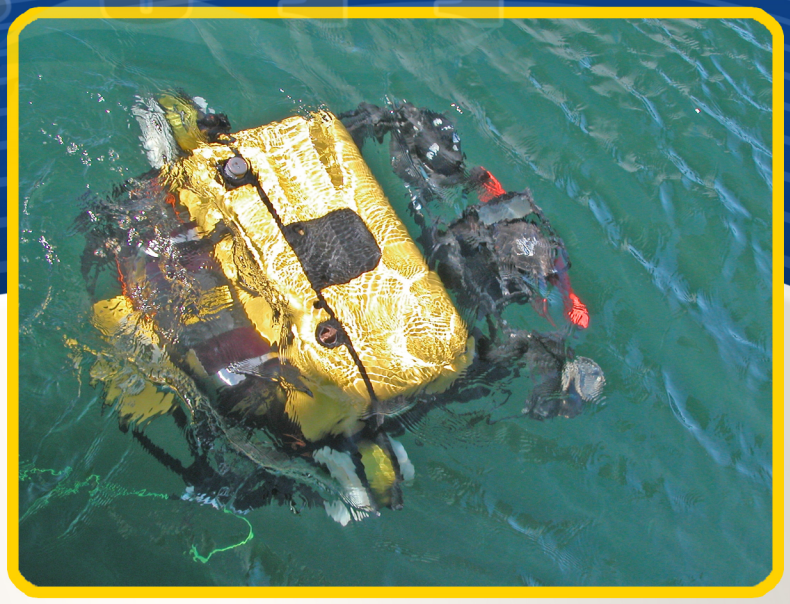
CONFINED AREA SEARCH HOVERING AUTONOMOUS UNDERWATER VEHICLE (CAS)

ONR MCM S&T DEMO 2011



NAVSEA WARFARE CENTERS PANAMA CITY

DEPARTMENT OF THE NAVY Science & Technology

NAVAL SURFACE WARFARE CENTER

NSWC Panama City

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Overview

The objective of the Confined Area Search (CAS) group is to conduct a fully autonomous, untethered, ship hull search for the detection of limpet mine-like objects using a Bluefin Hovering Autonomous Underwater Vehicle (HAUV).

Background

The current EOD Unmanned Underwater Vehicle (UUV) hull searching system is the Hull UUV Localization System (HULS) that is being fielded though PMS-408. Currently the HULS has the capability to search the Non-Complex Area (NCA) of a ship utilizing automated search algorithms (Bluefin) and requires a human operator to detect, identify and classify targets in the sonar image.

Objectives

- Develop automated algorithms to conduct searches of the Complex Areas (SeeByte)
- Plan trajectories in the Complex Areas to ensure 100% coverage (MIT)
- Improve navigation accuracy in the Non-Complex Areas using Feature Based Navigation (FBN) algorithms:
  - Sonar-based FBN (MIT)
  - Camera-based FBN (UMich)
- Automatically detect and identify HULS Type 1 and Type 2 targets in Non-Complex and Complex Areas (SeeByte)
- Mosaic DIDSON data in real time during NCA searches (SeeByte)
- Create real time 3D reconstructions during Complex Area Searches (SeeByte)
- Operate without a tether using high-speed acoustic communications (FAU)

Approach

Integrate all of the capabilities being developed to meet the objective and automate as many of the processes as possible.

Goals

- NCA Search
  - Demonstrate Automated Target Recognition (ATR) calls and Real Time Mosaics transmitted to operator via Acoustic Modem
  - Demonstrate integrated camera and sonar based FBN and Real Time navigation corrections to the HAUV path
- Complex Area Search
  - Demonstrate automated initial search
  - Demonstrate ATR calls and Real Time 3D Reconstruction transmitted to operator via Acoustic Modem
  - Demonstrate 3D Model preparation of searched area, development and execution of an automated path to fill in identified holidays in the search data (100% coverage)

Benefits

The CAS HAUV provides the full hull searching capability in a mostly automated process.

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