Practice Test Bed – Bay Site

- 15 surrogates deployed to demonstrate initial concept of operations (CONOPS)
- Selected practice site in protected waters with similar sediment composition
- St. Andrew Bay

Underwater Test Bed for Technology Demonstration
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Abstract: This year, two nearshore sites were used to test deployment and retrieval strategies needed to establish a test bed for evaluating underwater unexploded ordnance (UXO) detection and remediation techniques. One of these locations is the most critical in the Northern Gulf of Mexico (NGOM) due to human encroachment. However, since UXO UXO test bed in nearshore areas presents challenges for maintaining required ground truth, as this region of very shallow water may be both hydrodynamically energetic and morphodynamically active, surrogates UXO deployment at shallow water depths is normally avoided using line connecting targets to removable elements, such as anchors and clamps. However, since live UXO targets do not allow for seawall platforms (e.g., crawlers, sleds) that may be used to carry sensors in the nearshore. Additionally, these lines may be detected in the sensor responses. A deployment process to minimize the use of horizontal lines was sought this year by experimenting with deployment strategies that weight targets to minimize lateral movement under environmental forcing conditions and removable grids to maintain position ground truth. Environmental conditions were monitored in the target range to establish a baseline environmental characterization, understand target behavior (e.g. overburden) and support modeling and simulation. Descriptions and results of these efforts are presented.

Problem Statement
Demonstrate a process to set up a test bed for assessing the performance of sensor systems for finding near-shore underwater unexploded ordnance (UXO).

Technical Objectives
- Efficient set/recovery process
- Ground truth maintained over span of set & testing
- No artificial interference with sensor or sensor platform operation
- Lines normally used to locate/recover UXO can be detected in the sensor responses
- Pingers attached to UXO for location/recovery can interfere with sonar and active EM performance

Technical Approach
- Use practice field to test possible strategies for test bed set-up that meet requirements.
- Collect data to establish a baseline environmental characterization for demo tests in the area as well as promote the understanding of target behaviors (e.g. overburden) and support the modeling and simulation relevant to predicting target mobility and burial in nearshore test beds.
- Can minimize UXO movement by
  - Scheduling tests during benign weather periods
  - Loading surrogates UXO is suitable density to inhibit mobility

Pilot Test Bed – Gulf Site

- DOPRA-4
- Northern Gulf of Mexico
- Southern shore of Shell Island
- 2 miles east of the island
- 0.5 m depth

Interpolated bathymetry

Pilot Test Bed – Gulf Site

- UAS survey, 29 Sep
- Manta/MANTAS survey, 2 Oct
- REMUS (ROV) STS survey

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Environmental Effects – Gulf Site
31 JUL 2020
• Remus 100
• AUG 2020
• Deployed in situ
• Hurricane Marco
• 27 AUG 2020
• Hurricane Laura
• 16 SEP 2020
• Hurricane Sally
• 2 Oct 2020
• Manta Survey
• 28 SEP 2020
• Recovered in situ

Target Field Observations – Gulf Site
5 Aug – Divers deployed target field
5 Sep – Divers recovered field
- Targets were deeply buried and unable to be visually inspected.

25 Sep – Diver inspection performed on target field
- Compared to the effects taken associated with the target field were still in place and the trunk line was still visible, while all targets were buried.
- Dive team attempted recovery and data collection on the target field.
- One of the sand augers was loose. The trunk line was still visible on the surface (5/8” double braid) and the target line (550 cord) were visibly attached to the trunk line and then buried.
- Divers located and recovered 3 targets each of which were originally placed or flushed buried. The targets were located buried in a vertical orientation with the eye bolt up and the target line down.
- Attempts to dig out additional targets were unsuccessful. Additional tools (paddle, pump) and personnel will be needed to successfully recover the remaining 17 targets.
- None of the inert targets initially left proud had any expression on the sand surface.