

Unconventional Reservoir Imaging & Characterization

SHALE PLAY CHALLENGES

Natural gas production from unconventional reservoirs, and shale resource plays in particular, is one of the most rapidly expanding trends in onshore exploration and production today. Key challenges associated with shale play exploration and production revolve around ensuring an efficient and cost-effective drilling program and defining a drainage strategy that will maximize shareholder value creation. ION's GeoVentures group offers solutions that addresses these key challenges.



ION'S INTEGRATED SEISMIC SOLUTIONS OFFERING

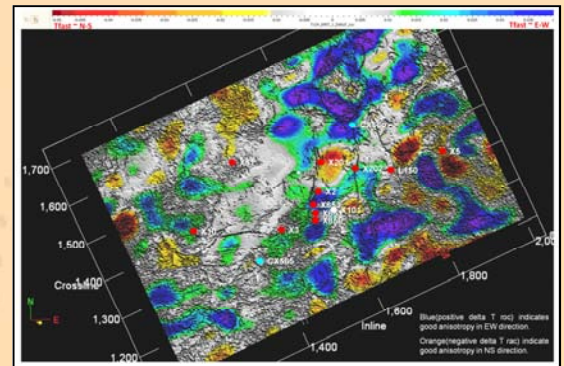
ION offers a start-to-finish, Image-Driven™ approach that reduces uncertainties associated with acreage assessment, drilling, and well performance. With this approach, oil & gas companies are able to:

- Understand the extent, varying thickness, and primary fairway of the play for acreage assessment
- Know where to steer horizontal wells in order to stay in zone and avoid geo-hazards such as faults and karst zones, minimizing the time to drill and complete each well
- Estimate in-situ stress conditions and characterize the density and orientation of the naturally occurring fractures for "sweet spot" mapping and the definition of a development drilling program that maximizes the number of high performing wells
- Understand rock properties such as reservoir and frac barrier brittleness for the design of cost-effective hydraulic fracturing and improved well performance

Whether working on a 2D program for regional geologic insight, 3D P-wave surveys with the objective of delivering high-quality structural imaging, or full-wave surveys aimed at solving geophysical challenges that require a more complete measurement of the seismic wavefield using multicomponent technology, our offering starts with close collaboration with our customers to fully understand and define their interpretation objectives. Survey parameters, acquisition technologies, and processing applications are then defined to deliver customized seismic imaging that will meet these objectives.

Our full integrated seismic solutions offering emphasizes the value-added elements of the seismic workflow and is provided using both multi-client and proprietary commercial models.

- Feasibility studies
- Survey design, planning, and permitting
- Acquisition using advanced technologies



This attribute map shows fracture orientations in a reservoir interval. The blue and purple areas indicate a single set of east-west oriented fractures; the yellow and red areas represent north-south fractures; the green indicates areas with a dual fracture set.

ION'S INTEGRATED SEISMIC SOLUTIONS OFFERING (Continued)

- Data processing by ION's GX Technology
 - High-quality structural imaging
 - Geophysical attribute analysis for stress field estimation, fracture detection, and rock brittleness insight
 - Reservoir interpretation services
- Project management and a single point of contact across the entire seismic workflow

ION'S SHALE PLAY EXPERIENCE

- What differentiates ION from other seismic service providers is the depth and breadth of our shale play experience. Since 2003 we have been providing enhanced imaging, fracture characterization, and rock property studies to oil & gas companies across virtually all the North American shale plays.
- 170+ shale play projects
- 13,000+ square miles of data delivered
- Projects include the Barnett, Fayetteville, Woodford-Caney, Bakken, Marcellus, Haynesville, and Horn River plays

ION has the expertise, technology, and experience to meet your shale play geophysical and interpretation objectives.

MAXIMIZE THE ECONOMIC VALUE OF YOUR RESOURCE PLAY

Drill and complete wells in the shortest and most cost effective manner. Design hydraulic fracturing jobs with the appropriate number of intervals and optimum interval spacing. Minimize the number of poor performing wells and maximize the number of high performers. ION's Image-Driven, integrated solutions will provide you with the customized seismic imaging needed to meet these unconventional reservoir challenges. You can count on ION's proven shale experience, toolkit, and experienced geoscientists and seismic operations staff to maximize the economic value of your resource play.

Contact Details

Scott LaBaume
VP Solutions Development
North America
Mobile: +1 281 202 9913
Email: scott.labaume@iongeo.com

Corporate Office

2105 City West Blvd., Suite 900
Houston, TX 77042
Phone: +1 713 789 7250
Fax: +1 713 789 7201
iongeo.com

