# An Introduction to 3D Seismic Interpretation

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# Introduction:

**The main objective of this course** is to provide to the professionals of exploration and production of the oil industry the necessary knowledge on visualization, integration and interpretation techniques recently developed for interpreting 3D seismic data.

Participants will gain a solid foundation in the understanding of the applications and the role of the seismic interpreter on studies related to seismic attributes before and after stacking, AVO, sequence seismic stratigraphy, seismic monitoring (4D), well to well seismic and integrated multidisciplinary studies.

We will guide participants through recent examples, case studies and relevant exercises to efficiently convey the concept that the integration of all available data adds value to the predictions that result from seismic interpretation models. The modular design of this course allows quickly adapt to full or reduced versions, meeting the requirements, profiles and interests of different groups of participants. The course will provide to the professionals of exploration and production of the oil industry the necessary knowledge on visualization, integration and interpretation techniques recently developed for interpreting 3D seismic data. This course provides a practical understanding of 3-D seismic structural interpretation in order to identify prospect locations.

## Objectives:

**By the end of this BTS training course, participants will be able to:**

- Get familiar with a 3-D seismic structural interpretation workflow
- Perform a seismic structural interpretation: seismic data QC, well-to-seismic tying, horizons and faults picking, structural model construction and trap identification

- Use a velocity field to perform a time-to-depth conversion
- Identify structural prospects

## Who should attend?

Geologists, Geophysicists, Reservoir Engineers, Production Engineers, Petro physicists, Petroleum Engineers, Drilling Engineers, Field Development Engineers, Managers, Asset Managers, Oil & Gas Engineers, Reservoir Operators, Surveillance Engineers, Technicians, Engineering Trainees, Technical Managers, Technical Assistants, Technicians, Chemists, Physicists, Technical Supervisors, Service Company Personnel responsible for improving the performance of petroleum reservoirs.

# Course Outline:

## Structural Interpretation - Prospect Geometry Identification

- Survey introduction - Geophysical context

- Geology and petroleum system overview

- Prospect objectives

## Seismic Data Analysis and QC

- Parameters for seismic displays: vertical sections, time slices, composite sections, 3D view

- Seismic data analysis: noises, multiples, footprints, frequency content, smoothing

- Seismic data preparation: smoothing/filtering for structural interpretation vs. reservoir interpretation.

## Well-to-Seismic Tying and Horizons Identification

- Well data calibration to identify main geological markers and main reservoir layers

- Synthetic seismogram calculation

## Seismic Data Picking and Mapping – Potential Traps Definition

- Structural interpretation (in Time) of mains horizons key horizons and faults picking (time picking: manual, guided, automatic, grid, and 3D picking), and correlation

- Picking results QC and estimation of uncertainties

- Volume and surface attributes calculation and analysis

- Surfaces generation to produce a time model

- Mapping

### Velocity Model Construction and Time-To-Depth Conversion

- Interfaces selection for modeling

- Seismic velocities of intervals editing and smoothing, control and correction with reference wells

- Velocity model construction via layer stripping

- Time-to-depth conversion

### Introduction to Seismic Reservoir Analysis: Potential Reservoirs Analysis

- Reservoir picking and modeling

- Surface attributes calculation and analysis

- Interval attributes calculation and analysis

**Structural Prospects Identification and Evaluation**

- Entrapment, reservoir extension
- Time vs. depth structures comparison
- Uncertainties assessment
- Recommendations