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The Atlantis OBS Project Overview

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Abstract
The Atlantis ocean bottom seismic (OBS) project applied the technology of deepwater node seismic acquisition in an effort to achieve high-quality subsalt imaging. As the first large-scale deepwater seismic acquisition survey to obtain data from autonomous nodes, the survey fostered innovations in node manufacturing, node deployment, and survey design. Over 900 nodes were produced in nine months. Deployment equipment included specially designed skids, two remotely operated vehicles (ROVs), and an advanced navigation system. Intensive modeling provided an initial assessment of optimal node spacing and node layout grid. Further considerations of operational costs, geophysical criteria, and processing requirements led to a final survey design of approximately 6 nodes/km^2 in a hexagonal sampling pattern, divided into two patches. The Atlantis OBS project successfully took a complex technology directly from inception to deepwater application, bypassing the gradual progression from shallow to deepwater implementation that has been standard for most deepwater technology. The documentation of lessons learned during the course of the project offers insight not only into how to conduct additional OBS node surveys, but also how to manage a large-scale technologically complex project.

Introduction
This paper is one of a group of papers[1-5] that collectively describe the development of deepwater ocean bottom seismic (OBS) acquisition technology, a novel technology that is currently (February 2006) being applied at a commercial scale over the Atlantis Field in the Gulf of Mexico. Taken together, these papers present a case history in how a staged development process, rigorously managed, can substantially accelerate the pace of E&P innovation. This case history records the development of this technology from definition of the problem to execution of a large scale field trial.

The Atlantis OBS project is unprecedented in directly applying a significant and extensive new technology to the deepwater environment without conducting a lengthy series of shallow water surveys first. Sea trials provided a successful test of the concept on a limited scale (Openshaw and Beaudoin[3]), and the lessons from the sea trials guided the planning and execution of the at-scale application.

This paper traces the execution of the large-scale project from equipment manufacture and survey design to field operations. The scale of the project and the use of innovative technology posed innumerable challenges in system operation and in project execution. Although some of the issues were unique to the Atlantis OBS project, others were characteristic of any large-scale deepwater project. This paper demonstrates that operating a new technology on a large scale requires a systematic and intensive effort.

Background
The central business challenge that underpinned the Atlantis OBS project was the lack of consistent, high-quality illumination of subsalt reservoirs in the Gulf of Mexico. This problem has made the development of these reservoirs potentially more costly. Determining the number and location of development wells, planning sidetracks, and reservoir modeling are key development activities that will carry higher risk when all or part of a reservoir is poorly illuminated. The right-sizing of field facilities is also made more difficult when reservoir structure cannot be accurately mapped from existing seismic. The Atlantis Field, discovered in 1998, is a case in point. In **Figure 1** we show a depth slice (an extraction of seismic data along the constant depth axis) of the Atlantis structure. The southern flank of the structure extends outboard from the edge of the complex salt mass overlying the rest of the field.