localization 2

8.1 Evaluation of Terrain Collision Risks for Flight Style Autonomous Underwater Vehicles

(1041) Sophia M Schillai, Alexander B Phillips, Stephen R Turnock, Eric Rogers, Catherine A Harris
University of Southampton, United Kingdom

8.2 Development of Image Sonar Based Autonomous Trajectory Backtracking Using AUVs

(1043) Byeongjin Kim, Hyeonwoo Cho, Juhyun Pyo, Son-Cheol Yu
Pohang University of Science and Technology, Republic of Korea

8.3 Underwater Cable Tracking Control of Under-Actuated AUV

(1096) Caoyang Yu, Xianbo Xiang, Bohao Wang, Hui Liu
Huazhong University of Science and Technology, China

8.4 Autonomous Adaptive Path Planning of Multi Resolution Visual Surveys Based on Scene Complexity

(1126) Yuto Otsuki, Blair Thornton, Toshihiro Maki, Yuya Nishida, Adrian Bodenmann, Kazunori Nagano
University of Tokyo, Japan

8.5 Online Motion Planning for Underwater Inspection

(1113) Marc Carreras, Juan David Hernandez, Eduard Vidal, Narcís Palomeras, Pere Ridao
University of Girona, Spain

8.6 A New Generation DVL for Underwater Vehicle Navigation

(1103) Audun Ramstad, Øyvind Hegrenæs, David Velasco, Torstein Pedersen
Nortek AS, Norway

Tuesday, November 8
16:30-17:45
Session 9 Control / Dynamics

9.1 Guidance based Straightline and Circular Path Following Control of Mini-AUV: Theory and Experiments

(1091) Xianbo Xiang
Huazhong University of Science and Technology, China

9.2 **Modelling of an AUV with Voith-Schneider Vector Thruster**
(1028) Rajat Mishra, Mandar Chitre
National University of Singapore, Singapore

9.3 **Underwater Vehicle Gesture Control Aided by Air Bubble Motion Observation in a Water Flow**
(1097) Jenhwa Guo, Chih-Wei Lee, Rui Nian
National Taiwan University, Taiwan

9.4 **Assessment of Underwater Glider Performance Through Viscous CFD**
(1022) Artur K Lidtke, Stephen R Turnock, Jon Downes
University of Southampton, United Kingdom

9.5 **Tracking Control Design for Autonomous Underwater Vehicle using Robust Filter Approach**
(1034) Yoong Siang Song, Mohd Rizal Arshad
Universiti Sains Malaysia, Malaysia

Wednesday, November 9
9:00 - 10:30
Session 10 Vehicle Design 2

10.1 **Envirobot: A Bio-Inspired Environmental Monitoring Platform**
(1002) Behzad Bayat, Alessandro Crespi, Auke Ijspeert
Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

10.2 **The Underwater Swimming Manipulator – A Bio-Inspired AUV**
(1031) Jørgen Sverdrup-Thygeson, Eleni Kelasidi, Kristin Y. Pettersen, Tommy Gravdahl
Norwegian University of Science and Technology, Norway

10.3 **Development of Small ROV Based Underwater Manipulation System with Winch and Laser for AUVs**
(1036) Juhwan Kim, Son-Cheol Yu
Pohang University of Science and Technology, Republic of Korea

10.4 **Fault Tolerant Tracking of Multiple Markers for Underwater Docking of Autonomous Underwater Vehicle**
(1117) Mohd Faid Yahya, Mohd Rizal Arshad
Universiti Sains Malaysia, Malaysia

10.5 **A Concept Design of Underwater Docking Robot and Development of Its Fundamental Technologies**
(1123) Hiroshi Yoshida, Shojiro Ishibashi, Yutaka Ohta, Makoto Sugesawa, Kiyotaka Tanaka
JAMSTEC, Japan

10.6 **Development of Quad-rotor Type Underwater Robot for Fixed-point Observation**
(1119) Tanaka Tenga, Fuji Hidetaka, Matsuo Takayuki, Takimoto Takashi
National Institute of Technology, Kitakyushu College, Japan

Wednesday, November 9
10:45-12:00
Session 11 Multi Vehicle 2

11.1 **Towards Persistent Cooperative Marine Robotics**
(1127) Brian Claus, Yogesh Girdhar, James Kinsey
Woods Hole Oceanographic Institution, United States

11.2 **Multi-Vehicle Autonomous Tracking and Filming of White Sharks Carcharodon Carcharias**
(1109) Amy L. Kukulya, Gregory B. Skomal, E. Mauricio Hoyos-Padilla, Carl Fiester, Roger Stokey
Woods Hole Oceanographic Institution, United States

11.3 **Development of a Regional Underwater Positioning and Communication System for Control of Multiple Autonomous Underwater Vehicles**
(1107) Masahiko Sasano, Shogo Inaba, Akihiro Okamoto, Takahiro Seta, Kenkichi Tamura, Tamaki Ura, Shinichi Sawada, Taku Suto
National Maritime Research Institute, Japan

11.4 **Cooperative Underwater Mission: Offshore Seismic Data Acquisition Using Multiple Autonomous Underwater Vehicles**
(1039) Youssef Essaouari, Alessio Turetta
Graal Tech Srl, Italy

11.5 **"Autonomous and Adaptive Control": Collaborative Swarm Control Algorism Inspired by Adaptive Mechanism of Living Organisms**
(1114) Masatsugu Ogawa, Masafumi Emura, Masumi Ichien, Masafumi Yano
NEC Corporation, Japan

11.6 **Path Planning for Multiple Autonomous Underwater Vehicles**
(1085) Zhuo Wang, Longjie Jiang, Xiaoning Feng, Xiyuan Lin
Harbin Engineering University, China