

## THE INTRODUCTION OF 3D RESERVOIR MAPPING–WHILE–DRILLING SERVICES BY LEADING OILFIELD SERVICE COMPANIES IS PROJECTED TO ENSURE CHARACTERIZATION OF STRUCTURAL, STRATIGRAPHIC AND LITHOGRAPHIC FEATURES OF THE RESERVOIR, WHICH IS LIKELY TO BOOST GEO–STEERING CONFIDENCE AMONG DRILLING OPERATORS



### Introduction

The oil and gas industry is constantly evolving, driven by the need to optimize extraction processes and ensure the efficient recovery of hydrocarbons. As exploration and production activities move into more complex and less understood geological formations, the demand for advanced technologies that can accurately characterize subsurface environments has intensified. Traditional methods of reservoir mapping often involve post–drilling analyses that are both time–consuming and prone to inaccuracies, particularly in complex stratigraphic and structural settings. These limitations have led to increased drilling risks, suboptimal well placement, and higher operational costs.

In response to these challenges, leading oilfield service companies have been at the forefront of developing technologies that offer real–time insights into subsurface conditions. The introduction of 3D reservoir mapping–while–drilling (MWD) services represents a significant advancement in the industry’s ability to navigate these complexities. This technology allows operators to obtain a detailed, real–time view of the reservoir while drilling is ongoing, thereby enabling more informed decision–making and reducing the likelihood of costly errors.

### Market Trends

The trend towards the integration of advanced digital technologies in the oil and gas industry has been gaining momentum, particularly with the rise of automation and real–time data analytics. The deployment of 3D reservoir mapping–while–drilling services aligns with this broader shift towards digitalization, as it leverages sophisticated sensors, telemetry systems, and real–time data processing to deliver unprecedented insights into subsurface conditions. Companies like Schlumberger have been pioneers in this field, introducing services such as the TruLink definitive dynamic survey–while–drilling service. This service represents a paradigm shift in well construction operations, as it enables continuous data acquisition without the need to pause drilling operations. The ability to conduct definitive dynamic surveys while drilling, coupled with real–time telemetry, allows operators to adjust drilling trajectories on the fly, thereby optimizing well placement and improving overall drilling efficiency.

The adoption of 3D reservoir mapping–while–drilling services is expected to grow rapidly, driven by the industry’s need to reduce operational risks and enhance well productivity. As more companies recognize the value of real–time reservoir characterization, the demand for these services is likely to increase, further driving innovation in this space.

### Client Challenges

**Drilling operations in complex geological formations are fraught with challenges, particularly when it comes to accurately characterizing the reservoir and ensuring optimal well placement. Traditional reservoir mapping techniques often require drilling to be paused to conduct surveys, which not only slows down operations but also increases the risk of inaccuracies. These pauses can lead to suboptimal well paths, higher drilling costs, and increased exposure to geological hazards. In addition, our client faced the lack of real–time data during drilling operations, which made it difficult for operators to make informed decisions, leading to a higher likelihood of encountering unexpected drilling conditions. This can result in costly corrective actions, such as sidetracking or re–drilling, which can significantly impact the overall economics of the project. For many drilling operators, these challenges are compounded by the increasing complexity of modern wells, which often involve extended reach, high–angle, or horizontal drilling. In such scenarios, the ability to accurately map the reservoir and adjust drilling trajectories in real–time is critical to ensuring the success of the operation.**

### Our Approach

**Our approach to addressing these challenges involved the deployment of advanced 3D reservoir mapping–while–drilling technology. We recommended the use of Schlumberger’s TruLink service, which offers a suite of capabilities designed to enhance the accuracy and efficiency of drilling operations.**

**The TruLink service integrates continuous six–axis directional and inclination sensors with gamma ray detection to provide real–time trajectory control. This allows operators to maintain precise control over wellbore placement, even in the most complex geological settings. The service also eliminates the need for traditional survey pauses, as it conducts dynamic surveys on–the–fly, thereby reducing survey–related rig time to zero.**

**To further enhance the accuracy of reservoir characterization, the service leverages advanced telemetry systems that deliver borehole data in real–time through every point of the well. This continuous data stream enables operators to make informed decisions during drilling, reducing the risk of encountering unexpected geological conditions and optimizing the overall drilling process.**

### Our Recommendations

Given the significant benefits of 3D reservoir mapping–while–drilling technology, we recommended that our client fully integrate this service into their well construction workflows. Specifically, we advised the following:

**Deployment in Complex Geological Settings:** We recommended that the TruLink service be deployed in wells with complex stratigraphy, high–angle drilling, or extended reach, where the ability to accurately map the reservoir in real–time is crucial

**Integration with Real–Time Data Analytics:** We advised to integrate the TruLink service with their existing real–time data analytics platforms. This integration would allow for the continuous monitoring and analysis of

**Training and Capacity Building:** To fully leverage the benefits of the TruLink service, we recommended that clients invest in training their drilling teams on the use of this technology. This would ensure that operators are well–equipped to interpret real–time data and make informed decisions during drilling operations

**Pilot Projects and Phased Implementation:** We recommended starting with pilot projects in select wells to demonstrate the value of the service. Based on the success of these pilots, we advised a phased implementation across their broader drilling operations

### Business Impact

The deployment of 3D reservoir mapping–while–drilling technology has had a profound impact on our clients’ drilling operations. The ability to conduct real–time, dynamic surveys during drilling has led to significant improvements in wellbore placement accuracy and overall drilling efficiency.

In one case, a client operating in the Middle East reported that the use of the TruLink service enabled them to land an 8 ½–inch curve section with near–pinpoint accuracy, comparable to static measurement while drilling. This level of precision was achieved without the need to pause drilling operations, resulting in a smoother wellbore trajectory and reduced dogleg severity.

Another client, operating in a complex offshore environment, reported that the use of 3D reservoir mapping–while–drilling technology saved them an average of 41 pumping hours per operation. This reduction in drilling time translated to significant cost savings and a more efficient overall drilling process.

Overall, our clients have reported increased confidence in their geo–steering decisions, reduced drilling risks, and improved well productivity. The ability to continuously monitor and adjust drilling trajectories in real–time has also led to a reduction in the need for corrective actions, further enhancing the economic viability of their projects.

### Conclusion

The introduction of 3D reservoir mapping–while–drilling services represents a major advancement in the oil and gas industry’s ability to accurately characterize subsurface environments and optimized well placement. By providing real–time, dynamic insights into the reservoir, this technology has empowered drilling operators to make more informed decisions, reduce operational risks, and enhance overall drilling efficiency.

As the industry continues to evolve, the adoption of 3D reservoir mapping–while–drilling technology is likely to become increasingly widespread. Companies that embrace this technology will be well–positioned to navigate the complexities of modern drilling operations and achieve greater success in their exploration and production activities.

The success stories of our clients demonstrate the tangible benefits of this technology, from reduced drilling time and costs to improved wellbore placement accuracy. As more companies recognize the value of real–time reservoir characterization, the demand for these services is expected to grow, driving further innovation in this space.