Identification of Wave Environments that Degrade the Performance of AUVs Operating Near-Surface

**BACKGROUND**

- Growing U.S. Navy interest to increase the use of autonomous underwater vehicles in a wide range of operational missions to support the warfighter
- Currently AUVs used primarily in deep-water mission operations
  - Degraded performance occurs due to strong underwater currents
- Next generation of missions will require AUVs to operate near-surface in waves
  - Missions include ISR, networked communication, and near-shore operations
  - Unknown how severe degraded performance will be due to wave-induced loads in certain wave environments
- Naval Postgraduate School has the tools required to address this issue:
  - New wave-generating tow tank in Halligan Hall
  - Currently unused micro-AUV resides on campus

**IMPORTANCE**

- Warfighter is increasingly depending on unmanned systems to support operations
  - One such system is man-portable micro-AUVs
  - It is critical that the warfighter understand how the operating environment of the micro-AUV will potentially degrade its performance
  - Degraded performance may cause the AUV to be unable to complete its required mission and put the warfighter at risk

**METHODOLOGY**

- Multi-disciplinary approach involving the SE and MAE departments and incorporating hydrodynamics, autonomy, and controls in experimental testing
  - Testing a man-portable Bluefin Robotics SandShark micro-AUV
  - Investigate how wave environments degrades the ability of the AUV to maintain desired speed, depth, and heading
  - Continues the creation of a new Navy relevant research program by NPS faculty with involvement from students:
    - 3 previous MS theses students
    - 2 previous STEM summer interns

- Follow-on work partnerships with NSWC-Carderock and UC-Berkeley possible

Experimental testing of a micro-AUV in various wave environments to provide operator guidance to warfighter.

**FY19 Call for Proposals**

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