

## A Marine Object Manager for Detected and Database-stored Features

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The combination of information present in bathymetric and imagery-based products is a key requirement for any modern feature-detection approach that aims to be adopted in coastal areas whereas the seafloor is deep enough that optic means are not reliable. If the data sources and the processing involved are correctly weighted in a fusion algorithm, the detection task can be extended beyond a simple binary (presence/absence) decision to provide a meaningful metric that evaluates confidence in the presence of new features. In combination with other existing information (such as that present in ENCs), this metric can become a proxy for areas with high probability of change (for features to be either added or removed) with respect to the baseline knowledge of the area. The dual, and partially contradictory, goals of such a system are to highlight areas with high probability of change, and to use the existing nautical documentation as a spatial filter to resource consumption on known features. Determining an appropriate balance between these is an interesting challenge.

Based on such considerations, this work describes an approach for how to effectively assist data analysts in combining the results of different target detection algorithms, as well as in comparing such results with existing features present on ENCs and geographic databases (e.g., spatial DBMS). The main goal is to help the analyst in focusing on specific areas (with higher likelihood of new features), prioritizing them on safety-of-navigation criteria and reducing the common pitfall of subjectivity in the processing workflow. Although mainly aimed at reducing the “ping-to-chart” time, the approach is also well suited for different scenarios such as rapid response to the short-term increase in marine debris deposition related to major events like hurricanes and floods.

These concepts are tested and demonstrated by a Marine Object Manager application prototype that uses real acoustic data products, existing nautical documentation, and publicly available geospatial services to support analyst decisions. The application also supports a schema-based mechanism for consistent data exchange and content validation.