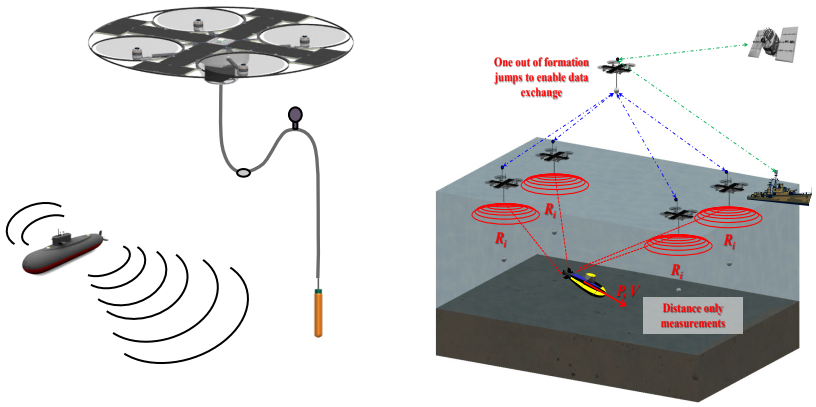
Acoustic Vector Sensing from Novel Autonomous Systems Using Light-Weight, Low-Power Data Acquisition Systems

CRUSER
Consortium for Robotics and Unmanned Systems Education and Research



Concept of operations for networked platforms, such as AquaQuad, using tethered acoustic vector sensors.

Technical Approach

- Development of light-weight, low-power data acquisition systems for acoustic vector sensing from distributed systems.
- Determination of capabilities achievable from tethered sensors, including surface noise reduction and sufficient signal transmission through the tether.
- Evaluate performance of adaptive processing strings to estimate bearing to targets of interest from tethered sensors.
- Evaluate performance of high data rate RF comms to transmit snippets of raw acoustic data to shore-based station for coherent/semi-coherent processing.
- Investigate capabilities of multiple systems to localize acoustic targets of interest.

Background

- Small form-factor acoustic vector sensors have been developed for the US Navy to provide directional information from single sensors.
- Previous work at NPS integrated such sensors onto autonomous UUVs to examine capabilities of such systems at providing bearing estimates to targets of interest.
- Analysis of data collected during FY15 showed good bearing resolution could be achieved by systems utilizing single sensors.
- Work at NPS and in collaboration with NUWC-Keyport has been initiated to develop low-power data acquisition systems for use with acoustic vector sensors tethered from surface platforms.

Research Goals

Successful outcomes of this research effort will support the following goals in future operations:

- Enhance the capabilities of autonomous systems to collect directional acoustic data without compromising weight or power requirements.
- Provide an effective means of tracking acoustic targets of interest by combining bearing estimates from multiple distributed systems.
- Advance the state-of-the-art capabilities in coherent processing between independent, distributed autonomous systems.

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FY18 Call for Proposals

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