James Campbell Kinsey

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Education

Ph.D. **Mechanical Engineering, The Johns Hopkins University**, Baltimore, MD USA, 2006
Dissertation Title: *Advances in Precision Navigation of Oceanographic Submersibles*
Adviser: Professor Louis L. Whitcomb

M.S. **Mechanical Engineering, The Johns Hopkins University**, Baltimore, MD USA, 2002

B.E. **Mechanical Engineering, State University of New York at Stony Brook**
Stony Brook, NY USA, 1998

Employment (In electronic versions of this document, click on the blue text to access the URL.)

Woods Hole Oceanographic Institution, Woods Hole, MA USA
Assistant Scientist, Applied Ocean Physics and Engineering — December 2009 - present
Deep Ocean Exploration Institute Postdoctoral Scholar — August 2007 - December 2009
Engineer I, Applied Ocean Physics and Engineering — June 1999 - September 1999
Engineering Assistant I, Applied Ocean Physics and Engineering — May 1998 - September 1998
Summer Student Fellow, Applied Ocean Physics and Engineering — June 1997 - September 1997

The Johns Hopkins University, Baltimore, MD USA
Visiting Research Scientist, Department of Mechanical Engineering — July 2007 - present
Postdoctoral Fellow, Department of Mechanical Engineering — July 2006 - July 2007
Graduate Student, Department of Mechanical Engineering — June 1999 - June 2006
On family leave of absence: January 2000 - January 2001

Integrated Coating Solutions, Huntington Beach, CA USA
Automation Consultant — January 2001 - August 2001

Center for Thermal Spray Research, Stony Brook, NY USA
Automation Engineer — June 2000 - January 2001

HD Systems, Inc., Hauppauge, NY USA
Design Engineer — January 1999 - June 1999

Journal Publications (In electronic versions of this document, click on the blue text to access the cited reference.)

[J9] R. Camilli, C.M. Reddy, D.R. Yoerger, B. Van Mooy, M.V. Jakuba, J.C. Kinsey, C.P. McIntyre, S.P. Sylva, J. V. Maloney. Tracking Hydrocarbon Plume Transport and Biodegradation at Deepwater Horizon. *Science*, 2010.

[J8] C.R. German, A. Bowen, M.L. Coleman, D.L. Honig, J.A. Huber, M.V. Jakuba, J.C. Kinsey, M.D. Kurz, S. Leroy, J.M. McDermott, B. deLépinay, K. Nakamura, J.S. Seewald, J.L. Smith, S.P. Sylva, C.L. Van Dover, L.L. Whitcomb, and D.R. Yoerger. Diverse styles of submarine venting on the ultra-slow spreading Mid-Cayman Rise, *Proceedings of the National Academy of Science*, 2010.

[J7] A.D. Bowen, D.R. Yoerger, C. Taylor, R. McCabe, J. Howland, D. Gomez-Ibanez, J.C. Kinsey, M. Heintz, G. McDonald, D.B. Peters, B. Fletcher, C. Young, J. Buescher, L.L. Whitcomb, S.C. Martin, S.E. Webster, and M.V. Jakuba. The Nereus Hybrid Underwater Robotic Vehicle for Global Ocean Science Operations to 11,000m Depth. *Underwater Technology*, 18(3), 2009.

[J6] D.R. Yoerger and J.C. Kinsey. Deep Ocean Surveying with Autonomous Underwater Vehicles. *Journal of Ocean Technology*. IV(1), 2009, Invited paper.

[J5] S.A. Soule, V.L. Ferrini, J.C. Kinsey, D.J. Fornari, C. Sellers, S.M. White, K. Von Damm, S.M. Carbotte. Navigational infrastructure at the East Pacific Rise 9° 50'N area following the 2005-06 eruption: seafloor benchmarks and high-resolution multibeam surveys. *Geochemisty, Geophysics, Geosystems*, 9, Q11T04, November 2008.

[J4] J.C. Kinsey and L.L. Whitcomb. In-situ alignment calibration of attitude and Doppler sensors for precision underwater vehicle navigation: Theory and experiment. *IEEE Journal of Oceanic Engineering*. 32(2):286-299, April 2007.

[J3] J.C. Kinsey and L.L. Whitcomb. Adaptive identification on the group of rigid body rotations and its application to precision underwater vehicle navigation. *IEEE Transactions on Robotics*, 23(1):124-136, February 2007.

[J2] V.L. Ferrini, D.J. Fornari, T.M. Shank, J.C. Kinsey, S.A. Soule, S.M. Carbotte, M.A. Tivey, L.L. Whitcomb, D.R. Yoerger, and J. Howland. Sub-meter bathymetric mapping of the East Pacific Rise crest at 9°50'N linking volcanic and hydrothermal processes. *Geochemisty, Geophysics, Geosystems*, 8, Q01006, January 2007.

[J1] J. C. Kinsey and L. L. Whitcomb. Preliminary field experience with the DVLNAV integrated navigation system for oceanographic submersibles. *Control Engineering Practice*, 12(12):1541-1548, December 2004. Invited Paper.

Peer Reviewed Conference Publications

(In electronic versions of this document, click on the blue text to access the cited reference. An asterisk (∗) indicates the author was a student I mentored.)

[CR5] M.J. Stanway* and J.C. Kinsey. Sensor alignment using rotors in Geometric Algebra. *Proceedings of the 2011 IEEE International Conference on Robotics and Automation*. Accepted, to appear.

[CR4] L.L. Whitcomb, M.V. Jakuba, J.C. Kinsey, S.C. Martin, S.E. Webster, J.C. Howland, C.L. Taylor , D. Gomez-Ibanez, D.R. Yoerger. Navigation and Control of the Nereus Hybrid Underwater Vehicle for Global Ocean Science to 10,903 m Depth: Preliminary Results. *Proceedings of the 2010 IEEE International Conference on Robotics and Automation*.

[CR3] J.C. Kinsey and L.L. Whitcomb. Model-Based Nonlinear Observers for Underwater Vehicle Navigation: Theory and Preliminary Experiments. *Proceedings of the 2007 IEEE International Conference on Robotics and Automation*, pages 4251-4256, April 2007, Rome, Italy.

[CR2] J.C. Kinsey and L.L1. Whitcomb. Adaptive Identification on the Group of Rigid Body Rotations. *Proceedings of the 2005 IEEE International Conference on Robotics and Automation*, pages 3256-3261, April 2005, Barcelona, Spain.

[CR1] J.C. Kinsey and L.L. Whitcomb. Towards In-Situ Calibration of Gyro and Doppler Navigation Sensors for Precision Underwater Vehicle Navigation. *Proceedings of the 2002 IEEE International Conference on Robotics and Automation*, pages 4016-4023, May 2002, Washington DC.

Additional Conference Publications

(In electronic versions of this document, click on the blue text to access the cited reference. An asterisk (∗) indicates the author was a student I mentored; a cross (†) indicates the author was a student I co-mentored.)

[CA11] M. VanMiddlesworth†, J.C. Kinsey and D.R. Yoerger. A Heterogeneous Rapid-Turnaround Visualization Package for AUV Data. *Submitted to the 2011 IEEE Oceans Conference*.

[CA10] J. Izraelevitz* and J.C. Kinsey. Optimal Trajectory Generation for Draped AUV Gravity Surveys. *Submitted to the 2011 IEEE Oceans Conference*.

[CA9] A.D. Bowen, D.R. Yoerger, C. Taylor, R. McCabe, J. Howland, D. Gomez-Ibanez, J.C. Kinsey, M. Heintz, G. McDonald, D.B. Peters, J. Bailey, E. Bors, T. Shank, L.L. Whitcomb, S.C. Martin, S.E. Webster, M.V. Jakuba, B. Fletcher, C.Young, J. Buescher, P. Fryer, S. Hulme. Field Trials of the Nereus Hybrid Underwater Robotic Vehicle in the Challenger Deep of the Mariana Trench. *Proceedings of the 2009 IEEE/MTS Oceans Conference*.

[CA8] J.C. Kinsey, M.A. Tivey and D.R. Yoerger. Toward High-Spatial Resolution Gravity Surveying of the Mid-Ocean Ridges with Autonomous Underwater Vehicles. *Proceedings of the 2008 IEEE/MTS Oceans Conference*, September 2008, Quebec City, Canada.

[CA7] A.D. Bowen, D.R. Yoerger, C. Taylor, R. McCabe, J. Howland, D. Gomez-Ibanez, J.C. Kinsey, M. Heintz, G. McDonald, D.B. Peters, B. Fletcher, C. Young, J. Buescher, L.L. Whitcomb, S.C. Martin, S.E. Webster, and M.V. Jakuba. The Nereus Hybrid Underwater Robotic Vehicle for Global Ocean Science Operations to 11,000m Depth. *Proceedings of the 2008 IEEE/MTS Oceans Conference*, September 2008, Quebec City, Canada.

[CA6] L.L. Whitcomb, M.V. Jakuba, J.C. Kinsey, S.C. Martin, S.E. Webster, J.C. Howland, C. Taylor, D. Gomez-Ibanez, and D.R. Yoerger. Navigation and Control of the Nereus Hybrid Underwater Vehicle for Global Ocean Science to 11,000m Depth. *The Fourteenth Yale Workshop on Adaptive and Learning Systems*. June 2008, New Haven, CT.

[CA5] J.C. Kinsey, R.M. Eustice, and L.L. Whitcomb. A survey of underwater vehicle navigation: Recent advances and new challenges. *In Proceedings of the IFAC Conference of Manoeuvring and Control of Marine Craft*, September 2006, Lisbon, Portugal. Invited paper.

[CA4] J.C. Kinsey, D.A. Smallwood and L.L. Whitcomb. A New Hydrodynamics Test Facility for UUV Dynamics and Control Research. *Proceedings of 2003 IEEE/MTS Oceans Conference*, pages 356-361, September 2003, San Diego, CA.

[CA3] J.C. Kinsey and L.L. Whitcomb. Preliminary Experiments with a Calibration Technique for Gyro and Doppler Navigation Sensors for Precision Underwater Navigation. *Proceedings of the 13th International Symposium on Unmanned Untethered Submersible Technology*, August 2003, Durham, NH.

[CA2] J.C. Kinsey and L.L. Whitcomb. Preliminary Field Experience with the DVLNAV Integrated Navigation System for Manned and Unmanned Submersibles. *Proceedings of the 1st IFAC Workshop on Guidance and Control of Underwater Vehicles*, April 2003. Paper received the IMarEST prize for Best Paper by a Young Author.

[CA1] J.C. Kinsey. Drag Characterization in the Autonomous Benthic Explorer. *Proceedings of 1998 IEEE/MTS Oceans Conference*, pages 1696-1700, September 1998, Nice, France.

Conference Abstracts (In electronic versions of this document, click on the blue text to access the cited reference.)

[A14] D.R. Yoerger, C.R. German, R. Camilli, J.C. Kinsey, K. Nakamura, D. De Beer, A. Boetius. Systematic Exploration of Cold Seeps by AUV: New Results Using Sentry at the Haakon Mosby Mud Volcano, September-October 2010. *2011 ASLO Aquatic Sciences Meeting*.

[A13] Camilli, R., Yoerger, D.R., German, C.R., Boetius, A., Kinsey, J.C,, de Beer, D. The Haakon Mosby Mud Volcano, a Carbon Dioxide Point Source. *2011 ASLO Aquatic Sciences Meeting*.

[A12] J.C. Kinsey, D.R. Yoerger, R. Camilli, and C.R. German. Developing Improved Water Velocity and Flux Estimation from AUVs Results From Recent ASTEP Field Programs. *Eos Trans. AGU, Fall Meet. Suppl.*, 2010.

[A11] D.R. Yoerger, J.C. Kinsey, M.V. Jakuba, R. Camilli, C.R. German, T. Shank, A. Bowen, K. Nakamura, SEEPS 2009 Scientific Party, OASES 2009 Scientific Party, GRUVEE 2010 Scientific Party, ENLIGHTEN 2010 Scientific Party, and HMMV 2010 Scientific Party. Searching for environments that could support life: Lessons learned from six deep sea cruises with the Sentry and Nereus Autonomous Underwater Vehicles. *Eos Trans. AGU, Fall Meet. Suppl.*, 2010.

[A10] C.R. German, A. Bowen, M.L. Coleman, D.L. Honig, J.A. Huber, M.V. Jakuba, J.C. Kinsey, M.D. Kurz, S. Leroy, J.M. McDermott, B. deLépinay, K. Nakamura, J.S. Seewald, J.L. Smith, S.P. Sylva, C.L. Van Dover, L.L. Whitcomb, and D.R. Yoerger. Diverse styles of submarine venting on the ultra-slow spreading Mid-Cayman Rise. *Eos Trans. AGU, Fall Meet. Suppl.*, 2010.

[A9] A. Bowen, C.R. German, L.L Whitcomb D.R. Yoerger, M.V. Jakuba, J.C. Kinsey, and OASES Science Team. OASES: Lessons learned from Oceanographic Exploration relevant to future Astrobiology expeditions *Eos Trans. AGU, Fall Meet. Suppl.*, 2010.

[A8] J.C.Kinsey, M.V. Jakuba, A. D. Bowen, D.R. Yoerger, L.L. Whitcomb, R. Camilli, C.R.German and D.L. Valentine. Employing Autonomous Underwater Vehicles to Develop New Techniques for Astrobiological Exploration: Recent Field Results and Future Opportunities. *Astrobiology Science Conference*, 2010.

[A7] R. Camilli, D. Yoerger, M. Jakuba, O. Pizarro, S. Williams, M. Johnson-Roberson, J.C. Kinsey, and T. Shank. Advancing autonomy for exploration, discovery, and characterization of astrobiology in aqueous environments. *Astrobiology Science Conference*, 2010.

[A6] C.R. German, A. Bowen, M.L. Coleman, D.P. Connelly, D. Honig, J. Huber, M. Jakuba, J.C. Kinsey, M.D. Kurz, J.M. McDermott, K. Nakamura, C.M. Sands, J.S. Seewald, J. Smith, S. Sylva, C.L. Van Dover, L.L. Whitcomb and D.R. Yoerger. Oases for Life and Pre-Biotic Chemistry: Hydrothermal Exploration of the Mid-Cayman Rise. *Astrobiology Science Conference*, 2010.

[A5] J. L. Smith, J. A. Huber, M. L. Coleman, D. P. Connelly, D. Honig, C. R. German, J.C. Kinsey, M. D. Kurz, J.M. McDermott, K. Nakamura, C. M. Sands, J. Seewald, S. Sylva and C. L. Van Dover. Microbial and Biogeochemical Characterization of Hydrothermal Plumes on the Mid-Cayman Rise. *Astrobiology Science Conference*, 2010.

[A4] C.R. German, A. Bowen, M.L. Coleman, J.A. Huber, J. Seewald, C.L. Van Dover, L.L. Whitcomb, D.R. Yoerger, D.P. Connelly, D. Honig, M. Jakuba, J. Kinsey, J. McDermott, K. Nakamura, C. Sands, J. Smith, and S. Sylva. Hydrothermal exploration of the Mid-Cayman Spreading Center: Isolated evolution on Earths deepest Mid-Ocean Ridge? *In Eos Trans. AGU, Fall Meet. Suppl.*, 2009.

[A3] J.C. Kinsey, L.L. Whitcomb, D.R. Yoerger, J.C. Howland, V.L. Ferrini, and Ø. Hegrenæs. New navigation post-processing tools for oceanographic submersibles. *In Eos Trans. AGU, 87(52), Fall Meet. Suppl.*, 2006. Abstract OS33A-1678.

[A2] L. Whitcomb, J. Kinsey, D. Yoerger, C. Taylor, A. Bowen, B. Walden, and D. Fornari. Navigation upgrades to the National Deep Submergence Facility vehicles D.S.V. Alvin, Jason 2, and the DSL-120A. *In Eos Trans. AGU 84(46), Fall Meet. Suppl.*, 2003. Abstract OS32A-0225.

[A1] Y. Rzhanov, L. Mayer, D. Fornari, T. Shank, S. Humphris, D. Scheirer, J. Kinsey, and L. Whitcomb. High-resolution photo-mosaicing of the Rosebud hydrothermal vent site and surrounding lava flows, Galapagos Rift 86°W — Techniques and interpretations. *In Eos Trans. AGU 84(46), Fall Meet. Suppl.*, 2003. Abstract OS32A-0231.

Additional Publications (In electronic versions of this document, click on the blue text to access the cited reference.)

[T3] J.C. Kinsey. *Advances in Precision Navigation of Oceanographic Submersibles*. Ph.D. thesis, Johns Hopkins University, Baltimore, MD USA, June 2006.

[T2] J.C. Kinsey and L.L. Whitcomb. *Adaptive Identification on the Group of Special Orthogonal Matrices*. Technical Report, Johns Hopkins University, October 2004.

[T1] L.L. Whitcomb and J.C. Kinsey. *DVLNAV Installation and Configuration Manual*. Technical Report, Johns Hopkins University. April 2003.

Grants

[G4]	Title:	Development and Field Deployment of a Novel AUV Gravimeter.
	PI:	J.C. Kinsey
	Agency:	Woods Hole Oceanographic Institution
	Dates:	September 1, 2010 to August 31, 2012
	Amount:	$71,257
[G3]	Title:	Potential Fields Pool Equipment (PFPE): A proposal to provide ship-board geophysical equipment and spares to UNOLS vessel operators.
	PI:	D.J. Fornari and J.C. Kinsey
	Agency:	National Science Foundation
	Dates:	August 1, 2009 to July 31, 2010
	Amount:	$200,000
[G2]	Title:	Development of Precision AUV Gravimeter to Enable Near-Bottom Gravity Surveys of Mid-Ocean Ridges
	PI:	D.R. Yoerger, J.C. Kinsey, and M.A. Tivey
	Agency:	Woods Hole Oceanographic Institution
	Dates:	December 1, 2007 to November 30, 2009
	Amount:	$51,658
[G1]	Title:	Improved Navigation Techniques for Deep Oceanographic Submersibles
	PI:	J.C. Kinsey
	Agency:	Edwin Link Foundation
	Dates:	September 1, 2004 to September 1, 2005
	Amount:	$25,000

Field Expeditions

[E14] **Deepwater Horizon Blowout Site**, *R/V Atlantis*, December 2010 — Deployed Sentry to map and photograph deep coral sites with potential damage resulting from the April 2010 Deepwater Horizon Disaster. Information from Sentry dives was used to plan subsequent *Alvin* dives focused on sampling. Planned AUV operations and worked with an undergraduate to develop tools for the rapid visualization of *Sentry* data for *Alvin* dive planning. Publications resulting from this cruise are [CA11].

[E13] **Barent Sea**, *R/V Marien*, September 2010 — Participated in the bathymetric mapping, photographing and water column surveys at Haakon Mosby Mud Volcano. Assisted in the planning of *Sentry* operations and processed AUV ADCP data. Publications resulting from this cruise are [A14,A13].

[E12] **Deepwater Horizon Blowout Site**, *R/V Endeavor*, June 2010 — Participated in the localization and mapping of a subsea hydrocarbon plume resulting from the April 2010 Deepwater Horizon Disaster. In addition to assisting with *Sentry* operations, processed AUV and ship ADCP data. Publications resulting from this cruise are [J9,CR5].

[E11] **Cayman Mid-Ocean Rise**, *R/V Cape Hatteras*, October-November 2009 — Using the *Nereus* HROV searched for hydrothermal vent activity along the Cayman Mid-Ocean Rise, the world's deepest ocean spreading center. On the AUV leg assisted with the navigation, control, and data processing; on the ROV leg served as the lead navigator and primary liason between the engineering and science parties. [J8,A4,A5,A6,A8,A10] are results of this expedition.

[E10] **Gulf of Mexico**, *R/V Brooks McCall*, June 2009 — Participated in using the *Sentry* AUV to map and photograph corals in the Gulf of Mexico.

[E9] **Challenger Deep**, *R/V Kilo Moana*, May 2009 — First full-ocean depth deployment of the *Nereus* hybrid ROV/AUV to the Challenger Deep. Served as the primary navigation software author and assisted in the systems engineering and control code development. Publications resulting from the expedition include [J7,CR4,CA9].

[E8] **Juan de Fuca Ridge**, *R/V Thompson*, Summer 2008 — First science cruise for the *Sentry* AUV. Contributions included control and navigation software development, systems engineering, and post-processing navigation data for use in high-resolution multi-beam maps of observatory sites.

[E7] **North Atlantic Ocean**, *R/V Oceanus*, April 2008 — *Sentry* AUV engineering cruise. Developed the navigation software used on Sentry. Also contributed to the vehicle control code and systems engineering.

[E6] **South Atlantic Ocean**, *R/V Knorr*, January 2008 — Engineering cruise investigating the use of multiple AUVs, employing acoustic modems for communication and navigation.

[E5] **Pacific Ocean**, *R/V Kilo Moana*, November 2007 — Participated in the engineering trials of *Nereus*, a hybrid ROV/AUV. Developed the navigation system used by *Nereus*. Publications resulting from the expedition include [CA7,CA6].

[E4] **Sea of Crete and Black Sea**, *NRV Alliance*, August 2007 — Served as watch navigator for the *Hercules* ROV during science operations in the Sea of Crete and archaeological excavations in the Black Sea.

[E3] **Juan de Fuca Ridge, Pacific Ocean**, *R/V Atlantis*, July 2002 — Installation and testing of navigation upgrades to the DVLNAV underwater vehicle navigation system developed in collaboration with Louis Whitcomb on *DSV Alvin*.

[E2] **Juan de Fuca Ridge, Pacific Ocean**, *R/V Atlantis*, July 2002 — Deployed DVLNAV, a new underwater vehicle navigation system developed in collaboration with Louis Whitcomb, on the *Jason II* ROV.

[E1] **Bermuda Rise, Atlantic Ocean**, *R/V Atlantis*, June 2001 — Deployed DVLNAV, a new underwater vehicle navigation system developed in collaboration with Louis Whitcomb, on the *DSL120A* robot vehicle and on the *DSV Alvin* inhabited submersible.

Education Experience

Woods Hole - MIT Joint Program, Woods Hole, MA
Thesis Committee Member for M.J. Stanway (2009-present)
Guest Lecturer — Ocean Instrumentation — Fall 2009

The Johns Hopkins University, Baltimore, MD
Teaching Assistant — Design and Analysis of Dynamical Systems — Spring 2002
Awarded the 2003 Mechanical Engineering Department Teaching Assistant Award for my work in this class.
Teaching Assistant — Sensors and Actuators — Spring 2001

Awards

- Postdoctoral Scholar, Woods Hole Oceanographic Institution, 2007.
- Link Foundation Oceanographic Engineering Graduate Research Fellowship, 2004-2005.
- IMarEST Prize for Best Paper by Young Author, 1st IFAC Workshop on Guidance and Control of Underwater Vehicles, April 2003.
- 2003 Department of Mechanical Engineering Teaching Assistant Award, The Johns Hopkins University.
- Department Fellow, Department of Mechanical Engineering, Johns Hopkins University, 1999-2000.
- Summer Student Fellow, Woods Hole Oceanographic Institution, Summer 1997.
- Member, Tau Beta Pi and Pi Tau Sigma Honor Societies, inducted 1996.

Additional Information

- **Society Memberships** — Member, American Geophysical Union; Member, IEEE Ocean Engineering Society and Robotics and Automation Society.
- **Recent Invited Talks** — WHOI Oil Spill Fourm; Naval Oceanographic Office 2010 UUV Operators Summit; Memorial University, St Johns, Newfoundland; Marine Institute, St Johns, Newfoundland; IEEE Oceanic Engineering Section, St Johns, Newfoundland; Massachusetts Future of Robotics Summit; Naval Oceanographic Office, Stennis Space Center; University of Guam; AOPE Department Seminar, Woods Hole Oceanographic Institution; Computer Science and Artificial Intelligence Laboratory, MIT; Mechanical Engineering Department, Worcester Polytechnic Institute; European Network on Marine Robotics Navigation Workshop, Killaloe, Ireland; Institute for Archeological Oceanography, University of Rhode Island; Interdisciplinary Science Seminar Series, Loyola College of Maryland; 2006 New Horizons in Science Briefing.
- **Recent Journal Reviews** — *International Journal of Robust and Nonlinear Control*, *IEEE Transactions on Robotics*, *Journal of Systems and Control Engineering*, *IEEE Transactions on Control Systems Technology*, IEEE Conference on Robotics and Automation, *Oceanography* Magazine, *IEEE Journal of Oceanic Engineering*.
- **Citizenship** — United States.