

Closing the Experimental Gap in the Search and MCM Communities



Naval
Postgraduate
School



NPS's SeaFox USV and REMUS 100 AUV

- Utilize available underwater and surface vehicle at NPS's Center for Autonomous Vehicle Research (CAVR), such as the SeaFox USV, the Kingfisher USV, and the REMUS 100 AUV
- Deploy simulated targets over predetermined search region
- Implement path planning using interpolation and GPS-tracking
- Compare detection performance of 'optimal search' trajectory to several other historical strategies
- Initial experimental runs in Monterey Bay with possible extension to Lake San Antonio and Lake Nacimiento

- Experimentally verify the effectiveness of search trajectories generated using the theory of 'optimal search'
 - Generate theoretically optimal search paths based specific vehicle, sensor, and terrain characteristics
 - Test their performance at detecting deployed targets such as sensor reflectors and mine shapes
 - Compare their performance to performance of traditional geometric strategies such as lawnmower sweeps

- Over last few years, research out of NPS has substantially progressed our motion planning abilities for utilizing mobile sensor platforms.
 - We can now generate optimal search trajectories which take into account vehicle dynamics, sensor characteristics, and prior environmental knowledge, and we can do this for multiple heterogeneous vehicles acting collaboratively.
- *But the effectiveness of these theoretical search methods has not been experimentally verified!*
- Experimental verification will facilitate the goal of creating efficient, equipment-based strategies for mobile and/or autonomous sensor platforms.