Dynamic Minefield Operation (DMO)

**WHAT**

**Operational Need and Improvement:** Fleet planners have no tools for determining how best to locate, utilize, and deploy precision and advanced maritime minefields in order to maximize their warfighting contribution. Current fleet tools only evaluate the effectiveness of randomly placed conventional maritime mines.

**Specifications Required:** Need to optimally locate, utilize, and deploy precision and advanced maritime minefields.

1. Current approaches randomly distribute mines in an area.
2. Need to evaluate and optimize precision placement of mines and advanced sensors/effectors for multiple maritime minefields.
3. Need to evaluate and optimize precision placed mine and advanced sensor/effectector delivery plans for multiple maritime minefields.

**Technology Developed:** Dynamic Minefield Optimization (DMO) evaluates and optimizes precision placement of mines and advanced sensors/effectors for multiple maritime minefields. It also evaluates and optimizes precision placed mine and sensor/effectector delivery plans for multiple maritime minefields.

**Warfighter Value:**

1. Significantly more effective use of precision placed mines and sensors/effectors.
2. Significantly more effective use of precision placed mine and advanced sensor/effectector delivery resources.
3. Higher probability of defeating threat submarines and surface ships.
4. Reduced vulnerability of friendly forces to threat submarines and surface ships.
5. Reduced planner time-on-task and much faster response to operational changes.

**HOW**

**Projected Business Model:** Daniel H. Wagner Associates designs, develops, markets, implements and provides training for custom decision support, resource optimization, and data fusion software. Our goal is to support Navy program offices and collaborate with defense contractors to integrate these advanced decision support, resource optimization, and data fusion solutions for ship and aircraft platforms. Examples of successful transitions include:

1. Computational modules for evaluating and optimizing mine countermeasures (MCM) operations and estimating risk in MINEnet Tactical.
4. Net-Centric Data Fusion (NDCF) for USW-DSS.
5. Data Fusion Engine (DFEN) in USW-DSS.

**Company Objectives:** Rapidly and cost-effectively integrate operationally effective components into larger command and control systems.

**Potential Commercial Applications:** Enhancements to commercial sensor placement systems (e.g., harbor defense, facility protection).

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**WHO**

**SYSCOM:** ONR

**Sponsoring Program:** PMS 495

**Transition Target:** MINEnet Tactical

**TPOC:**
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**Other transition opportunities:**
Harbor defense, facility protection, System with distributed sensors

**Notes:** Figure shows Optimal Allocation of Mines and Ship Count Settings to Maximize Average Damage to Threat

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**WHEN**

**Contract Number:** N68335-17-C-0052  **Ending on:** January 23, 2019

<table>
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<th>Milestone</th>
<th>Risk Level</th>
<th>Measure of Success</th>
<th>Ending TRL</th>
<th>Date</th>
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<td>Optimize precision placed mine locations/settings</td>
<td>Low</td>
<td>Successful test in Wagner lab</td>
<td>5</td>
<td>1st QTR FY18</td>
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<tr>
<td>Optimize precision placed mine delivery</td>
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<td>Joint optimization of precision placed mine locations/settings and delivery across multiple maritime minefields</td>
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<td>Successful test in Wagner lab</td>
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**Image:** Mine Locations for Channelled Penetrator Designed to Maximize (Avy of the TP)