

Navigator

Overview

The Navigator course is designed to provide essential background information for Navigators. The course includes an introduction to seismic exploration, geodesy and cartography, GPS, and the positioning of seismic nodes. The course also provides an overview of the Concept Systems product suite, UKOOA P1 and P2 formats, and an introduction to the Linux operating system and command line.

Duration

A four day course primarily held at our Edinburgh training facilities. (09:30 ~ 17:00). The course may be held at client premises, provided suitable facilities are available.

Who should attend

This course is designed for trainee navigators, or anyone who is new to the industry or has an interest in expanding their knowledge in this area.

Objectives

The course will provide essential background information for those working in the seismic industry.

Prerequisites

There are no pre-requisites required for this course.

Teaching Methods

The course is made up of a series of lectures where the trainees are encouraged to ask questions and participate in group discussions. The Linux session will include practical tutorials.

Course Content

Seismic Overview

- Origins of oil and gas
- Hydrocarbon migration and accumulation
- Introduction to plate tectonics
- Reservoir characteristics
- Introduction to seismic acquisition
- Seismic reflection
- 2D, 3D, and 4D seismic acquisition
- Traces, CMPs, CMP bins, fold
- Survey design considerations
- Source equipment
- Recording equipment
- Seismic record information
- Processing and interpretation of seismic data
 - Pre-processing
 - CMP sorting (binning)
 - Velocity analysis
 - Stacking
 - Migration
 - Introduction to interpretation

Basics of Geodesy and Cartography

- Introduction to Geodesy and Cartography
- Brief history of the methods used to determine the shape of the Earth
- The geoid
- Spheroid and ellipsoid models
- Horizontal and vertical geodetic datums
- Datum transformations
- Coordinate systems
 - Cartesian coordinate systems
 - Geographic coordinate systems
 - Geodetic coordinate systems
- Latitude and longitude
- Map projections
- Universal Transverse Mercator projection
- Tides
 - Spring and neap tides
 - Chart datum
 - Bathymetry
- Time (TAI, sidereal, UTO, UTC, GPS)

Basics of GPS

- Basics of trilateration
- Introduction to GPS
- GNSS
 - Architecture
 - Control segment
 - Space segment
 - User segment
- GPS summary
- GLONASS summary
- GALILEO summary
- GPS signal structure
- GPS navigation message
- GPS message format
- Pseudoranges

- Carrier phase
- GNSS positioning
- Errors in GPS
- Dilution of precision
- Differential corrections (DGPS)
 - Veripos
 - Fugro
 - C-Nav
- Relative GPS (RGPS)

Methods of Positioning of Seismic Nodes

- Introduction to node positioning
- Vessel positioning, motion and heading
- 2D, 3D, and 4D deep marine positioning
- OBC cable positioning
- Acoustic positioning

Concept Systems Product Overview

- Introduction to Spectra
- Introduction to Sprint
- Introduction to Reflex
- Introduction to Orca
- Introduction to Gator

Data Format Description (P1/90, P2/91, P2/94)

- Introduction to the P1 and P2 record formats
- Brief history of the development of the P1 and P2 record formats
- P2/91 and P2/94
 - File structure
 - Record length, types, and codes
 - Time records
 - Times in records
 - Data fields
 - One line per file
 - Headers
 - Redundant information
 - Nominal offsets
 - Storage media and physical file specification
 - General rules
- P1/90
 - General information
 - Storage media and physical file specification
 - File description
 - Tape and disk labelling
 - Header and record specification

Basics of the Linux Operating System

- Brief explanation of the term 'operating system'
- Brief history of the Linux operating system
- Shells and file handling
- The UNIX file system
- Special directories
- Pathnames
- Command line interpreters
- Introduction to Linux commands
- Common commands
- File permissions
- Wild cards

- Processes
- Text editors and PDF readers
- Compression and archiving
- Comparing files and directories
- Searching for files
- Command help
- The Tab key
- Superuser command
- The Gnome desktop