

2012 IEEE/OES Autonomous Underwater Vehicles (AUV)

Southampton, UK

September 24 - 27, 2012



AUV 2012



2012 IEEE / OES Autonomous Underwater Vehicles (AUV)

Southampton, UK

Sept. 24 - 27, 2012



Copyright © 2012 by the Institute of Electrical and Electronic Engineers, Inc.
All rights reserved.

ISBN : 978-1-4577-2056-7

ISSN : 1522- 3167

Patrons:



2012 IEEE/OES Autonomous Underwater Vehicles (AUV)

Copyright © 2012 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved.

Copyright and Reprint Permission

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint or republication requests should be addressed to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

IEEE Catalog Number : CFP12AUV-ART

ISBN : 978-1-4577-2056-7

ISNN : 1522-3167

Additional copies of this publication are available from

Curran Associates, Inc.

57 Morehouse Lane

Red Hook, NY 12571 USA

+1 845 758 0400

+1 845 758 2633 (FAX)

Email: curran@proceedings.com

2012 IEEE/OES Autonomous Underwater Vehicles (AUV) Table of Contents

Persistent Presence – Day 1 Tuesday – Sept. 25th

08:15 Registration

08:50 Opening Remarks

09:00 Keynote: *Bill Gilmour* - [Field resident AUV systems: Chevrons long-term goal for Autonomous Underwater Vehicle \(AUV\) Development](#)

09:30 AM – Vehicle

Brett Hobson, MBARI, USA: [Extending the endurance of cruising AUVs from days, to weeks and months](#)

Mathieu Kemp, Bluefin Robotics, USA: [Persistence at 6000m](#)

Maaten Furlong, NOC, UK: [Autosub Long Range: a deep diving long range AUV for ocean monitoring](#)

11:15 AM – Vehicles in Action

Clayton Jones, Teledyne Webb Research, USA: [Slocum Gliders - persistent ocean observation platforms](#)

Mark Inall, SAMS, UK: [AUV observations of surface mixing and bubble entrainment in the Clyde estuary, Scotland](#)

Bastien Queste, UEA, UK: [Deployments in extreme conditions: pushing the boundaries of Seaglider capabilities](#)

Edward Steele, Plymouth Univ., UK: [Cooling of the West Spitsbergen current: AUV-based turbulence measurements west of Svalbard](#)

12:55 LUNCH – thank you RS Aqua Ltd

2:00 pm – Vehicle developments and operational issues

Brian Claus, MUN, Canada: [Analysis and development of a buoyancy-pitch based depth control algorithm for a hybrid underwater glider](#)

Alex Phillips, Univ. Southampton, UK: [Nature in Engineering for Monitoring the Oceans \(NEMO\): An isopycnal soft bodied approach for a deep diving autonomous underwater vehicle](#)

Don Brutzman, NPS, USA: [An implemented universal mission controller with run-time ethics checking for Autonomous Unmanned Vehicles a UUV example](#)

Roland Rogers, NOC, UK: [The legal regime governing AUV operations - how far and how wide?](#)

2012 IEEE/OES Autonomous Underwater Vehicles (AUV)

Table of Contents

Persistent Presence – Day 1

Tuesday – Sept. 25th

4:00pm Single Power Point Slide Poster Introduction

4:50 pm Poster Session

Javier Busquets , UPCT, Spain: [Deployment of a collaborative team of AUV's for long term survey in a delimited area combined with an ASV as AUV recharging dock and communication station](#)

Abhra Roy Chowdhury, NUS, Singapore: [Lighthill mathematical model study and implementation of an BCF mode bio-mimetic robotic-fish underwater vehicle](#)

Marc Hildebrandt, DFKI, Germany: [Experiences with the AUV Dagon - a versatile vehicle for high precision visual mapping and algorithm evaluation](#)

Alexandra Gottschall, Florida Tech, USA: [Design of an underwater glider for education and research](#)

Maryam Haroutunian, Newcastle Univ., UK: [Mission based optimum system selector for bio-inspired unmanned untethered underwater vehicles](#)

Thomas Hiller, Thurne Hydrographic Ltd, UK: [Expanding the small AUV mission envelope; longer, deeper & more accurate.](#)

Mark Inall, SAMS, UK: Horizontal evolution of tidally modulated buoyant plumes as observed with an AUV based microstructure profiler

Carlos Insaurralde, Heriot-Watt Univ., UK: [Autonomic Management for the Next Generation of Autonomous Underwater Vehicles](#)

Banghyun Kim, KORDI, South Korea: [Design and implementation of control architecture for the ISIMI6000 Autonomous Underwater Vehicle](#)

Ji-Hong Li, Korea Institute of Robot and Convergence, South Korea: [Local path planning for P-SURO series AUVs](#)

Nicholas Limparis, Univ. Maryland, USA: [Design of a distributed control architecture for the SAMURAI deep submergence manipulator](#)

Katherine McBryan, Univ. Maryland, USA: [Vision recognition using shape context for autonomous underwater sampling](#)

Pareecha Rattanasiri, Univ. Southampton, UK: [Numerical investigation into the drag of twin prolate spheroid hulls in various configurations](#)

Leo Steenson, Univ. Southampton, UK: [Effect of measurement noise on the performance of a model predictive controller](#)

Martin Syre Wiig, FFI, Norway: [Adaptive mine-hunting operations with the HUGIN autonomous underwater vehicle](#)

Wine and Cheese – Thank you Teledyne RDI

**2012 IEEE/OES Autonomous Underwater Vehicles (AUV)
Table of Contents**

**Persistent Presence – Day 1
Tuesday – Sept. 25th**

Award Presentations

AUV2012 Best Student Paper Award – Thank you SeeByte LTD

IEEE/OES Distinguished Technical Achievement Award

5:50 PM Close

7:00 PM Gala Dinner Welcome Drinks – Thank you EdgeTech

8:30 PM – Dining Starts

Table wine – Thank you Ocean Business

Keynote: Dana Yoerger

2012 IEEE/OES Autonomous Underwater Vehicles (AUV) Table of Contents

Persistent Presence – Day 2 Wednesday – Sept. 26th

08:30 Registration

08:50 Opening Remarks

09:00 Keynote: *Prof. David Lane*: [Persistent Autonomy - Artificial Intelligence or Biomimesis?](#)

09:30 – Autonomy

Carlos Insaurralde, Heriot-Watt, UK: [Autonomy-assessment criteria for underwater vehicles](#)

Catherine Harris, Univ. Birmingham, UK: [Contingency planning for long-duration AUV missions](#)

Mario Brito, NOC, UK: [The role of adaptive mission planning and control in persistent autonomous underwater vehicles presence](#)

10:45 AM Morning Coffee – Thank you Sonardyne International Ltd

11:15 AM – Obstacle Avoidance and Navigation

Sarah Houts, Stanford Univ., USA: [Aggressive terrain following for motion-constrained AUVs](#)

Serge Karabchevsky, Ben Gurion Univ, Israel: [AUV Real-Time acoustic vertical plane obstacle detection and avoidance](#)

Shandor Dektor, Stanford Univ., USA: [Improving robustness of terrain-relative navigation for AUVs in regions with flat terrain](#)

Giancarlo Troni, Johns Hopkins Univ., USA: [Preliminary experimental evaluation of in-situ calibration methods of MEMS-based attitude sensors and Doppler sonars for underwater vehicle navigation](#)

12:55 LUNCH – thank you RS Aqua Ltd

2.00 PM – Collaboration

Chris German, WHOI, USA: [A long term vision for long-range \(ship-free\) deep ocean operations: persistent presence through coordination of ASVs and AUVs](#)

Axel Hackbarth, Hamburg Uni. of Technology, Germany: [Collaborative Control of Multiple AUVs for Improving the Estimation of Flow Field Dependent Variables](#)

Francesco Maurelli, Heriot-Watt, UK: [Marine world representation and acoustic communication: challenges for multi-robot collaboration](#)

João Sousa, Universidade do Porto, Portugal: [Coordinated control of ocean going vehicles](#)

Douglas Horner, NPS, USA: [Undersea acoustic communication maps for collaborative navigation](#)

2012 IEEE/OES Autonomous Underwater Vehicles (AUV)

Table of Contents

Persistent Presence – Day 2
Wednesday – Sept. 26th

3:40 PM Morning Coffee – Thank you Sonardyne International Ltd

4:25 PM – Path Planning and Control

Peter King, MUN, Canada: [Real-time side-scan image generation and registration framework for autonomous AUV route following](#)

Zheng Zeng, Flinders Univ., Australia: [Optimal path planning based on annular space decomposition for AUVs operating in a variable environment](#)

Tan Yew Teck, NUS, Singapore: [Hierarchical multi-agent command and control system for autonomous underwater vehicles](#)

5:40 PM – Closing Remarks

2012 IEEE/OES Autonomous Underwater Vehicles (AUV)

Presenting Authors

Mario Brito – National Oceanography Centre UK : Mario.Brito@noc.ac.uk

Don Brutzman – Naval Postgraduate School : brutzman@nps.edu

Javier Busquets – UPCT : jbm2@alu.upct.es

Brian Claus – Memorial Univ. of Newfoundland : bclaus@mun.ca

Abhra Roy Chowdhury – National Univ. of Singapore : abhra.roychowdhury@nus.edu.sg

Shandor Dektor – Stanford Univ. : sgd@stanford.edu

Maaten Furlong – National Oceanography Centre UK : maatenf@noc.ac.uk

Chris German – WHOI : cgerman@whoi.edu

Bill Gilmour –Chevron : bill.gilmour@chevron.com

Alexandra Gottschall – Florida Institute of Technology : agottschall@gmx.de

Axel Hackbarth – Hamburg Uni. of Technology : axel.hackbarth@tu-hamburg.de

Maryam Haroutunian – Newcastle Univ. : maryam.haroutunian@ncl.ac.uk

Catherine Harris – Univ. Birmingham : cah652@cs.bham.ac.uk

Marc Hildebrandt – DFKI : marc.hildebrandt@dfki.de

Thomas Hiller – Thurne Hydrographic Ltd : tomhiller_uk@yahoo.co.uk

Brett Hobson – MBARI : hobson@mbari.org

Sarah Houts – Stanford Univ. : shouts@stanford.edu

Douglas Horner – Naval Postgraduate School : dphorner@nps.edu

Mark Inall – Scottish Association for Marine Science : Mark.Inall@sams.ac.uk

Carlos Insaurralde – Heriot-Watt Univ. : c.c.insaurralde@hw.ac.uk

Clayton Jones – Teledyne Webb Research : cjones@teledyne.com

Serge Karabchevsky – Ben Gurion Univ. : serge@ee.bgu.ac.il

Mathieu Kemp – Bluefin Robotics : mkemp@bluefinrobotics.com

Banghyun Kim – KORDI : legnamai@chol.com

2012 IEEE/OES Autonomous Underwater Vehicles (AUV) Presenting Authors

Peter King – Memorial Univ. of Newfoundland : peter.king@mun.ca

David Lane – Heriot-Watt Univ. : d.m.lane@hw.ac.uk

Ji-Hong Li – Korea Institute of Robot and Convergence : jhli5@postech.ac.kr

Nicholas Limparis – Univ. Maryland : nlimpari@umd.edu

Francesco Maurelli – Heriot-Watt Univ. : f.maurelli@hw.ac.uk

Katherine McBryan – Univ. Maryland : kmcbryan@gmail.com

Alex Phillips – Univ. Southampton : abp@soton.ac.uk

Bastien Queste – Univ. of East Anglia : b.queste@uea.ac.uk

Pareecha Rattanasiri – Univ. Southampton : pj506@soton.ac.uk

Roland Rogers – National Oceanography Centre UK : rxr@noc.ac.uk

João Sousa – Universidade do Porto : jtasso@fe.up.pt

Edward Steele – Plymouth Univ. : edward.steele@plymouth.ac.uk

Leo Steenson – Univ. Southampton : l.v.steenson@soton.ac.uk

Tan Yew Teck – National Univ. of Singapore : william@arl.nus.edu.sg

Giancarlo Troni – Johns Hopkins Univ. : gtroni@jhu.edu

Martin Syre Wiig – Norwegian Defence Research Establishment (FFI) : martin-syre.wiig@ffi.no

Zheng Zeng – Flinders Univ. : zheng.zeng@flinders.edu.au

2012 IEEE/OES Autonomous Underwater Vehicles (AUV) Staff

Gwyn Griffiths – Chair: gxg@noc.ac.uk

Maaten Furlong – Tech Chair: maatenf@noc.ac.uk

Hanu Singh – Past Conference Chair: hsingh@whoi.edu

Mario Brito – Tutorials Chair: mario.brito@noc.ac.uk

Bill Kirkwood – Past Conference Chair: kiwi@mbari.org

Jim Mann – SUT representative: J.Mann@fugro.com

Aidan Thorn – Organisation: aidan.thorn@noc.ac.uk

Andy Lane – Web administration: ale@noc.ac.uk

Stephanie Walsh – Treasurer: stls@noc.ac.uk