One of the more perplexing areas in E&P is subsalt exploration and reservoir development. While the potential yield is great, the salt layer poses unique imaging challenges. A major offshore E&P operator with a vast portfolio of acreage in the Gulf of Mexico and offshore regions of West Africa, Brazil, and the Mediterranean faced a decision to either relinquish or extend their leases on soon-to-expire acreage, or acquire offset blocks. The acreage was believed to be highly prospective but difficult to image, as many targets were obscured by salt. Through a multi-year RTM alliance with ION’s GX Technology group, coupled with leveraging ION’s BasinSPAN™ data library, the operator was able to gain the subsurface images required to de-risk their exploration portfolio.
COMPLEX GEOLOGIES

Subsalt Imaging

**Challenge:** Identify drillable prospects in a subsalt-intensive portfolio.

**Approach:** Multi-project ‘alliance’ applying reverse time migration (RTM).

**Result:** Clearer subsurface images help de-risk exploration portfolio.

**Large Portfolio of Hard-to-Image, High-Potential Subsalt Acreage**

One of the world’s most technologically sophisticated offshore operators had compiled a large portfolio of proven and undeveloped acreage in the Gulf of Mexico and offshore regions of West Africa, Brazil, and northern Africa. The acreage was believed to be highly prospective, but the potential reservoir targets in many areas were difficult to image as they frequently were overlain by regional salt bodies or extensive salt sheets.

In addition to the imaging challenges, the ‘clock was ticking’ for the E&P operators as they had lined up deepwater drilling capacity to test their highest potential prospects and, in some areas, faced a tough decision among the options of relinquishing soon-to-expire acreage, extending their leases, or ‘doubling down’ by acquiring additional acreage. The company, which had been so successful in obtaining lease positions in some of the most promising and prolific hydrocarbon basins in the world, quickly formulated a plan to progress leads to drillable prospects within their exploration portfolio and further high-grade the portfolio in order to commit their budgeted capital to the best prospects.

**Committing to a Multi-Project Alliance Based on Reverse Time Migration**

This E&P operator had been one of the earliest proponents of reverse time migration (RTM) as the next evolution in pre-stack depth migration (PreSDM). As early as 2005, they were working with ION’s GX Technology (GXT) group to refine and commercialize the technique.

As an early adopter of RTM, this E&P operator was keenly aware of the advantages that RTM could bring to structurally complex imaging situations, including reservoir targets that were adjacent to or beneath the salt. Moreover, they had witnessed first-hand the 30x improvement in efficiency that GXT had achieved in implementing the computationally intensive RTM algorithm. Confident in ION’s ability to provide much needed data, the E&P operator committed to a multi-year RTM alliance with GXT.

**RTM3: Real-Time Model Morphing and Migration**

As the challenges for imaging subsalt reservoirs became more complex, E&P companies continue to look for fast and efficient ways to reduce their risk and improve drilling success. To enable interpreters to test what-if scenarios in a matter of hours, GX Technology developed RTM3, a suite of tools that allow salt models to be modified very quickly within the RTM software. Confident in ION’s RTM technology, the Exploration teams have been able to leverage this RTM alliance with GXT to rapidly assess their undeveloped acreage position, make decisions about leasehold acquisition (and divestment), and rapidly progress exploration concepts and leads into a prioritized set of near-term drillable prospects. The structure of the global, multi-project alliance, along with GXT’s pioneering implementation of the RTM algorithm, has allowed the client’s Exploration teams to rapidly assess their opportunities on several hundred subsalt lease blocks held in the Gulf of Mexico. Moreover, RTM and additional geophysical studies have enabled the client to better characterize assets that already have been discovered and, in so doing, optimize their appraisal, development, and reservoir management programs.

**CONTINUED RTM LEADERSHIP**

Since commercially introducing RTM, GXT has increased its compute power to deliver the fastest RTM code in the industry and has applied its advanced RTM technique to over 100 projects worldwide, including in the Gulf of Mexico, North Sea, the South Atlantic basin, and offshore West Africa. Most recently, GXT introduced RTM3 – Real-Time Model Morphing and Migration, a revolutionary velocity modeling tool that lets interpreters test ‘what if’ salt model hypotheses using RTM in a matter of hours rather than weeks.

“GXT’s RTM techniques have proven invaluable in our exploration and development programs in the Gulf of Mexico and other areas.”

– Sanio VP – E&P Technology
Integrated Oil & Gas Company
**COMPLEX GEOLOGIES**

**Subsalt Imaging**

**Challenge:** Identify drillable prospects in a subsalt-intensive portfolio.

**Approach:** Multi-project ‘alliance’ applying reverse time migration (RTM).

**Result:** Clearer subsurface images help de-risk exploration portfolio.

**LARGE PORTFOLIO OF HARD-TO-IMAGE, HIGH-POTENTIAL SUBSALT ACREAGE**

One of the world’s most technologically sophisticated offshore operators had compiled a large portfolio of proven and undeveloped acreage in the Gulf of Mexico and offshore regions of West Africa, Brazil, and northern Africa. The acreage was believed to be highly prospective, but the potential reservoir targets in many areas were difficult to image as they frequently were overlain by regional salt bodies or extensive salt sheets.

In addition to the imaging challenges, the ‘clock was ticking’ for the E&P operator as they had lined up deepwater drilling capacity to test their highest potential prospects and, in some areas, faced a tough decision among the options of relinquishing soon-to-expire acreage, extending their leases, or ‘double-downing’ by acquiring offset blocks.

The company, which had been so successful in obtaining lease positions in some of the most promising and prolific hydrocarbon basins in the world, quickly formulated a plan to progress leads to drillable prospects within their exploration portfolio and further high-grade the portfolio in order to commit their budgeted capital to the best prospects.

COMMITTING TO A MULTI-PROJECT ALLIANCE BASED ON REVERSE TIME MIGRATION

This E&P operator had been one of the earliest proponents of reverse time migration (RTM) as the next evolution in pre-stack depth migration (PreSDM). As early as 2005, they were working with ION’s GX Technology (GXT) group to refine and commercialize the technique.

As an early adopter of RTM, this E&P operator was keenly aware of the advantages that RTM could bring to structurally complex imaging situations, including reservoir targets that were adjacent to or beneath the salt. Moreover, they had witnessed first-hand the 30x improvement in efficiency that GXT had achieved in In addition to the imaging challenges, the ‘clock was ticking’ for the E&P operator as they had lined up deepwater drilling capacity to test their highest potential prospects and, in some areas, faced a tough decision among the options of relinquishing soon-to-expire acreage, extending their leases, or ‘double-downing’ by acquiring offset blocks.

The company, which had been so successful in obtaining lease positions in some of the most promising and prolific hydrocarbon basins in the world, quickly formulated a plan to progress leads to drillable prospects within their exploration portfolio and further high-grade the portfolio in order to commit their budgeted capital to the best prospects.

COMMITTING TO A MULTI-PROJECT ALLIANCE BASED ON REVERSE TIME MIGRATION

This E&P operator had been one of the earliest proponents of reverse time migration (RTM) as the next evolution in pre-stack depth migration (PreSDM). As early as 2005, they were working with ION’s GX Technology (GXT) group to refine and commercialize the technique.

As an early adopter of RTM, this E&P operator was keenly aware of the advantages that RTM could bring to structurally complex imaging situations, including reservoir targets that were adjacent to or beneath the salt. Moreover, they had witnessed first-hand the 30x improvement in efficiency that GXT had achieved in In addition to the imaging challenges, the ‘clock was ticking’ for the E&P operator as they had lined up deepwater drilling capacity to test their highest potential prospects and, in some areas, faced a tough decision among the options of relinquishing soon-to-expire acreage, extending their leases, or ‘double-downing’ by acquiring offset blocks.

The company, which had been so successful in obtaining lease positions in some of the most promising and prolific hydrocarbon basins in the world, quickly formulated a plan to progress leads to drillable prospects within their exploration portfolio and further high-grade the portfolio in order to commit their budgeted capital to the best prospects.

**GXT’s RTM techniques have proven invaluable in our exploration and development programs in the Gulf of Mexico and other areas.”**

– Senior VP - E&P Technology, Integrated Oil & Gas Company

**GXT’s RTM techniques have proven invaluable in our exploration and development programs in the Gulf of Mexico and other areas.”**

– Senior VP - E&P Technology, Integrated Oil & Gas Company

**ION TECHNOLOGIES HELP DE-RISK EXPLORATION PORTFOLIO**

ION helped this E&P client better understand the risks and opportunities associated with its exploration portfolio around the world. At a macro-level, by accessing portions of ION’s BasinSPAN™ data library, the New Ventures team within this E&P operator was able to develop holistic, basin-scale insights about entire petroleum systems. They are using these insights to determine which global petroleum systems around the world to enter or exit and to optimally allocate their exploration investment among the basins in which they already operate.

Within the Gulf of Mexico, the client’s Exploration teams have been able to leverage their RTM alliance with GXT to rapidly assess their undeveloped acreage position, make key decisions about leasehold acquisition (and divestment), and rapidly progress exploration concepts and leads into a prioritized set of near-term drillable prospects. The structure of the global, multi-project alliance, along with GXT’s pioneering implementation of the RTM algorithm, has allowed the client’s Exploration teams to rapidly assess their opportunities on several hundred subsalt lease blocks held in the Gulf of Mexico. Moreover, RTM and additional geophysical studies have enabled the client to better characterize assets that already have been discovered and, in so doing, optimize their appraisal, development, and reservoir management programs.

**CONTINUED RTM LEADERSHIP**

Since commercially introducing RTM, GXT has increased its compute power to deliver the fastest RTM code in the industry and has applied its advanced RTM technique to over 100 projects worldwide, including in the Gulf of Mexico, North Sea, the South Atlantic basin, and offshore West Africa. Most recently, GXT introduced RTM – Real-Time Model Morphing and Migration, a revolutionary velocity modeling tool that lets interpreters test ‘what if’ salt model hypotheses using RTM in a matter of hours rather than weeks.

**GXT’s RTM techniques have proven invaluable in our exploration and development programs in the Gulf of Mexico and other areas.”**

– Senior VP - E&P Technology, Integrated Oil & Gas Company

**GXT’s RTM techniques have proven invaluable in our exploration and development programs in the Gulf of Mexico and other areas.”**

– Senior VP - E&P Technology, Integrated Oil & Gas Company

**GXT’s RTM techniques have proven invaluable in our exploration and development programs in the Gulf of Mexico and other areas.”**

– Senior VP - E&P Technology, Integrated Oil & Gas Company

**ION TECHNOLOGIES HELP DE-RISK EXPLORATION PORTFOLIO**

ION helped this E&P client better understand the risks and opportunities associated with its exploration portfolio around the world. At a macro-level, by accessing portions of ION’s BasinSPAN™ data library, the New Ventures team within this E&P operator was able to develop holistic, basin-scale insights about entire petroleum systems. They are using these insights to determine which global petroleum systems around the world to enter or exit and to optimally allocate their exploration investment among the basins in which they already operate.

Within the Gulf of Mexico, the client’s Exploration teams have been able to leverage their RTM alliance with GXT to rapidly assess their undeveloped acreage position, make key decisions about leasehold acquisition (and divestment), and rapidly progress exploration concepts and leads into a prioritized set of near-term drillable prospects. The structure of the global, multi-project alliance, along with GXT’s pioneering implementation of the RTM algorithm, has allowed the client’s Exploration teams to rapidly assess their opportunities on several hundred subsalt lease blocks held in the Gulf of Mexico. Moreover, RTM and additional geophysical studies have enabled the client to better characterize assets that already have been discovered and, in so doing, optimize their appraisal, development, and reservoir management programs.
ABOUT ION

ION Geophysical Corporation is a leading provider of geophysical technology, services, and solutions for the global oil & gas industry. ION’s offerings are designed to allow E&P operators to obtain higher resolution images of the subsurface to reduce the risk of exploration and reservoir development, and to enable seismic contractors to acquire geophysical data safely and efficiently.

To learn more about how ION helps oil & gas companies and seismic contractors solve their toughest imaging and operational challenges, visit us at iongeo.com.