Global hydrocarbon demand is increasing while production is barely keeping up with demand, if not falling. As a consequence, global exploration budgets are dramatically increasing and a substantial portion of these budgets is allocated to high risk areas, such as deepwater, where initial investments and risks are enormous.

Leaders in the oil & gas industry continue their focus on return on capital expenditures, with special attention on accurately estimating and mitigating exploration risks. Assessing the geologic risks is the fundamental first step, and these risks are commonly related to the key elements of Reservoir, Trap, and the Oil & Gas Charge.

At most internationally operating petroleum E&P companies, 3D Exploration Modeling is a key step in the exploration decision making process and the deliverables are, for example, the availability, type and timing of the oil and gas charge, the temporal relationship of the charge to the structural evolution of the trap, and a host of related processes which effect the preservation or loss of the hydrocarbons.

Similar to the superior value of 3D seismic interpretation compared to 2D seismic interpretation, leading E&P companies have recognized that hydrocarbon resource assessments in exploration programs can only be made with a 3D approach, rather than the limiting 2D perspective. The 3D approach enables oil and gas volumetrics to be determined and Prospect and Play Risks to be quantified as accurately as possible - with significantly less bias than with non-quantitative approaches.

Today, 3D Exploration Modeling brings together multiple disciplines to improve exploration success rates, just as more than a decade ago 3D seismic interpretation enabled concurrent analysis of developmental activities across multiple domains.

3D Exploration Modeling’s success and growth has been aided by two key factors:

1. Technology Availability:
   a. Core technologies such as true 3D Petroleum Systems Modeling that link and integrate different disciplines, such as, Seismic, Structure, Sequence Stratigraphy, Seal Behavior, Geochemistry, Bio-Stratigraphy, Petrophysics & Log Analysis
   b. Unique technologies that enable rapid Risk Assessment of the effects of uncertainties in data on the results of analyses.


The value of 3D Exploration Modeling can be best expressed through case studies. Despite worldwide usage of 3D Exploration Modeling, due to the confidential nature of exploration activities, case studies are rare. The ones on hand, however, exemplify how Reservoir, Trap, and Charge Risks and Timing can be determined on a wide range of scales - from an entire basin to a single prospect or reservoir.