

Underwater Robotics

Chairs: Sang-Rok Oh, D. Yoerger

In-situ Attitude Calibration for High Resolution Bathymetric Surveys with Underwater Robotic Vehicles

H. Singh¹, O. Pizarro¹, L. L. Whitcomb² and D. Yoerger¹

¹Woods Hole Oceanographic Institution and ²Johns Hopkins University

- High Resolution Mapping from underwater vehicles is limited by attitudinal calibration offsets
- An in-situ methodology is proposed based on specific vehicles maneuvers
- The Jason ROV was used to collect data at archaeological sites of interest in the Mediterranean Sea
- Our technique improves upon the state of the art by an order of magnitude

An Inertial Navigation System for Small Autonomous Underwater Vehicles

X. Yun, E. R. Bachmann and S. Arslan
Naval Postgraduate School

- Low-cost, small-size navigation system for AUV
- Integrated INS/GPS with asynchronous Kalman filter
- Land vehicle test validated the approach and achieved 15m accuracy
- Post-processing at-sea data confirmed the feasibility of the system



Autonomous Underwater Simultaneous Localisation and Map Building

Stefan B. Williams, Paul Newman, Gamini Dissanayake and Hugh Durrant-Whyte
ACFR, University of Sydney

- The ACFR's Autonomous Underwater Vehicle - Oberon
- Underwater Simultaneous Localisation and Map Building
- Distributed AUV software control architecture
- Conclusions and future work

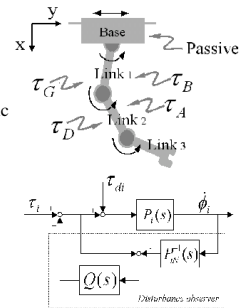


Disturbance Observer-Based Robust Control for Underwater Robotic Systems with Passive Joints

G. B. Chung¹, K. S. Eom¹, B. J. Yi¹, I. H. Suh¹ and S. R. Oh²

¹Hanyang University and ²KIST, Korea

- Motivation and Problem Statement: Difficulty in control due many hydrodynamic forces, passive mode of underwater vehicle
- Techniques and Proposed Approach: Nonholonomic motion control, disturbance observer-based robust control
- Simulation Results: Robust motion control under passive joint
- Conclusions: Disturbance observer is good for robust control of underwater robot

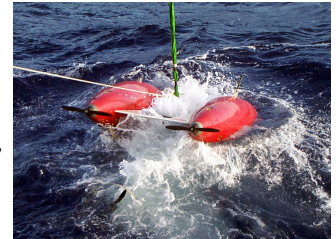


Fine Scale Seafloor Survey in Rugged Deep-Ocean Terrain with an Autonomous robot

D. Yoerger¹, A. Bradley¹, B. Walden¹, M. Cormier² and W. Ryan²

¹Woods Hole Oceanographic Institution and ²Lamont-Doherty Earth Observatory

- Fully autonomous deep sea geological survey
- Survey in rugged terrain at 2600 meters depth
- Coregistered sonar bathymetry, video stills, and magnetics
- Automated navigation, track following, and bottom following



Guidance of unmanned underwater vehicles: experimental results

M. Caccia, G. Bruzzone and G. Veruggio
Consiglio Nazionale delle Ricerche

- Free space and environment-related guidance of UUVs
- Lyapunov-based task functions handling system kinematics
- Acoustic-based estimators of the operational variables
- Free-space maneuvering and wall-following pool trials

