Open-source Backseat Driver Software Demonstrated

Bluefin Robotics and the Laboratory for Autonomous Marine Sensing Systems (LAMSS) at the Massachusetts Institute of Technology (MIT, USA) recently installed and demonstrated MOOS-IvP on a two-man portable Bluefin-9 AUV. Once in the field, the system was able to transmit wavelet-compressed side-scan sonar images via an acoustic modem and display them on the topside command and control console.

The MOOS-IvP autonomy system is a set of third-party, open-source C++ modules that provide autonomy for robotic platforms. The joint effort took very little time with just a few days of testing on a virtual machine, one day in the lab performing the integration into the vehicle, and two days at-sea in Boston Harbour.

The use of MOOS-IvP propels the state of AUV autonomy into the next phase. It allows users to develop new behaviours and smart payloads. Instead of directing the AUV to follow a pre-planned survey, users can instruct the vehicle to change its behaviour based on payload data it collects in real-time. For instance, the AUV could descend to a certain water temperature and follow a thermocline based on the CTD data.

Results of this project will be presented by Chris Murphy and Toby Schneider at the MOOS Development and Applications Working Group Meeting scheduled for 19-20 July in Cambridge, Massachusetts.

In the past, the MOOS-IvP autonomy system was integrated into two Bluefin-21 AUVs' payload sections alongside various acoustic sources and arrays for underwater acoustic research. A separate, dedicated computer was used for the payload and the MOOS-IvP software. In cases like the Bluefin-9 which already has a payload, MOOS-IvP autonomy system was integrated directly onto the existing main vehicle computer so no hardware modifications were required. The MOOS-IvP software interfaced with the Huxley operating system via a standard Bluefin payload interface. Through this means, core vehicle data was shared and MOOS-IvP operated as a backseat driver.

This project was sponsored by the Office of Naval Research (ONR) with supplemental support by Bluefin Robotics. Development of MOOS-IvP is sponsored by the ONR code 311. The adaptive and collaborative environmental acoustic research performed in LAMSS is funded by ONR code 322OA.