Performance Analysis & Training Tool (PATT)

Assess MCM Capabilities

SeeByte's SeeTrack Performance Analysis and Training Tool (PATT) can be used to assess the Mine Countermeasure (MCM) capabilities of a complete MCM system. Such capabilities are generally evaluated through expensive sea trials that only use a small number of targets.

To address this problem, PATT inserts multiple simulated targets into real side-scan sonar data, allowing accurate quantitative estimates to be obtained. The simulated targets have realistic sensor performance qualities added to them as part of the process.

This Augmented Reality approach quantitatively measures the capability of either an operator or an ATR algorithm to effectively clear a survey region.

Accurately assess target recognition capability:

The key to PATT relies on accurately inserting simulated, ground-truth targets into real sensor data. Evaluation results can therefore be obtained against a variety of controlled ground truth parameters such as sonar range, target type, target orientation and environmental constraints to the sensor (surface return, shadow, obstruction, noise).

PATT may also be used for autonomous underwater vehicle (AUV) re-planning to maximize sensor performance in terms of reliable MCM capabilities. Automated mission planning, risk analysis, and Q-route planning can also use the output from PATT.
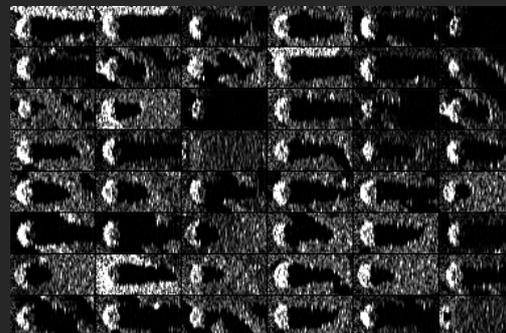
Sidescan image with the simulated contacts

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Specifications

Core features of PATT:

- **Sidescan Object Simulator:** This is used to accurately insert simulated, ground-truth targets into real sensor data. Evaluation results can be obtained against a variety of controlled ground truth parameters such as sonar range, target type, target orientation and environmental constraints to the sensor (surface return, shadow, obstruction, noise).

- **Statistics Toolbox:** Carries out performance analysis of marked contacts compared to ground truth. It uses a ground truth data layer, that can come from the Sidescan Object Simulator or an operator generated contact layer in SeeTrack, to produce Receiver Operating Characteristic (ROC) curves.

- **ATR Selection:** Allows an advanced operator to update the set of detectors to be used and to deploy a different tuned ATR algorithm.

- **Tuner Exporter:** Allows the operator to export the sidescan data and contact data of a mission to a zip file. The zip file can then be imported by the sidescan classification tuner, which is a tool that allows an advanced operator to retune the SeeByte ATR System.

Further details:
PATT requires SeeTrack and the SeeTrack ATR system.

Training:
The ability to accurately insert simulated targets into real sensor data also provides the opportunity to train operators in a wide variety of scenarios. The operator's performance can be quantitatively assessed and areas of weakness developed through further specific training.

Customise target types:
PATT is provided with a small set of hard-to-detect, standard target shapes that are currently used in the system. These models are represented by a height map where each value in the map represents the elevation of the target. 3-D models of targets or Improvised Devices may be drawn up in a commercial package such as Google Sketch Up and then converted into the required PATT format. This ensures that PATT may be constantly updated to include new targets when evaluating and training new operators and ATR models. Training the ATR algorithms must be done by a certified SeeByte operator.

ATR Evaluation: Probability Detection (PD)