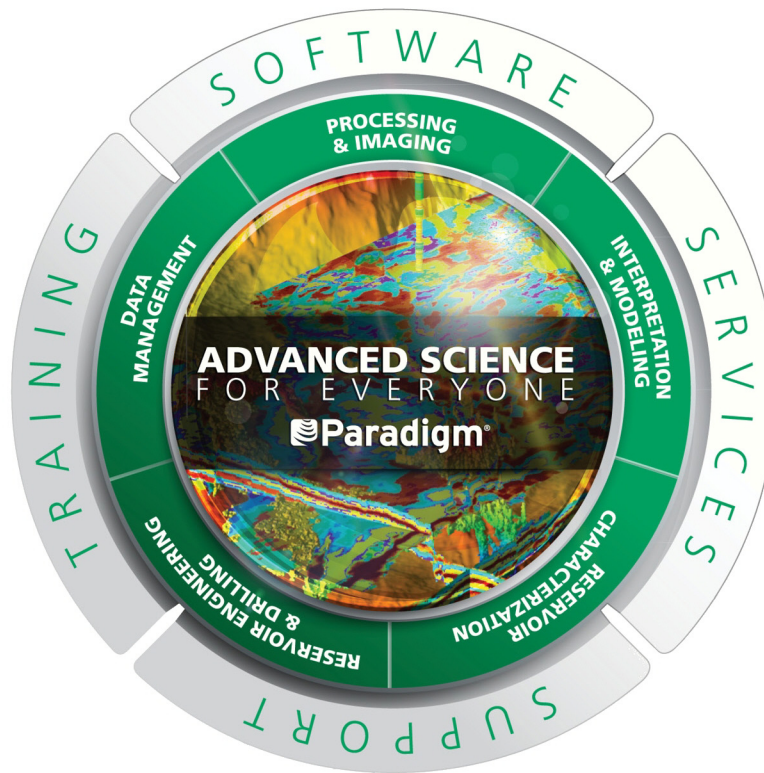


Instructor Led Courses

Training Catalog



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Value of Paradigm Training

Intellectual capital is a vital asset for your corporation. It includes the possession of knowledge, experience, technology, and professional skills that provide your company with a competitive edge in the market. Paradigm® Training is your premier partner in maintaining and improving the intellectual capital of your organization. Paradigm Training is an important part of your competitive edge.

Paradigm's training programs will help you:

- Empower your staff
- Increase productivity
- Reduce cycle time
- Build employee confidence and loyalty
- Keep and develop key performers
- Align employees to business unit goals and objectives
- Enable team development

Paradigm training programs are a value-added core component of your business strategy. Training has never been more important in helping you meet the changing needs of a complex, constantly evolving business environment.

Return On Investment of Paradigm Training

Paradigm training programs are an investment in your company's intellectual capital. Many companies focus on the "expense" of training. While it is true that training costs money and takes up valuable employee time, studies show that training provides a positive return on investment, sometimes as much as several hundred percent. Training increases the knowledge and skills of your employees, as well as contributes to their sense of being valued by the company. Both lead to a sharp increase in productivity and reduction in cycle time.

Employee surveys indicate that appropriate and timely training programs are one of the best ways to ensure employee retention. Paradigm training programs will make your employees knowledgeable in the use of our products, allowing them to meet corporate objectives faster, using state-of-the-art technology. Therefore, although training may seem like a luxurious expense to some companies, it is, in fact, one of the soundest investments you can make. The question becomes, can you really afford not to make this investment?

Paradigm Training Programs

Paradigm offers training programs globally that will enhance your company's intellectual capital and maximize your return on investment. Our training programs include:

- Public courses on Paradigm products offered at our Training Centers worldwide
- Private courses on Paradigm products offered at our Training Centers or your site
- JumpStart training programs that reduce the learning curve for new users
- Customized Private Training programs that meet your specific business objectives
- Advanced Training programs that contain a complement of science and technology workflows
- Exponential Learning programs that include customer selected topics and delivered as follow-up mentoring

Paradigm Training Best Practices

Paradigm highly recommends the following best practices to ensure the highest level results from our training programs.

- Paradigm training programs work best when they are integrated with your career development and performance management initiatives. When Paradigm training programs are incorporated into individual career development plans, it has a powerful effect on the performance and productivity of the individual, as well as the company. Managers must support and encourage employees to attend training classes.
- Global (or large group) training programs should be customized to your specific corporate goals and objectives. Paradigm will partner with you to plan and manage all training programs so that they are clearly linked to your desired business outcomes.
- Reinforcement strategies should be implemented upon the student's completion of the course. Paradigm offers follow-up mentoring after scheduled course training to put classroom concepts into real world practicality.
- Best results from our training programs occur when you have an internal infrastructure in place that supports the student's application of what has been learned. Training only adds value when you have all the software and projects loaded and available to students upon completion of their training program.

Training List

Paradigm offers a spectrum of training options to suit your needs, from formal courses on our software in one of our training centers around the world, to custom courses designed around one of your current projects. You can mix and match courses from the course catalog to create a customized workshop that meets your specific business needs.

For information about schedule and location of training courses contact Leslie Brand at training_info@pdgm.com.

Epos Infrastructure		
Epos System Administration and Database Management	<i>Acquire skills required to install and maintain the integrated environment provided by Paradigm's Epos framework. Learn principles of data management.</i>	page 8
Data Management & Interoperability		
Data Management for Technologists using Epos	<i>Learn how to load, QC, and manage interpretation, well, and seismic data.</i>	page 10
Interpretation & Modeling		
Multi-Survey (2D-3D) Interpretation using SeisEarth XV	<i>Acquire the tools and techniques for interpreting horizons and faults across a large region encompassing multiple 2D and 3D surveys.</i>	page 12
Volume Visualization and Interpretation in VoxelGeo	<i>Learn to use the basic tools in VoxelGeo for visualizing and interpreting 3D data.</i>	page 14
Time to Depth Conversion using Explorer	<i>Learn to use the tools provided by Explorer to perform time to depth conversion.</i>	page 16
Fundamentals of SKUA-GOCAD for Reservoir Modeling	<i>Learn to use 3D modeling technology to model reservoirs.</i>	page 18
Modeling Reservoir Architecture using SKUA	<i>Learn to model any 3D structure for a geologic and flow simulation model.</i>	page 19
Modeling Reservoir Architecture using GOCAD	<i>Learn how to use 3D modeling technology to model reservoirs.</i>	page 21
Velocity Modeling and Calibration using SKUA	<i>Learn how to make the most of SKUA unique technology to build accurate velocity models and perform efficient time-to-depth conversion.</i>	page 23
Prospect Generation Workflow	<i>Teaches an integrated best-practices interpretation workflow combining functionalities of several Paradigm products.</i>	page 24
Introduction to Well Correlation using StratEarth	<i>Teaches well correlation in Epos using StratEarth, BaseMap and 3D Canvas.</i>	page 26

Seismic Processing & Imaging

Seismic Data Processing with Echos	<i>Introduces the interactive and processing approaches to using Echos.</i>	page 27
Depth Velocity Model Building and Depth Imaging using GeoDepth 3D	<i>Guides students through recommended basic time to depth velocity analysis workflows.</i>	page 28
Depth Velocity Model Building and Depth Imaging using GeoDepth 2D	<i>Learn how to create and update an interval velocity section.</i>	page 30
Modeling and Imaging with Anisotropy in GeoDepth	<i>Introduces usage of GeoDepth in anisotropic modeling and imaging workflows.</i>	page 31

Reservoir Characterization & Petrophysics

Essentials for Performing Log Analysis using Geolog	<i>Introduces students to the basics of Geolog's primary applications.</i>	page 32
Borehole Image Processing and Analysis	<i>Teaches how to use Geolog to create and process image logs, and typical workflows.</i>	page 34
Integrated Interpretation using Geolog	<i>Learn about Mapping, Correlation, and Visualization in Geolog.</i>	page 35
Deterministic Petrophysical Log Analysis using Geolog Determin	<i>Learn how to use Geolog as a tool for performing deterministic petrophysical well evaluations.</i>	page 37
Multiple Mineral Analysis and Interpretation using Geolog Multimin	<i>Teaches the Formation Evaluation professional the Optimizing approach to Petrophysical Analysis.</i>	page 38
Introductory Loglan Programming in Geolog	<i>Learn the basics of the Loglan programming language, how to develop a module using the language, and how to run the module from within Well or Project.</i>	page 40
Tcl Programming in Geolog	<i>Learn to use Tcl to develop modules for log processing, database access, information management, and report generation.</i>	page 41
Full Waveform Sonic Processing using Geolog	<i>Teaches you the basics of using the array sonic processing tools by guiding you through a typical workflow and procedures.</i>	page 43
Geolog for Petrophysicists	<i>Learn the basics of the primary Geolog applications and work through a deterministic petrophysical workflow. Introduces students to the Loglan programming language.</i>	page 45
Geolog for Geologists	<i>Learn the basics of the primary applications with hands-on exercises that illustrate most of their features and functions.</i>	page 47
Advanced Geolog	<i>Covers Multimin (probabilistic, or optimizing, petrophysical analysis) and Geolog programming using Loglan and Tcl.</i>	page 49

Electrofacies Analysis using Geolog Facimage	<i>Introduces students to Log-based facies analysis.</i>	page 51
Geolog Site Administration	<i>Teaches how to install, configure, and maintain Geolog.</i>	page 53
NMR and NMR 2D	<i>Introduces Geolog NMR and NMR2D modules: Theory behind NMR and NMR2D measurements and workflows.</i>	page 54
Rock Physics (Including Pore Pressure Prediction)	<i>Learn how to generate a synthetic trace and examine fluid substitution workflows.</i>	page 55
Reservoir Characterization using Probe and Vanguard	<i>Develop a comprehensive understanding of the theory and application of Paradigm's broad offerings in Reservoir Characterization.</i>	page 57
AVO Inversion and Analysis using Probe	<i>Learn how to identify hydrocarbon prospects by generating and analyzing AVO attributes</i>	page 59
Seismic Inversion for Rock Property Analysis using Vanguard	<i>Learn how to use seismic inversion functionality to generate rock property volumes for prospect analysis.</i>	page 60
Facies Classification and Analysis using Stratimagic and SeisFacies	<i>Presents two workflows in which students learn about the features and tools in Stratimagic and SeisFacies.</i>	page 61
Data Analysis and Property Modeling with SKUA-GOCAD	<i>Learn to create robust and realistic 3D property models.</i>	page 62
Well Planning & Drilling		
Introduction to Well Planning and Drilling Engineering	<i>Introduces you to well planning and drilling engineering using Sysdrill.</i>	page 63
Advanced Well Planning and Drilling Engineering	<i>Advanced well planning and drilling engineering using Sysdrill.</i>	page 64
Geosteer: Well Directional Steering	<i>Guides students through practical Geosteering exercises and workflow processes.</i>	page 65
Development		
GOCAD/SKUA - Programming in GOCAD Developer Kit Framework	<i>Get started creating your own application in GOCAD Suite development framework.</i>	page 67
GOCAD/SKUA - Developer Kit: Implementing Gobjs and User Interfaces	<i>Learn to create custom objects in GOCAD and implement interactivity with them. Learn to develop advanced interfaces with QT.</i>	page 68
Epos OpenGeo SDK	<i>Learn how to use OpenGeo, one of Paradigm's development toolkits.</i>	page 69

Epos Infrastructure

System Administration and Database Management

Details

Duration	3 days
Prerequisites	Some familiarity with Linux or completion of a System Administration course (Unix and/or Windows). Some exposure to Paradigm® products.
Who should attend?	System Administrators and Data Managers responsible for maintaining Paradigm environments.

Objectives

This course is intended for System Administrators and Application Support staff who are responsible for maintaining multi-user, networked Epos environments. Students should achieve the following objectives upon completion of the course:

- Understand the Epos architecture
- Install and configure the Paradigm software
- Create and administer Epos Databases
- Support and troubleshoot using Paradigm utilities

This course can be combined with the Geolog Site Administration course. See “Geolog Site Administration” on page 1-53.

Contents

- System Architecture
- Installation
- Uninstall
- Licensing
- Ready for Launch
- Backup and Restore Tool
- Epos Administration
- Epos User Internals

Continued on next page...

- Epos Databases
- Data Paths
- Files and Directories
- Paradigm Name Service
- Enterprise Employment
- Permissions and Security
- System Level and Project Level Backup
- Support Packs
- High Performance Clusters
- Troubleshooting
- Third-Party Server Installation and Configuration
- Epos/Third Party Connectivity Overview
- Wrap Up

Data Management and Interoperability

Data Management for Technologists using Epos

Details	
Duration	5 days
Prerequisites	Background/familiarity in data loading terminology and concepts. Understanding of basic geoscience concepts.
Who should attend?	Technologists, processors, geoscientists, and new users of Paradigm technology who load and manage data.
Applications	Epos Data Management utilities, BaseMap, Section, and 3D Canvas

Objectives

This five day comprehensive course is designed to teach students how to use Paradigm tools for loading, QCing, and managing seismic, Interpretation and well data.

Contents

- Getting Started
- Introduction to Epos Infrastructure, Data Model, and Terminology
- Loading 3D Poststack Data
- Creating a New Project
- Loading 2D Seismic Data and Creating Line Geometry
- Loading Prestack Seismic Data
- Loading Topography (Land) Data from SEG-Y Trace Headers
- Exporting Seismic Data
- Importing and Exporting Interpretation Data
- Epos User - Concept and Control of Data Access
- Sharing Data Between Studies
- Loading Well Data
- Managing Well Data

Continued on next page...

- Plotting
- Backup and Restore
- Appendix: Terminology and Concepts
- Third-Party Connectivity (Demo- Time Permitting)

Interpretation and Modeling

Multi-Survey (2D-3D) Interpretation using SeisEarth XV

Details	
Duration	4 days
Prerequisites	Students should have a general understanding of horizon and fault interpretation
Who should attend?	New SeisEarth® users, Interpreters
Applications	BaseMap, Well Log window, 3D Canvas, Section

Objectives

This training course guides students through a typical multi-survey interpretation workflow. Students start by examining the data and calibrating it, then perform structural and stratigraphic interpretation, using the advanced visualization tools provided by the different windows of SeisEarth. Finally, students create a multi-survey map, scale it to depth and plot it.

Contents

- Getting Started
- Data QC
 - Project/Survey Setup and QC
 - Seismic, Well, and Culture Data QC
- Data Correction and Calibration
 - Correcting Seismic Misties
 - Calibrating Wells to Seismic
- Structural interpretation
 - Interpreting Faults
 - Interpreting Horizons
 - Interpretation Data Management

Continued on next page...

- Stratigraphic Interpretation
 - Examining the Volume using Reference Horizons
 - Using Proportional Slicing
 - Horizon Based Volume Flattening
 - Volume Visualization and Interpretation
- Mapping
 - QCing Fault and Horizon Interpretation Using Fault-Horizon Contacts
 - Creating Fault Outlines and Map Boundaries
 - Gridding Multi-Survey Horizons
 - Smoothing, Contouring, and Map Editing
 - Extracting Map Attributes
 - Plotting Maps
 - Scaling Maps from Time to the Depth Domain

Interpretation and Modeling

Volume Visualization and Interpretation in VoxelGeo

Details	
Duration	3 days
Prerequisites	None
Who should attend?	New VoxelGeo® users, Interpreters
Applications	VoxelGeo, BaseMap, 3D Canvas

Objectives

This course is designed for interpreters and geophysicists interested in advanced visualization and interpretation workflows.

Progress through a series of comprehensive exercises that teach how to link Epos data with VoxelGeo. Learn about the different types of data that can be displayed in VoxelGeo. Become familiar with the powerful tools that combine interactive 3D seismic volume rendering and subvolume extraction with automatic and manual fault and horizon picking tools.

Learn how to create and examine well trajectories and perform volume operations such as horizon based flattening, multi-volume visualization and volume attributes generation.

Contents

- Getting started
 - QC the Epos project
- Displaying data in VoxelGeo
 - Displaying seismic data in VoxelGeo
 - Displaying Epos interpretation in VoxelGeo
 - Displaying contours in VoxelGeo
 - Displaying wells in VoxelGeo
 - Displaying all data together

Continued on next page...

- Basic Volume Visualization
 - Prepare the display for volume visualization
 - Focusing in on a target
 - Time Slab visualization
 - QC the visualization
 - Volume Visualization for Reconnaissance
- Subvolume detection
 - Single seed detection
 - Horizon detection
 - Paintbrush picking
 - Multi-body detection
 - Formation sculpting
- Structural interpretation
 - Interpreting faults
 - Interpreting horizons
 - Editing Interpretation
- Creating and Examining Well Trajectories
 - Creating wells
 - Examining well trajectories
- Volume Operations
 - Horizon flattening
 - Multi-volume visualization
 - Generating volume attributes

Interpretation and Modeling

Time to Depth Conversion using Explorer

Details	
Duration	2.5 days
Prerequisites	Geoscience background
Who should attend?	Explorer™ users
Applications	3D Canvas, BaseMap, Data Managers, CVI, Geostatistical Mapping

Objectives

The objective of this course is to expose students to as many tools as possible for performing time-to-depth conversion while giving examples of meaningful workflows. We hope that students will then be able to develop company specific workflows using what they have learned in the course.

The student is introduced to the Explorer toolkit and learns how to perform 2D and 3D visualization, model building from structure-limited and non-structural velocity sources, integration of well and seismic data, calibration to wells, basic geostatistical mapping, Constrained Velocity Inversion, building a velocity volume, estimating velocity gradients, and editing data.

Contents

- Getting Started
 - Getting Started
 - Data Preparation and QC
- Performing Depth Conversion
 - Learning about Constrained Velocity Inversion (CVI)
 - Depth Conversion using a Seismic Velocity Volume
- Performing Calibration to Wells
 - Preparing Well Data for Calibration
 - Calibrating Grids to Wells

Continued on next page...

- Calculating Updated Interval Velocities
 - Creating Isomaps
 - Calculating Updated Velocity Maps
- Horizon Based Modeling
 - Performing Velocity Mapping
 - Performing Depth Conversion

Interpretation and Modeling

Fundamentals of SKUA-GOCAD for Reservoir Modeling

Details

Duration	Half day
Prerequisites	A background in geology or geophysics is required. Reservoir modeling experience is useful but not required.
Who should attend?	Geophysicists, Geologists, and Reservoir Engineers

Objectives

This half-day course is designed to introduce new SKUA-GOCAD users to the user interface and the basics of project management, data management and editing. **This course is the first part of a class that teaches the Modeling Reservoir Architecture with SKUA or the Modeling Reservoir Architecture with GOCAD course.** (See “Modeling Reservoir Architecture using SKUA” on page 19 and “Modeling Reservoir Architecture using GOCAD” on page 21.)

It is not intended to cover all of the product’s functionality and we recommend users enroll in the following SKUA-GOCAD courses available in [Paradigm Online University](#) before taking the class:

- Online Training > SKUA-GOCAD > Getting Started > Creating a Project and Importing Data in SKUA-GOCAD
- Online Training > SKUA-GOCAD > Getting Started > Navigating the User Interface and Managing your Data in SKUA-GOCAD

Contents

- Getting Started
- Navigating the User Interface
- Importing and Exporting Data
- Creating and Editing Data

Interpretation and Modeling

Modeling Reservoir Architecture using SKUA

Details	
Duration	3 days (includes half day of Fundamentals of SKUA-GOCAD for Reservoir Modeling course)
Prerequisites	<ul style="list-style-type: none"> ● Background in geosciences ● SKUA® Fundamentals, experience in GOCAD®, or SKUA Base Module ● Complete the following courses available in Paradigm Online University: <ul style="list-style-type: none"> — Online Training > SKUA-GOCAD > Getting Started > Creating a Project and Importing Data in SKUA-GOCAD — Online Training > SKUA-GOCAD > Getting Started > Navigating the User Interface and Managing your Data in SKUA-GOCAD
Who should attend?	Geophysicists, geologists, petrophysicists and reservoir engineers interested in using SKUA modeling technology to model reservoirs.

Objectives

The Modeling Reservoir Architecture with SKUA course teaches students how to use SKUA's unique technology to create geologically accurate structural models, geologic grids and flow simulation grids, regardless of the structural complexity of the reservoir. This course includes a quick introduction to SKUA-GOCAD™ that covers project and data management. It is not intended to cover all the product's functionality and we recommend you enroll in the SKUA-GOCAD courses available in [Paradigm Online University](#) before taking the class.

This course covers the following topics:

- Fundamentals of SKUA-GOCAD for Reservoir Modeling introductory course (see "Fundamentals of SKUA-GOCAD for Reservoir Modeling" on page 18)
- Introduction to SKUA technology
- Defining the geologic information for reservoir modeling
- Building a 3D structural model
- Building a geologic grid architecture
- Building a flow simulation grid architecture

Continued on next page...

Contents

- SKUA Quick Start
 - Modeling Reservoirs using SKUA Workflows
 - Building a Structural Model
 - Building a Geologic Grid and Property Modeling
 - Building a Flow Simulation Grid
 - Upscaling Properties to the Flow Simulation Grid
- Structure and Stratigraphy Modeling
 - Structure and Stratigraphy Modeling Process
 - Preparing the Data and Defining the Volume of Interest
 - Modeling the Fault Network
 - Modeling Horizons
 - Honoring Well Data and Checking the Structural Model
 - Modeling the Geologic Grid
- Flow Simulation Grid Modeling
 - Flow Simulation Grid Building Process
 - About Flow Simulation Grids in SKUA
 - Building a Flow Simulation Grid and Editing the Cell Alignment
 - Creating a Non-Uniform Gridding using Tartan
- Case Studies
 - Garfield: Modeling an Unconformity
 - Preparing the data
 - Building the Structural Model
 - Checking Well Stratigraphy
 - Building the Geologic Grid and Flow Simulation Grid
 - Bonnie: Modeling an Extensive Environment
 - Geological Context
 - Dataset
 - Summary

Interpretation and Modeling

Modeling Reservoir Architecture using GOCAD

Details	
Duration	2 days (includes half day of Fundamentals of SKUA-GOCAD for Reservoir Modeling course)
Prerequisites	<ul style="list-style-type: none"> ● Background in geosciences ● Complete the following courses available in Paradigm Online University: <ul style="list-style-type: none"> — Online Training > SKUA-GOCAD > Getting Started > Creating a Project and Importing Data in SKUA-GOCAD — Online Training > SKUA-GOCAD > Getting Started > Navigating the User Interface and Managing your Data in SKUA-GOCAD
Who should attend?	Geoscientists, engineers, or other technical personnel interested in using 3D modeling technology to model reservoirs.

Objectives

Modeling Reservoir Architecture using GOCAD® is designed for geoscientists, engineers, and other technical personnel interested in using 3D modeling technology for reservoir or velocity modeling purposes. This course provides an opportunity to quickly get started with SKUA-GOCAD™: Students will become familiar with the interface, and progress through a series of comprehensive exercises to learn how to use GOCAD workflows to create structural models, and 3D stratigraphic grids.

Contents

- Fundamentals of SKUA-GOCAD for Reservoir Modeling introductory course (see “Fundamentals of SKUA-GOCAD for Reservoir Modeling” on page 18)
- Getting Started
 - Introduction
 - Reviewing Data and Geologic Setting
 - Opening Project and Selecting Modules

Continued on next page...

- Creating a Structural Model with the GOCAD Structural Modeling Workflow
 - Workflow Basics
 - Selecting Input Data
 - Defining Volume of Interest
 - Modeling Faults and Horizons
 - Fitting Faults to Markers
 - Modeling Fault o Fault Contacts
 - Modeling Horizon to Fault Contacts
 - Fitting Horizons to Well Markers and Checking the Model
- Creating a Stratigraphic Grid with the GOCAD 3D Reservoir Grid Building Workflow
 - Preparing Data for Modeling
 - Background Concepts
 - Building a Grid with the 3D Reservoir Grid Building Workflow

Interpretation and Modeling

Velocity Modeling and Calibration using SKUA

Details	
Duration	1 to 2 days
Prerequisites	<ul style="list-style-type: none"> ● Background in geosciences ● Some experience in SKUA-GOCAD™, or attend the Modeling Reservoir Architecture using SKUA class
Who should attend?	Geoscientists, engineers, or other technical personnel interested in using 3D modeling technology to model reservoirs.

Objectives

Learn how to make the most of SKUA® unique technology to build geologically constrained velocity models and perform efficient time-to-depth conversion. Unlike other solutions where structural complexity is a limiting factor, SKUA structural and stratigraphic modeling enables accurate time-to depth conversion in salt and structurally complex environments, and provides all the tools needed to create geologically realistic velocity models.

Contents

- Importing data
- Creating a SKUA structural model and geologic grid in a salt environment
- Building a velocity model using seismic velocity
- Calibrating the velocity model to well data
- Time-to-depth conversion of interpretations, seismic cube, SKUA model and geologic grid
- Capturing trends in velocity models
- Building a velocity model using well data
- Building a velocity model from well velocity for time-to-depth conversion
 - Perform a quick time-to-depth conversion using pseudo-velocity
 - Build a 3D velocity model using sonic velocity logs
 - Learn how to capture trends in velocity models

Interpretation and Modeling

Prospect Generation Workflow

Details	
Duration	2 days
Prerequisites	Working knowledge of at least one of the products covered in the course: Stratimagic®, VoxelGeo®, SeisEarth® XV
Who should attend?	Intermediate to Advanced users of Paradigm® interpretation software
Applications	3D Canvas, BaseMap, VoxelGeo, and Stratimagic

Objectives

This fast-paced two-day course follows an interpretation workflow which integrates several different Paradigm products. The purpose of the course is to teach intermediate to advanced users of Paradigm interpretation products how to integrate multiple Paradigm products in a best-practices workflow to accomplish interpretation goals.

The workflow starts with data reconnaissance and structural framework interpretation using 3D Canvas and BaseMap, followed by prospect area visualization and mapping in VoxelGeo, and finally generating a seismic facies map at the prospect using Stratimagic.

The results are then compiled and examined in 3D Canvas.

Contents

Specific topics covered in this course include:

- Getting Started:
 - Opening the Project
 - Examining the Data in 3D Canvas

Continued on next page...

- Interpreting Faults and Horizons in SeisEarth
 - Picking faults in 3D Canvas
 - Using manual fault picking tools
 - Adding multi-directional picks
 - Creating a fault T-surface
 - Using FaultTrak
 - Picking horizons in 3D Canvas
 - Using the 3D Propagator
 - Editing the propagation results
 - Creating horizon attribute maps in BaseMap
- Examining Prospects in VoxelGeo
 - Visually isolating prospects using Subvolume Detection and opacity
 - Examining attribute information at the targets using the Volume Crossplot
- Performing Facies Analysis in Stratimagic
 - Use Neural Network Technology (NNT) to classify the seismic facies

Interpretation and Modeling

Introduction to Well Correlation using StratEarth

Details

Duration	3 days
Prerequisites	<ul style="list-style-type: none"> ● A background in geology or geophysics is required. ● Complete the following courses available in Paradigm Online University: <ul style="list-style-type: none"> — Online Training > StratEarth > Working with Well Track Templates in Vertical Sections in StratEarth — Online Training > StratEarth > Well Correlation in StratEarth — Online Training > StratEarth > Using Cross Sections for Geologic Interpretation in StratEarth
Who should attend?	This course is designed for geologists, geoscientists, engineers, and other technical staff who are interested in performing well correlation in Epos
Applications	StratEarth, 3D Canvas, and BaseMap

Objectives

This introductory course teaches users how to make the most of StratEarth, BaseMap, 3D Canvas capabilities for enhanced geologic interpretation and well correlation within a context of field development. It is not intended to be a comprehensive course covering all of the products' functionality. In this course the student progresses through a series of comprehensive exercises which include managing well data, correlating wells, creating maps and computing volumetrics and deliverables.

Contents

- Overview
- Reviewing and Activating Well Data
- Well Correlation in StratEarth
- Creating Maps in BaseMap and 3D Canvas
- Volumetrics and Deliverables

Processing & Imaging

Seismic Data Processing with Echos

Details	
Duration	4 days
Prerequisites	None
Who should attend?	Experienced seismic data processors, new Echos users

Objectives

Learn about the interactive and processing approaches to using **Echos**, and the wide range of modules available in Echos®. Echos is a workstation-based processing system that combines interactive and batch, prestack and poststack processing in one unified, Windows-based system.

Contents

- Getting Started in Echos
- Epos Data Management
- Echos Orientation and Data I/O
- Land Geometry
- Marine Geometry
- View Data and Interactive Job Building
- Amplitude Corrections/Signal Processing
- Signal Enhancement/Noise Elimination
- Picking First Breaks and Static Solutions
- Floating Datum Processing
- Velocity Analysis
- ETA Analysis
- Residual Statics
- Data Regularization, DMO and Post-Stack Processing
- Migrations

Processing & Imaging

Depth Velocity Model Building and Depth Imaging using GeoDepth 3D

Details	
Duration	3-5 days depending on chapters covered. 5 days is recommended.
Prerequisites	Some familiarity with Paradigm® products
Who should attend?	New GeoDepth® users, Geophysicists
Applications	GeoDepth 3D, Earth Domain Imaging Migrations, FastVel™, 3D Grid Based and 3D Model Based Tomography

Objectives

This training course is designed to introduce new and existing users to the working environment and applications in GeoDepth. The course guides the student through Paradigm's recommended basic time to depth velocity analysis workflows using GeoDepth and time to depth migrations.

This training manual covers basic workflows in GeoDepth 3D and offers students two alternatives for building the initial model, a structure independent workflow and a layer based model building workflow. This is followed by two chapters describing alternative depth model refinement workflows.

The training manual offers a detailed step-by-step description of each workflow, including operational information about each application, as well as theoretical considerations and practical hints regarding each step. The training manual maintains a realistic production-oriented approach, and emphasizes correct practices (e.g. correct setup, QC of results after each stage, etc.).

Contents

- Introduction, Setup, Data Loading and QC
 - Launching the Session Manager and overview
 - 3D Survey Setup and QC
 - Seismic and Velocity Data Loading and Data QC
 - Interpretation Data Loading and QC
 - QC and Preparation of Velocity Data

Continued on next page...

- Initial Velocity Model Building
 - Initial Depth Interval Velocity Volume Creation with Constrained Velocity Inversion (CVI)
 - Target Line 3D Kirchhoff Prestack Depth Migration
 - Automatic Residual Velocity Analysis
 - Velocity Volume Update with CVI
 - Horizon Interpretation Depth Scaling
 - Preparation for Horizon-Based Velocity Model Building
 - DIX Conversion and Map Migration
 - Horizon-based Interval Velocity Volume Creation
- 3D Prestack Depth Migration and Grid Tomography
 - Prepare for Prestack Depth Migration
 - Target Line 3D Kirchhoff Prestack Depth Migration
 - Calculate Structural Attributes and Create Pencils
 - Preparation for Tomography
 - 3D Grid Tomography
 - Final Depth Migration
- 3D Prestack Depth Migration and Model-based Tomography
 - Prepare for Prestack Depth Migration
 - Target Line 3D Kirchhoff Prestack Depth Migration
 - Calculate Structural Attributes and Create Pencils
 - Preparation for Tomography
 - 3D Model Based Tomography
 - Final Depth Migration

Processing & Imaging

Depth Velocity Model Building and Depth Imaging using GeoDepth 2D

Details	
Duration	2 days
Prerequisites	Some familiarity with Paradigm® products, reviewing the Paradigm Online University CVI course
Who should attend?	New GeoDepth® users, Geophysicists
Applications	GeoDepth 2D: Velocity Navigator. Constrained Velocity Inversion

Objectives

This two day training course teaches students how to create and update an Interval Velocity Section using GeoDepth 2D. The course teaches two workflows: Workflow #1: Creating an Initial Interval Velocity Section using Constrained Velocity Inversion (CVI) and Workflow #2: Creating an Initial Interval Velocity Section using Coherency Inversion Analysis.

Students are requested to review the [Paradigm Online University](#) Constrained Velocity Inversion training course before taking this course.

Contents

- Introduction
 - Getting Started
 - QCing the Input Data
 - Preparing the Data
- Workflow #1: Creating an Initial Interval Velocity Section using CVI
 - Creating an Initial Interval Velocity Section using CVI
 - Updating the Depth/Interval Velocity Model – Vertical Mode
- Workflow #2: Creating an Initial Interval Velocity Section using Coherency Inversion Analysis
 - Performing Coherency Inversion Analysis
 - Updating the Depth/Interval Velocity Model

Processing & Imaging

Modeling and Imaging with Anisotropy in GeoDepth

Details	
Duration	2 days
Prerequisites	<p>Introduction to GeoDepth 3D training course or prior experience using GeoDepth in isotropic workflows, these Paradigm Online University videos:</p> <ul style="list-style-type: none"> • Online Training > GeoDepth > Anisotropy in Seismic Modeling and Imaging • Online Training > GeoDepth Time Preserving Model-Based Tomography (2 videos)
Who should attend?	Experienced GeoDepth® users, Geophysicists
Applications	GeoDepth, Tomography, and Migrations

Objectives

Introduces existing users of GeoDepth to its usage in anisotropic modeling and imaging workflows. The course guides the student through a series of recommended anisotropic workflows, using GeoDepth and tomography and migrations. It starts with an initial isotropic velocity model; students learn how to generate and update anisotropic models, by performing a number of workflows (ISO-VTI, VTI-VTI, ISO-TTI). The student learns how to use both welltie and travelttime grid tomographies, in order to tie seismic to well data, update anisotropic parameters (delta, epsilon), and obtain improved models suitable for input to anisotropic imaging.

Contents

- Preparing for Anisotropic (Welltie) Tomography
- ISO to VTI (Welltie) Tomography
- Prestack Depth Migration
- Preparing for Anisotropic (Travelttime) Tomography
- VTI (Travelttime) Tomography
- Prestack Depth Migration
- ISO to TTI (Welltie) Tomography
- Prestack Depth Migration

Reservoir Characterization & Petrophysics

Essentials for Performing Log Analysis using Geolog

Details	
Duration	3 days
Prerequisites	Background in geology, petrophysics, or well log analysis.
Who should attend?	All Geolog® users, specifically new users
Applications	Geolog primary applications and Determin

Objectives

Learn the general basics of **Geolog** primary applications, with hands-on exercises that illustrate most of their features and functions. The course covers:

- Managing working projects
- Loading and exporting data
- Managing Geolog applications
- Opening, formatting, and saving document views
- Using menus, tool bars, and other functions common throughout Geolog
- Displaying, browsing, interpreting, and modifying data

This course is designed for geologists, petrophysicists, or other technical personnel interested in using the Geolog product suite for well data management, petrophysical analysis, and geological interpretation. It is for new users and is not intended to be a comprehensive course covering the full functionality of Geolog. The objective is to teach the basics of using Geolog prior to a student's use of more advanced modules.

Continued on next page...

Contents

- Geolog overview
 - Introduction to Geolog and getting started
 - Visualizing data in Map View
 - Visualizing data in wells
 - Customizing your workspace and creating custom menus
 - Using the Online Help
- Creating a new project and importing data
 - About the Geolog environment
 - Creating a new project
 - About importing data
 - Loading LIS/LAS/Flat ASCII/Geolog ASCII format data files
 - Transferring data between projects
 - Copying data from XLS format file
- Displaying and formatting well data in a layout
 - Creating and preparing a new layout
 - Displaying data in tracks
 - Formatting the layout
 - Controlling data display
- Interpreting and editing data
 - Using QC tools in Project
 - Copying project files between locations
 - Interpreting and editing data graphically in a Layout View
 - Interpreting and editing data with the Module Launcher
- Reviewing and exporting Data
 - Checking wells in Mapsheet
 - Creating a montage with formatted Document Views
 - Exporting data
 - Reviewing Audit Trail

Reservoir Characterization & Petrophysics

Borehole Image Processing and Analysis

Details	
Duration	2 days
Prerequisites	A working knowledge of Geolog®
Who should attend?	Geoscientists interested in using, processing, or enhancing wellbore images, all Geolog users, new users of Geomage
Applications	Geomage

Objectives

Learn to use this Geolog module, an advanced analysis tool kit allowing users to process, enhance, and analyze vendor specific image tools and logs. This training course is designed for users who are new to the borehole image processing and analysis modules within Geolog. It teaches how to process and analyze image logs, and guides you through typical workflows and procedures.

Contents

- About borehole imaging in Geolog
- Loading well data
- Well borehole image quality check
- Speed correction
- Image generation
- Borehole Image processing: Utilities
- Borehole Image processing: Post-processing
- Dip computation and analysis
- Fracture analysis
- Borehole shape analysis
- Image analysis
- Automatic texture detection
- Walkout plot and stereonet
- Wireline borehole imaging tools

Reservoir Characterization & Petrophysics

Integrated Interpretation using Geolog

Details	
Duration	1 day
Prerequisites	A working knowledge of Geolog 7 and proficiency in using Geolog's Well and Project applications.
Who should attend?	Geologists, Geophysicists, and Petrophysicists
Applications	Section and Correlation

Objectives

This course teaches you the basics of using Section by guiding you, step by step, through the procedures to:

- Create and display graphical plan and section views of the well path
- Calculate TVD, TVT, TST and Vertical Section (VS) if required data is available
- Graphically define a section using Geolog's Project Map application
- Edit existing sections
- Format the section
- Add interpreted geological surfaces to your section
- Add interpreted geological features to your section such as faults
- Import 3D surfaces and view them against well paths
- Use Correlation in conjunction with Section to aid interpretation
- Display fluid contacts
- Create simple schemes to display in correlations

Contents

- Preparing Data
- Starting Line of Section
 - Line of Section Views

Continued on next page...

- Generating Sections
- Displaying and Interpreting Between Wells
- Dynamic Pick Updates Between Correlation and Section
- Fluid Contacts
- Simple Scheme Create
- Importing 3D Surfaces to Help with Correlations
- Putting It All Together

Reservoir Characterization & Petrophysics

Deterministic Petrophysical Log Analysis using Geolog

Details	
Duration	2 days
Prerequisites	A working knowledge of the Geolog® software, and of basic Petrophysics
Who should attend?	Geologists, Petrophysicists
Applications	Well and Loglan

Objectives

Learn how Geolog can be used as a tool for performing advanced deterministic petrophysical well evaluations. Determin is a comprehensive suite of individual deterministic modules that allow the analyst to apply all the major modern petrophysical models in the traditional analysis methodology. All common techniques for shale/clay volumes, porosity, saturation and lithology determination are included. Interactive parameter picking and multi-zone/multi-well analysis provide a rapid workflow for the formation evaluation. Students are also introduced to Loglan, the Geolog programming tool.

Contents

- Determin Overview
- Using the Evaluate module
- Geolog's Frequency (Histogram) View
- Geolog's Xplot View
- The different types of Xplot functions supplied with Geolog
- Deterministic Petrophysics
- Petrophysics Philosophy
- Parameter Picking
- Analysis
- Multiwell Analysis
- Create a new Loglan Program (Geolog's programming tool)

Reservoir Characterization & Petrophysics

Multiple Mineral Analysis and Interpretation using Geolog Multimin

Details	
Duration	2 days
Prerequisites	<p>To gain the most from this training course, the following prerequisites are required:</p> <ul style="list-style-type: none"> ● A working knowledge of the Geolog® system and its conventions, the methods to import data into the software, and the way data is stored. ● A working knowledge of the methods used in Geolog to perform basic preparation tasks for petrophysical data including: <ul style="list-style-type: none"> — depth-matching, editing and despiking for petrophysical logs — environmental corrections — data displays — crossplotting ● A general understanding of petrophysics, including the concept of response equations for tools, and the methods used to calculate shale volumes, porosities and water saturations. An appreciation of cation-exchange based methods for water saturation determination would be beneficial, as would an understanding of mineralogy effects on tool responses. ● Grounding is given in the Paradigm® theoretical tutorial, "Probabilistic Petrophysics - Optimizing Methods in Formation Evaluation". This tutorial is based on the Multimin Technical Reference documentation. An understanding of the detailed mathematics is helpful, but not essential.
Who should attend?	Petroleum geologists, engineers, and petrophysicists
Applications	Project and Well

Objectives

Provide the formation evaluation professional with an understanding of the theoretical basis of the optimizing approach to petrophysical interpretation, a good understanding of how to create models in Multimin, and how to run optimizing evaluations within the **Geolog** environment. Multimin is a software program that provides advanced formation evaluation answers. The program is based in the probabilistic, or optimizing, approach to modeling wireline and rock data.

Continued on next page...

Contents

- Introduction to Multimin and Data Preparation
- First Example - Multimin Analysis
- First Example - Alternative Interpretations
- Complex Example
- Verification Example
- Silt Procedure
- NIMBLE Example
- Carbonate Example
- Multimin Aliases

Reservoir Characterization & Petrophysics

Introductory Loglan Programming in Geolog

Details

Duration	2 days
Prerequisites	Basic familiarity with the Geolog® environment
Who should attend?	Geolog users and programmers

Objectives

Learn how to develop log processing modules to perform your own processing algorithms on your Geolog data. These modules will be fully integrated into the Geolog environment, and will function in exactly the same way as any other module in **Geolog**. A number of exercises are included throughout to demonstrate concepts and to allow you to check your progress.

Contents

- How to write a program
- Create a new program
- The Loglan environment
- Loglan program development interface
- The Module Launcher interface
- Loglan language syntax
- Arrays in Loglan
- Log constants
- External functions
- Module processing
- Creating a combined module
- Additional optional exercises
- Introduction to Macro Reader

Reservoir Characterization & Petrophysics

Tcl Programming in Geolog

Details	
Duration	1 day
Prerequisites	Basic familiarity with Paradigm® products
Who should attend?	Geolog users and programmers who wish to develop modules for log processing, database access, information management and report generation.

Objectives

Learn how to create applications that complement the functionality of Geolog. This course is designed to teach students to develop their own modules for log processing, database access, information management, and report generation using Tcl instructions and the Geolog extensions to Tcl. These modules will be fully integrated into the Geolog environment and function in exactly the same way as any other module in the Geolog environment.

Contents

- Introduction to Tcl programming language
- Creating your first Tcl program
- Understanding the basics
- More Tcl Basics
- TCl Variables
- Expressions and Numbers
- Flow Control
- String Manipulation
- Procedures
- Input and Output'
- Error Handling
- Putting It All Together
- GEOLOG Extensions
- Making Your Own Library

Continued on next page...

- Using Geolog's Interpreters
- Building a Geolog Module
- log_dbms: Geolog Database Command Language

Reservoir Characterization & Petrophysics

Full Waveform Sonic Processing using Geolog

Details	
Duration	1 day
Prerequisites	This advanced class presumes that participants are experienced with basic Geolog® functionality and module processing.
Who should attend?	Geoscientists concerned with processing and interpretation of acoustic waveforms in Geolog.

Objectives

This course is designed for users of Paradigm's Geolog Full Waveform Sonic modules. It teaches the basics of using the array sonic processing tools by guiding the student through a typical workflow and procedures to:

- Become familiar with array sonic waveforms
- View/create an array sonic tool specification
- Create other attributes for a given waveform
- Unpack "packed waveforms" to the individual receiver logs
- Perform data analysis and pre-processing of waveforms
- Remove noise from waveforms using a depth average, time average and frequency filter
- Remove gain and normalization amplitudes added to waveforms during data acquisition
- Process dipole and monopole waveforms
- Perform automatic and interactive picking of arrivals
- Perform dispersion correction
- Travelttime overlay
- View the Semblance display for diagnostic analysis

Contents

- Well Data Review
- Data Preparation

Continued on next page...

- Preprocessing
- Slowness Processing
- Postprocessing
- Quick Run
- Dispersion Correction Discussion

Reservoir Characterization & Petrophysics

Geolog for Petrophysicists

Details	
Duration	4 days
Prerequisites	None
Who should attend?	Petrophysicists, Geologists, Geoscientists
Applications	Well, Connect, Project, Artist, Loglan

Objectives

Gain a comprehensive overview of the general basics of the primary applications, with hands-on exercises that illustrate most of their features and functions. Students are then guided through the deterministic petrophysical workflow and introduced to the Loglan programming language. This course is designed for new users of the software.

Contents

- Essentials for Performing Log Analysis using Geolog
Gain a general grounding in the primary Geolog applications. Learn to start Geolog, open Geolog applications and document views within the applications, use the menus, tool bars and other functions common throughout Geolog, and manage their working projects.
- Connect
Go through loading and exporting data using different file formats and various file transfers such as project to project.
- Well
Learn the basics of using the well application by being guided through a typical workflow and procedures that familiarize the student with Geolog's Well interface and the various track types used in a layout. Participants learn how to create their own layout, view and modify well data in text (table) format using Well's text view, view and modify well data using a graphical interface and generate and modify data using a series of utilities (modules) designed for specific tasks.

Continued on next page...

- Project
Learn how to prepare the data for processing in the current working session, become familiar with mapsheets (basemaps), format mapsheet displays, use mapping tools to display data in various formats, view and search all, or a subset of, the data in a project using the Well Catalogue view.
- Determin
Learn how Geolog can be used as a tool for performing deterministic petrophysical well evaluations. All common techniques for shale/clay volumes, porosity, saturation and lithology determination are included. Interactive picking using crossplot and frequency plot and multi-zone/multi-well analysis provide a rapid workflow for the formation evaluation.
- Loglan
Gain basic skills necessary for creating and running a Loglan module. Loglan is a fully functional programming language which is written, compiled and executed within Geolog. It allows users to develop their own modules to perform log processing and many other applications.

Reservoir Characterization & Petrophysics

Geolog for Geologists

Details	
Duration	4 days
Prerequisites	None
Who should attend?	Geologists, Geoscientists
Applications	Well, Connect, Project, Artist, Section

Objectives

Learn the general basics of the primary Geolog® for Geologists applications, with hands-on exercises that illustrate most of their features and functions. Students are exposed to the Section and Correlator applications, tools designed for cross-section creation and interactive correlation picking. This course is designed for new users of the software.

Contents

- Essentials for Performing Log Analysis using Geolog

Gain a general grounding in the primary Geolog applications. Learn to start Geolog, open Geolog applications and document views within the applications, use the menus, tool bars and other functions common throughout Geolog, and manage working projects.
- Connect

Load and export data using different file formats and various file transfers such as project to project.
- Well

Gain an understanding of the basics of using the Well application by being guided through a typical workflow and procedures in order to become familiar with Geolog's Well interface and the various track types used in a layout. Learn how to create a customized layout, view and modify well data in text (table) format using Well's text view, view and modify well data using a graphical interface and generate and modify data using a series of utilities (modules) designed for specific tasks. Learn about the Wellpath view, TVD calculation and the importance of this step for dip picking, Xplot view, frequency plot view and multi-well log analysis.

Continued on next page...

- **Project**

Acquire the skills necessary to prepare the data for processing in the current working session, become familiar with mapsheets (basemaps), format mapsheet displays, use mapping tools to display data in various formats, view and search all, or a subset of, the data in a project using the Well Catalogue view.
- **Artist**

Learn how to open new and edit existing pictures, display and position graphic objects, use variable and static text to create a header for use in Geolog layouts and create new fill and marker patterns.
- **Section**

Gain an understanding of the procedures for displaying vertical and deviated wells, interactive correlation picking and applying geological drawing tools and line styles to cross sections.
- **Correlator**

Progress through the workflow for performing interactive correlation picking: creating a Project well, loading and modifying an existing Project well, creating and editing stratigraphic interpretation schemes, well partitioning on horizontal wells, and adding interpreted geological surfaces.

Reservoir Characterization & Petrophysics

Advanced Geolog

Details	
Duration	5 days
Prerequisites	Basic Geolog® knowledge
Who should attend?	Experienced Geolog users
Applications	Well, Loglan, Tcl

Objectives

Gain a comprehensive overview of Multimin (probabilistic, or optimizing, petrophysical analysis) and Geolog programming using Loglan and Tcl.

Contents

- Multimin

Multimin is a software program that provides advanced formation evaluation answers. The program is based on the probabilistic, or optimizing, approach to modeling wireline and rock data. The formation evaluation professional will gain an understanding of the theoretical basis of the optimizing approach to petrophysical interpretation, a good understanding of how to create models in Multimin and how to run optimizing evaluations within the Geolog environment. Students will work through several exercises highlighting different modeling challenges, such as bad hole, heavy minerals and secondary porosity.

- Loglan

Loglan is a fully functional programming language which is written, compiled and executed within Geolog. It allows users to develop their own modules, easily accessible from Geolog's Well or Project applications, to perform log processing and many other applications. Learn the basics of the Loglan programming language, how to develop a module using the language, and how to run the module from within Well or Project.

Continued on next page...

- Tcl Programming

Tcl, the Tool Command Language, is a platform independent easy-to-learn scripting language that is an integral part of Geolog. Learn how to develop programs using Tcl commands and Geolog extensions to create applications that complement the functionality of Geolog.

Reservoir Characterization & Petrophysics

Electrofacies Analysis using Geolog Facimage

Details	
Duration	2 days
Prerequisites	Background in geosciences, some prior experience with Geolog® is recommended.
Who should attend?	Geolog users, new Facimage users
Applications	Facimage

Objectives

This course covers the Facimage functionality in **Geolog**. It introduces Facimage methodology and provides hands-on experience with electrofacies analysis and data modeling. It focuses on Facimage MRGC (Multi Resolution Graph Based Clustering) and KNN (K-Nearest Neighbor) approach. This method allows a simple, fast, and effective integration of all types of petrophysical and geological information: conventional logs, array and image logs, core measurement, and core description. This training course teaches the student how to:

- Identify and select Training Datasets for use with the application dataset.
- Analyze Training Datasets for coherence with the application dataset.
- Perform Facies propagation to create electrofacies.
- Perform log prediction: log reconstruction and core data prediction.
- Perform comparison among cluster models using various methods.

Contents

- Define Objectives
- Data Preparation
- Basic Workflow
 - Create a Facimage Project
 - Insert a Cluster Model
 - Facies Propagation
- Features

Continued on next page...

- Training Data
- Comparing MRGC Electrofacies to a Lithology Log
- Similarity Modeling
- Log Prediction
- Electrofacies Ordering -CFSOM
- NMR T2 Electrofacies
- Synthetic Clustering

Reservoir Characterization & Petrophysics

Geolog Site Administration

Details	
Duration	2 days
Prerequisites	Knowledge of Linux and/or Windows administration
Who should attend?	Administrators of Paradigm's Geolog product
Applications	Geolog

Objectives

This training course is designed for administrators of Paradigm's Geolog products. It provides a wide-ranging knowledge of Geolog site administration, teaching the student how to install, configure and maintain Geolog.

This course can be combined with the System Administration and Database Management course. See "System Administration and Database Management" on page 1-8.

Contents

- Customer Support Hub
- Geolog installation
- Licensing
- Geolog Configuration
- Navigating Online Help
- Project Structure
- Project Management
- Geolog Database
- Peripherals
- Tcl

Reservoir Characterization & Petrophysics

NMR and NMR2D using Geolog

Details

Duration	2 days
Prerequisites	Essentials for Performing Log Analysis using Geolog
Who should attend?	Geolog Users
Applications	Geolog

Objectives

This course introduces students to the Geolog NMR and NMR2D modules. Both the theory behind NMR and NMR2D measurements and the workflows associated with the modules are covered.

Contents

- Data Loading
- CMR 1D Data Set QC & Inversion
- T2 Analysis
- MRX 2D Data Set Workflow
- MReX2D Data Set Workflow
- Appendix 1 - NMR Theory
- Appendix 2 - NMR Tools and Logging Services
- Appendix 3 - NMR and Petrophysics
- Appendix 4 - Inversion Revisited
- Appendix 5 - Glossary and References

Reservoir Characterization & Petrophysics

Rock Physics (Including Pore Pressure Prediction)

Details	
Duration	2 days
Prerequisites	A good working knowledge of Geolog is required and proficiency in Geolog's Well application, having a good understanding of log manipulation and interrogation.
Who should attend?	Geolog Users
Applications	Geophysics application within Geolog

Objectives

This training course is an introduction to the Geophysics application within Geolog, where you will learn how to generate a synthetic seismic trace. The various modules and their capabilities are studied in a logical series of steps, which the geoscientist uses to create the synthetic. In the second section of the course, the fluid substitution workflow will be examined.

Contents

- Geophysics and Fluid Substitution Workflow Overview
- Data Preparation
- Welltie
- Seismic Tie
- Filters
- Synthetic
- Generate an AVO Synthetic
- Model Well
- Pore Pressure
- Fluid Properties
- Gassmann Model
- Bounds

Continued on next page...

- Additional Exercises
- Extending the Wire Set to Match the Checkshot Set
- Depth to Time Conversion
- Synthetics for a Vertical Well
- TVD Synthetics for a Deviated Well
- Sources of Errors in Well to Seismic Ties
- Empirical Relations
- Effective Medium Models
- Contact Models

Reservoir Characterization & Petrophysics

Reservoir Characterization using Probe and Vanguard

Details	
Duration	4 days
Prerequisites	Familiarity with 3D Canvas, Well Log and Section windows and a basic understanding of the Epos® database. A basic understanding of prestack seismic data.
Who should attend?	Geoscientists interested in using log analysis, AVO attributes and Seismic Inversion to combine information from well data, and poststack and prestack seismic data for prospect identification.
Products and Applications	Probe® and Vanguard®, Probe, Vanguard (these are products); 3D Canvas, Well Log Window, BaseMap, Section Window, 2D Canvas (or AVO Inversion and Analysis window on Linux)

Objectives

Learn how to easily use tools available in Paradigm's Probe® (AVO) and Vanguard® (seismic inversion) to identify hydrocarbon prospects by combining data from well logs and post- and prestack seismic. This course provides a thorough introduction to elastic wave theory, rock physics, AVO theory, and seismic inversion. This course integrates petrophysical analysis, rock physics, AVO analysis and seismic inversion along with powerful 3D visualization techniques to identify, visualize and validate hydrocarbon prospects.

Contents

- Elastic Wave Theory
- AVO Theory
- Analyzing Well Data for Fluid Anomalies
 - Examine logs using Templates in Well Log Window
 - Generate and analyze Rock Physics logs

Continued on next page...

- AVO Analysis and Classification
 - Use Synthetic modeling to generate AVO logs
 - Examine AVO effect on well data
 - Examine prestack data for AVO effects
 - Use RMO attributes to check gather quality
 - Gather conditioning using FastVel
 - Use AVO Inversion to generate AVO attributes and Angle Stacks
 - Use Crossplotting tools to analyze and classify AVO effects in the seismic data.
- Petrophysical Analysis of the Seismic Data (Seismic Inversion)
 - The Inversion Workflow
 - Well calibration and wavelet extraction
 - Fluid substitution
 - Creating a background model
 - Generating rock property volumes using prestack maximum likelihood inversion (PMLI)
 - QC the inversion results
- Target Identification and Visualization
 - Identify and display prospects in 3D using crossplotting and visualization tools in 3D Canvas
 - Compare AVO results with Inversion results
 - Validate targets using the corrected gather

Reservoir Characterization & Petrophysics

AVO Inversion and Analysis using Probe

Details	
Duration	1.5 days
Prerequisites	Familiarity with 3D Canvas, Well Log and Section windows and a basic understanding of the Epos® database. A basic understanding of prestack seismic data.
Who should attend?	Geoscientists interested in analyzing AVO effects on prestack seismic and log data to identify hydrocarbon prospects.
Applications	Probe® and Vanguard®

Objectives

This course covers how to use Paradigm's AVO functionality available in Probe® to identify hydrocarbon prospects by generating and analyzing AVO attributes. The student learns and applies AVO theory and classification methods using synthetic modeling for well data and using powerful 3D computational and visualization techniques for prestack seismic data.

This course is taught by an instructor and uses short videos and hands-on exercises for self-paced learning. Videos are available during and after the course through [Paradigm Online University](#).

Contents

- AVO Theory
- Generating AVO attributes from log data using Synthetic Modeling
- Using QC RMO attributes to examine the quality of the gathers (creating pencils and using the prestack autopicker)
- Using NMO Tuning (Fastvel) to flatten the gathers
- Using AVO Inversion to generate angle stacks, and AVO attribute volumes
- Crossplotting
- 3D Visualization
- Overview of AVAZ functionality in Paradigm

Reservoir Characterization & Petrophysics

Seismic Inversion for Rock Property Analysis using Vanguard

Details	
Duration	2.5 days
Prerequisites	A basic understanding of prestack seismic data. Familiarity with 3D Canvas, Well Log and Section windows and a basic understanding of the Epos database.
Who should attend?	Geoscientists interested in using seismic inversion to generate and analyze rock property volumes for hydrocarbon prospects.
Applications	Probe® and Vanguard®

Objectives

Learn how to use Paradigm's seismic inversion functionality available in Vanguard® to generate rock property volumes for prospect analysis. This course follows a prestack inversion workflow incorporating log data and prestack seismic data using Paradigm's Prestack Maximum Likelihood Inversion method (PMLI). Learn how to prepare log data to create a background model and perform the seismic inversion. The student also learns how to QC and modify the inversion parameters to ensure the best results and use powerful 3D visualization tools to identify prospects. This course is taught by an instructor and uses short videos and hands-on exercises for self-paced learning. Videos are available during and after the course through [Paradigm Online University](#).

Contents

- Seismic inversion theory
- Understanding the background model
- Using Synthetic Modeling to generate global wavelets and scale factors
- Using Fluid Substitution to prepare logs for the background model
- Using Geostatistical Volume creation to generate the background model
- Using PMLI to generate rock property volumes
- Using log data and synthetic/residual gathers to QC the inversion results
- Using powerful 3D visualization and crossplotting tools to identify hydrocarbon prospects

Reservoir Characterization & Petrophysics

Facies Classification and Analysis in Stratimagic and SeisFacies

Details	
Duration	3 days
Prerequisites	Basic experience in 3D seismic interpretation
Who should attend?	Seismic interpreters and geophysicists working on reservoir characterization projects
Applications	Stratimagic and SeisFacies

Objectives

This course provides the student with a thorough understanding of seismic facies analysis, QC and classification in Stratimagic and SeisFacies. The course covers a wide variety of topics using workflows targeted toward different datasets and interpretation goals.

Contents

- Course Overview
- Seismic Facies Classification for Stratigraphic Analysis
 - Examine the Data
 - Interval Analysis
 - Unsupervised Neuronal Classification
 - Supervised Neuronal Classification
 - Multi-Attribute Neuronal Classification (Trace Facies)
 - Multi-Attribute Hybrid Classification (Volume Facies)
 - 3D Visualization of Facies Maps and Volumes in 3D Canvas
- Seismic Facies Classification for Non-Stratigraphic Analysis
 - Examine the Data and Create the Facies Volume
 - Create and Examine Thickness Maps
 - 3D Visualization of the Thickness Maps and Facies Volume

Reservoir Characterization & Petrophysics

Data Analysis and Property Modeling with SKUA-GOCAD

Details

Duration	2 days
Prerequisites	A background in geosciences is required. Optional: Complete the courses available in Paradigm Online University under Online Training > SKUA-GOCAD > Reservoir Characterization
Who should attend?	Geoscientists and Engineers

Objectives

A rigorous and systematic analysis of reservoir data is key to the construction of a reliable reservoir model. In this course the student progresses through a series of comprehensive exercises to gain a practical approach to reservoir data analysis and stochastic property modeling. The course teaches how to use the Data Trend Analysis workflow and the Reservoir Properties workflow to create robust and realistic 3D models of the lithology, porosity and permeability. This is followed by reservoir volumes computation and post-processing.

Contents

- Introduction to Data Analysis and Property Modeling
- Raw Data Analysis
- Discrete Property Modeling
- Continuous Property Modeling
- Reservoir Volume Computations and Post-Processing

Well Planning and Drilling

Introduction to Well Planning and Drilling Engineering using Sysdrill

Details	
Duration	2 days
Prerequisites	Students should have a basic familiarity with Windows operating system.
Who should attend?	Geologists, Drilling Engineers

Objectives

Introduces the student to the features and functionality of Sysdrill.

Contents

- Introduction to Sysdrill
 - Working with the Data Selector, Saving Data, Data Structure, Working with Spreadsheets, Catalogues, Graphs and Plots, and 3D View.
- Introduction to Well Planning
 - Starting Sysdrill, Data Setup, Introduction to Planned Wells, Boundaries and Line Calls, Other Planning Options, and Well Planning Challenge.
- Well Design
 - Well Planning and Engineering
- Drilling Workflow
 - Actual Wellbores, Project Ahead, and Sidetracks
- Data Exchange Between Databases
 - Importer and Exporter Utilities

Well Planning and Drilling

Advanced Well Planning and Drilling Engineering using Sysdrill

Details

Duration	3 days
Prerequisites	Students should have a basic familiarity with Windows operating system.
Who should attend?	Geologists, Drilling Engineers

Objectives

Introduces the student to Sysdrill's advanced features and functionality.

Contents

- Introduction to Well Planning
 - Getting Started, In Sysdrill, Data Setup
 - Introduction to Planned Wells
 - Creating a Planned Wellpath
- Well Design
 - Well Planning and Engineering, Torque and Drag Analysis, Jar Placement, Hydraulics Analysis, Cementing Analysis, Casing Analysis.
- Drilling Operations
 - Survey Management, Friction Factors, Project Ahead
- Data Exchange Between Databases
 - Importer and Exporter Utilities
- Clearance Analysis
 - Selecting Reference and Offset Wellbores, Running Clearance Analysis
- Extended Workflows - Integration with VoxelGeo
- Appendices: Working with Spreadsheets, Reporting, Basic Plotting, Catalogues, 3D View Summary, Working with Graphs and Plots, Further Help.

Well Planning and Drilling

Geosteer: Well Directional Steering

Details	
Duration	2 days
Prerequisites	Introduction to Well Data Processing course. An expert with Well module layouts and managing log data in text view. Familiar with variety of concepts including directional and horizontal wells; plan and section views of well paths; directional logs and survey calculations; planned and actual wells, drilling targets, position uncertainty; basic structural geology including true and apparent bed dips, conformability, and TVT/TST; LWD including real-time vs. memory; tool response characteristics including depth of investigation, radial and vertical response; image interpretation in high angle wells.
Who should attend?	Geoscientists interested in near real-time well directional steering in Geolog®.
Applications	Geosteer®

Objectives

Learn to:

- Create offset, planned, and actual wells
- Perform forward resistivity modeling
- Perform dip picking from image logs
- Perform exercises comparing planned vs. actual wells within Geosteer section and provide update to actual well path projection
- Export updates to geologic model

Geosteer is an advanced module supporting direction drilling operations based on comparison of planned vs. actual LWD logs. Geosteer uses Offset wells together with Planned and Actual wells in the Geosteer Section that allows update to the planned well based on actual LWD logs and forward resistivity modeling, and dip/thickness editing techniques and procedures.

Contents

- Creating and using Offset, Planned/Re-Planned, and actual wells in the Geosteer section
- Dip editing and Resistivity modeling

Continued on next page...

- Workflow processes
- Practical Geosteering exercises

Development

GOCAD/SKUA - Programming in GOCAD/SKUA Developer Kit Framework

Details	
Duration	3 days
Prerequisites	Experience in C++ required. Introduction to GOCAD® Base Module is recommended.
Who should attend?	This course is designed for computer scientists who would like to get started in the exciting arena of programming GOCAD.
Modules	GOCAD Developer Kit

Objectives

Gain an understanding of the basics for configuring your development environment and understanding the GOCAD Development Kit framework.

GOCAD is designed to support proprietary development. This introductory course is the foundation for all other GOCAD Development training and is essential if students want to attend any other modular training.

Contents

- Creating a plugin and configuring environment (Windows and Unix)
- Programming with CLI (Command Language Interface)
- Using API (Application Programming Interface) of Software Development Kit (SDK)
- Introduction to GOCAD Suite objects (GOBJ) and their capacities
 - Geometrical classes
 - Regions and properties
 - Archives and ASCII files
 - Coordinate System
- Overview of SKUA objects
- Introduction to Macro Commands

Development

GOCAD/SKUA - Developer Kit: Implementing Gobjs and User Interfaces

Details	
Duration	2 days
Prerequisites	Attending Programming in GOCAD Development Kit Framework class and experience in C++ required.
Who should attend?	This course is designed for computer scientists who are already familiar with the GOCAD® Development Kit Framework and who would like to learn more about Gobjs (GOCAD objects) and QT.
Modules	GOCAD Developer Kit

Objectives

Gain the skills necessary to create custom objects in GOCAD and implement interactivity with them. Learn how to develop advanced interfaces with QT. The workflow implementation is not addressed in this course.

Contents

- Creating your own Gobjs
 - ASCII converter factories
 - Graphic system
 - Styles and attributes
 - Interactive manipulation
- Programming with QT designer and GOCAD Suite Framework
 - Programming with signals and slots
 - Programming with QT designer

Development

Epos OpenGeo SDK

Details	
Duration	4 days. 5 days with well training.
Prerequisites	Developing experience in C++, basic knowledge of geophysics
Who should attend?	Developers

Objectives

Gain the skills necessary to work with OpenGeo®, one of Paradigm's development toolkits. The Epos OpenGeo devkit training teaches the students how to manage data in these domains:

- Epos project study
- Epos survey study (2D and 3D)
- Epos well study
- Project/survey metadata
- Seismic data: 3D, 2D, poststack, prestack
- Seismic interpretation: horizons, faults
- Vertical functions
- Well data

The course consists of a series of presentations that alternate with interactive sessions in which the student learns how to find the information using the OpenGeo navigator or go through examples of coding.

Contents

- Epos infrastructure
- Epos logical data model
- Epos OpenGeo devkit architecture
- Epos OpenGeo devkit libraries, structure, API
- Epos OpenGeo devkit navigator
- Epos OpenGeo devkit workflows and examples

Notes