

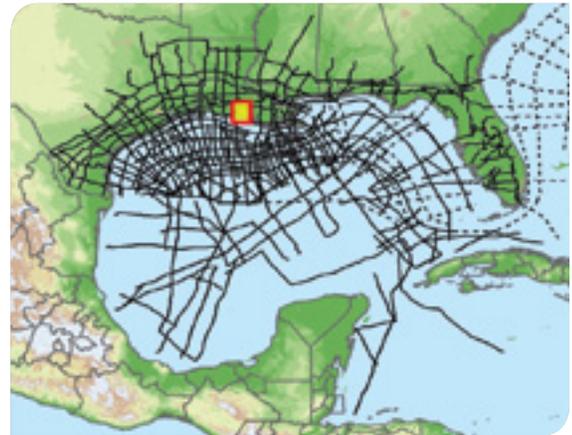
# GulfSPAN 3D FTG

3D FTG Integrated with Sparse 2D Seismic Data

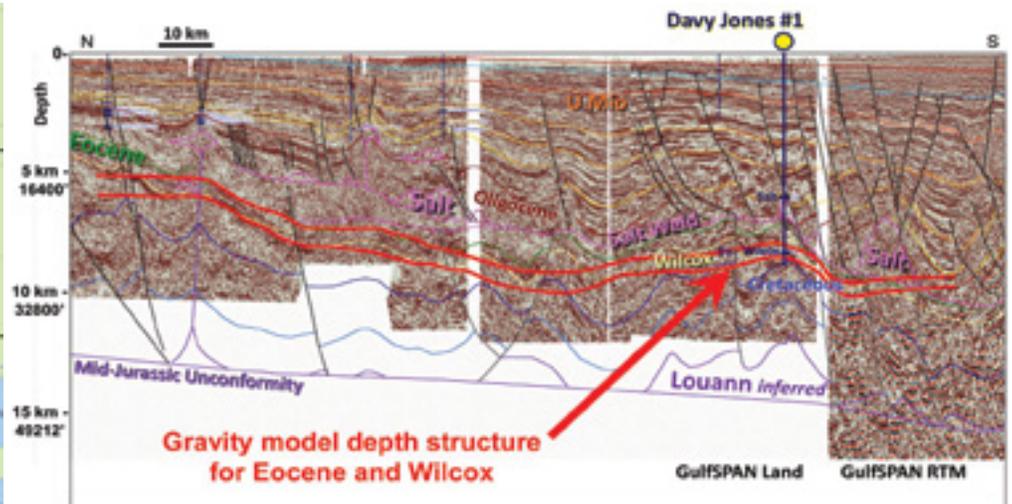
ION and ARKeX have completed a pilot project for a new and innovative integration of the modern, multi-attribute (tensor), airborne gravity survey by ARKeX, called gravity gradiometry, with the regional PSDM seismic data from ION's GulfSPAN™ survey. The goal is to integrate a sparse set of seismic lines and a database of wells that have high resolution depth imaging, with the power of a gravity gradiometry survey that has high resolution 3D spatial imaging to provide a much enhanced interpretation of the Paleogene/ Mesozoic structural framework.

The result is a workstation compatible 3D earth model that best fits all the data. This project solves long-standing problems for exploration. ION's GulfSPAN data delivers deep imaging of the less explored areas of the basin but at sparse intervals. Seismic and well log delineation of the shallower Miocene and Sub-Miocene growth fault systems can be achieved, but the extrapolation from line to line is not constrained. Well control for deeper units is rare or nonexistent. Use of the gravity gradiometry survey is an efficient and cost effective way to approach a 3D view of the subsurface that serves a multitude of scanning functions for exploration groups. In addition, the data will also be used to improve the velocity model for reprocessing of existing lines and the processing of new onshore GulfSPAN lines.

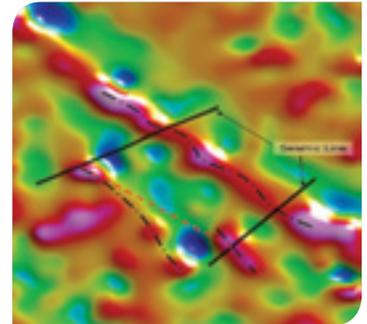
The gravity gradiometry data was collected by ARKeX with its state of the art FTGeX technology deployed in a twin-engine aircraft. The area comprises of a 3,100 sq. mile survey over the Gulf Coast and includes the recent Davy Jones discovery in its South West corner. There are many gaps in the seismic data coverage along the transition zones of the Gulf Coast due to swampy areas and bays with population and environmental sensitivities. Gravity gradiometry provides a tool for expanding the interpretation through areas with no previous data coverage or areas where the data coverage is variable.



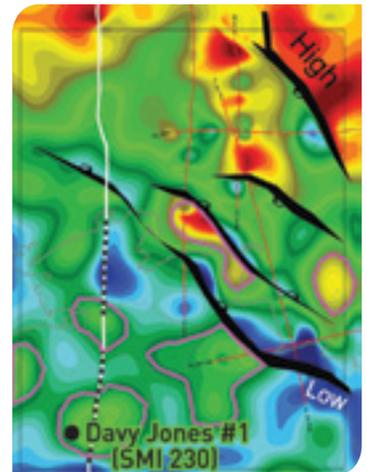
Completed/currently in progress: 42,000+ miles  
Planned for 2015 and beyond: 22,000+ miles



The real world data example shows how an interpolation between seismic lines can result in an incorrect interpretation of the fault geometry. From the seismic data lines below, it can be seen that two faults are interpreted on each of the lines. However, the gravity gradiometry data illustrates that not all the information needed to properly extrapolate the fault geometry is available from a sparse 2D grid of seismic data. The gravity gradient data used in conjunction with the seismic data gives a more complete picture of fault geometry.

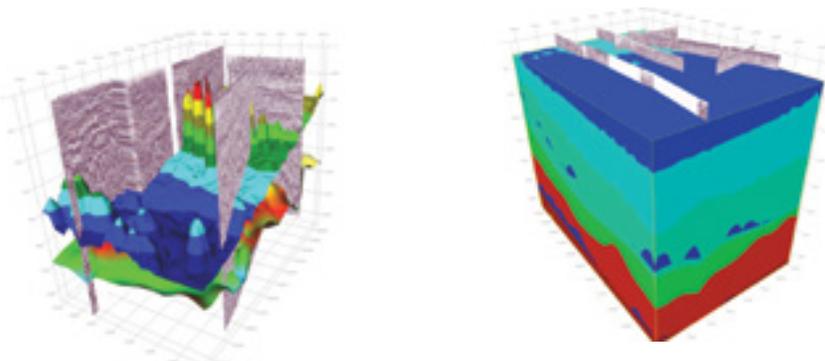


The integrated gravity gradiometry product results in a 3D earth model. This enhanced interpretation is developed when a gravity gradiometry derived model is coupled with access to pre-stack depth seismic data and available well log data to enable an improved petrophysical template, principally in the velocity/density relationship.



The cube is the result of application of an integrated gravity gradiometry and seismic interpretation which creates a much improved earth model in areas where seismic data is sparse. This data cube is workstation compatible and can be updated as new control data is acquired.

In addition to the ability to assist with interpolation of faults, the gravity gradient data set was used to improve the velocity model. By providing an additional geophysical method to help constrain the seismic velocity model, a more accurate model can be derived. Offline gradients are actually measured giving increased fidelity to feed into a better interpretation and depth migration of 2D seismic data.



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## ABOUT BasinSPAN™

BasinSPAN surveys are geologically inspired, basin-scale seismic data programs acquired and depth-imaged using the most advanced geological and geophysical processing tools available. They provide upstream companies with the ability to evaluate the geologic evolution, deep basin architecture and depositional and structural histories of entire petroleum systems in a region. Our global 2D BasinSPAN library consists of data from virtually all major offshore petroleum provinces providing asset managers significant risk mitigation as they develop exploration and appraisal programs with greater confidence.

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