SSO 2008

Interactive 3-D visualization and analysis of multi-sensor, multi-resolution data sets

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This paper is a follow-on from papers of the same title presented at previous International Conferences on Shallow Water Survey Technologies in Sydney, Australia, October 1999 and November 2003, and Portsmouth, USA 2001. It will present recent developments in interactive 3D visualization that deal with the ever-increasing volumes of data from the variety of emerging shallow water sensors in the common dataset and elsewhere.

The nine-year period since the first conference in 1999 has seen significant advances in the sensor technology and the ability to map the seafloor. However the new techniques produce massive and diverse data sets that can challenge the ability to process and manage the data. The great density of these data, however, offers the opportunity to take advantage of automatic processing combined with interactive 3D visualization techniques to improve the efficiency and accuracy of processing, and reveal an unprecedented perspective of seafloor morphology and processes.

The combined presentations from the previous conferences illustrated the evolution of the use of 3D visualization, processing and analysis, with the:

- Combination of 3D objects from the common dataset in a scene, such as digital elevation models, draped sonar imagery and sub-bottom seismic data.

- First implementation of an area based processing approach for multibeam sonar data undertaken jointly with the US Naval oceanographic Office under a Cooperative Research and Development Agreement.

- Extension of the area based processing and analysis to a range of multibeam sonar, and hydrographic and topographic lidar systems in the common datasets.

In this year's presentation of the current common dataset we extend data integration capabilities to include the processing of backscatter from a number of the sonars and direct integration in the 3D scene. The processing was undertaken in a module that originates from Geocoder, a development from research at the Center for Coastal and Ocean Mapping/ Joint Hydrographic Center at UNH.