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Integration and Visualization of Multiple Data Types for Deepwater Facilities Planning

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This presentation shows results of a visualization method used to display and analyze multiple data types in a geospatially referenced three-dimensional (3-D) space. The integrated data types include sonar and seismic geophysical data, pipeline and geotechnical engineering data, and 3-D facilities models.

Key technological components of the method are: 1) high-resolution geophysical data obtained using a newly developed autonomous underwater vehicle (AUV), 2) 3-D visualization software that delivers correctly positioned display of multiple data types and full 3-D flight navigation within the data space and 3) a highly immersive visualization environment (HIVE) where multidisciplinary teams can work collaboratively to develop enhanced understandings of geospatially complex data relationships.

Visualization of these data collectively in proper 3-D orientation yields insights and synergistic understandings not previously obtainable.

The initial study focused on an active deepwater development area in the Green Canyon protraction area, Gulf of Mexico. Here several planned production facilities required detailed, integrated data analysis for design and installation purposes. To meet the challenges of tight budgets and short timelines, an innovative new method was developed based on the combination of newly developed technologies. Key benefits of the method include enhanced understanding of geologically complex seabed topography and marine soils yielding safer and more efficient pipeline and facilities siting. Environmental benefits include rapid and precise identification of potential locations of protected deepwater biological communities for avoidance and protection during exploration and production operations. In addition, the method allows data presentation and transfer of learnings to an audience outside the scientific and engineering team. This includes regulatory personnel, marine archaeologists, industry partners and others.