Towards Cooperative Cognitive Control for Autonomous Underwater Vehicles (AUV)

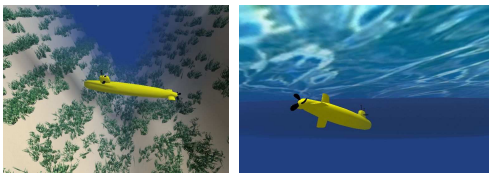
Results from the first 9 months of Co^3-AUVs project

Co^3 AUVs
Cooperative Cognitive Control for Autonomous Underwater Vehicles

Overview

The aim of the EU-project “Cooperative Cognitive Control for Autonomous Underwater Vehicles (Co^3-AUVs)” is to develop, implement and test advanced cognitive systems for coordination and cooperative control of multiple AUVs. Several aspects are investigated including 3D perception and mapping, cooperative situation awareness, deliberation and navigation as well as behavioral control strictly linked with the underwater communication challenges.

simulatorscreen shots



Simulator

- 3D visualization and physics based on UT3-USARsim
- suited for multiple vehicles; underwater communication

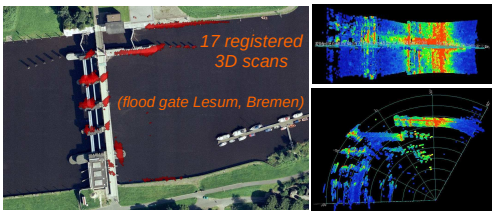
2D and 3D Mapping

- 2D registration for images and sonar data based on spectral method suited for realtime, fixed deterministic computation time
- Registration supplemented with uncertainty measures for SLAM
- 3D registration of sonar data without vehicle motion sensors

>2000 registered video frames

Underwater localization and navigation

- Real-Time Ray-Tracing for accurate horizontal distance evaluations
- Analysis of the relative localization assuming range and depth measurements
- Identified relative movements for which the localization is not possible
- Non-conventional geophysical-based navigation



Cooperative behaviors

- Behavioral control to improve relative localization
- Behavioral control for the caging mission
- Cooperative adaptive sampling
- Harbor protection
- Path planning/following for marine vehicles
- Cooperative navigation and motion control of multiple AMVs under communication constraints
- Human-vehicle communication and interaction
- Diver assistance with multiple AMVs demonstrator

Website http://www.Co3-AUVs.eu

Project Consortium

- Jacobs University Bremen (DE)
- Interuniversity Center Integrated Systems for Marine Environment (IT)
  Universita' degli Studi di Cassino, Universita' degli Studi di Genova, Universita' di Pisa, Universita' del Salento
- Instituto Superior Tecnico / Institute for Systems and Robotics (PT)
- Graaltech (IT)

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