Coalition Underwater Mine & IED Defeat (CUMID)

Presentation to
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UNCLASSIFIED//REL USA, CAN, NOR
Objective: Increase effectiveness of mine counter-measures by maturing and incorporating techniques for *automated seabed change detection* (ACD)

- Automatically detect differences in before/after sonar images of the same scene
- Improve detection performance
  - Reduce false alarm rates through removal of stationary clutter; Increase fraction of huntable seafloor areas
- Increase detection rates for objects with Low signatures or Unknown signatures (IEDs)

Technical Focus Areas:
- Algorithm robustness
- Performance assessment
- Operator displays, tools and decision aids
SAS Image-Based ACD Historical Timeline

1990
- CA Blink Comparator
- Manual & Contact Correlation Change Detection Tools for SLS

2010
- 1st Image Correlation ACD Exp with SLS
- 1st Image Correlation ACD Exp with SAS
- SAS ACD Programs Commence

2015
- SAS ACD Key Experiments Larvik / Panama City / Italy
- Baseline ACD-Processors
- SAS ACD Key Publications
- CUMID Partnership Established
- CUMID WKSHP CA
- NATO WKSHP IT

2020
- SAS ACD Simulations
- CUMID Operator Summit Part 1 Panama City, USA
- US ACD Technique Meets EOD TTA Requirements
- EOD MOEs Established
- Signing of ICE-PPR MOU
Leverage team strengths in algorithm development.

Performance prediction:
How well will it work in the future?
What is required resurvey frequency?

Performance estimation:
How well is it working now?

Emphasis on Operational Decision Aid that is Physical, Chart-based, Intuitive, and Straight forward to use.
**CUMID Schedule / End-State / Challenges**

- **Anticipated End-State**: Introduction of ACD into Naval MCM tools for improved hunting in cluttered areas and for new threat identification.

- **Challenges**: Covid-19 posture complicates interactive workshops.
  - Mitigation: CY2020 and early CY2021 workshops conducted virtually. Follow-on workshops in person if possible.

- **Related efforts**
  - US MK18 MOD 2 Program of Record
  - Potential for joint experimentation in BALTOPS experiments

### Table: CUMID Schedule

<table>
<thead>
<tr>
<th>CY2021</th>
<th>CY2022</th>
<th>CY2023</th>
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<tbody>
<tr>
<td>Improve robustness of image-based ACD algorithms</td>
<td>Draft requirements and specifications for ACD performance assessment</td>
<td>Architect operator displays, tools and decision aids</td>
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<tr>
<td>▲ CUMID PA Signatures</td>
<td>▲ CUMID Workshop US</td>
<td>Summary Workshop</td>
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<td>▲ Operator Summit Pt 2</td>
<td>▲ NATO Workshop Pt 2</td>
<td>Final Report Deliverables</td>
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<tr>
<td>✡ Mar 31: SNNR Forum</td>
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<td>Commence Development of Performance Prediction Tools &amp; Next Gen ACD</td>
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