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DIN PILOT PROJECTS: PROBLEM STATEMENT 5
MINE COUNTERMEASURES

PROBLEM

Naval mines have sunk or damaged more ships since the end of World War II than all other weapons combined. A naval ground mine covered by 6 mm of sand is almost impossible to detect with sonar, and, in general, will be discovered only when a target attracts its attention. Ground mines have a wide variety of influence activation methods: acoustic, magnetic, pressure, and electric potential. Activation methods can be combined to provide a more specific set of criteria when defining a target; this capability also makes them harder to sweep and clear.

Some modern ground mines can burrow into soft bottoms while maintaining their ability to detect, at a minimum, magnetic signatures. Contemporary ground mines can be laid by submarines, surface ships, aircraft, and small fishing vessels – just about anything that can carry mines.

NEED AND RELEVANCE TO DEFENCE

Mine Countermeasures is one of the most difficult and time-consuming missions for navies to successfully execute. In terms of availability, variety, cost-effectiveness, ease of deployment and potential impact on naval expeditionary operations, mines are some of the most attractive weapons available to any adversary determined to prevent Joint or coalition forces from achieving access to sea lines of communications or the littorals.

The threat of naval mines is one of the key challenges that drives our emerging need to once again compete for freedom of movement on the world's oceans, as well as in the littorals. Emerging technologies may offer Navy the ability to bridge this gap and usher in a true 21st Century renaissance in Mine Countermeasures.

RESEARCH QUESTIONS

Using existing sonar (acoustic) information from typical Unmanned Underwater Vehicle (UUV) or Remotely Operated Vehicle (ROV) sonars, can new types of analysis provide more information than common frequency domain methods to detect features of buried mines? What new sensors could be deployed on UUV or ROV for buried mine detection?

How can detection be improved using data fusion methods by combining data from different sensors and measurement techniques?

EXPECTED OUTCOMES

New types of analysis of existing sonar (acoustic) information that can be used to detect and identify buried mines. New types of sensors that can be integrated into UUV/ROV. Development of efficient algorithms to implement the analysis that can be implemented in real-time on embedded UUV/ROV processing systems.