

## 3D DESIGN FOR LAND SEISMIC OPERATIONS 2-DAY COURSE OUTLINE

### Day One

- 1. Overview and Introduction (8:00-8:30)**  
Introduce Mustagh and instructor(s)  
Introduce participants and background
- 2. Review of Basic Concepts (8:30-10:00)**  
Stacking and Random Noise  
Bandwidth and Resolution  
The Seismic Wavefield  
Spatial sampling at the surface  
Sparse sampling of wavefield  
Case history 2D vs 3D  
  
**- 15 Minute Coffee Break -**
- 3. Types of Noise (10:15-12:00)**  
Random – time variant  
Source Generated – offset variant  
    Trapped Mode  
    Guided waves  
    Scattered surface waves  
    Ground Roll  
    Shear converted surface waves  
  
**- 1 Hour Lunch Break -**
- 4. Basic 3D Grid (1:00-2:30)**  
Definition of terminology  
Coverage with single shot  
Basic building blocks – 1 fold  
Fold, Bin Size and Trace Density  
Example of how Fold can be mis-leading  
Development of 3D fold equation  
Offset Limited Fold  
  
**- 15 Minute Coffee Break -**
- 5. Examples of Design (2:45-3:30)**  
Modeller versus Designer  
2D versus 3D considerations  
    Full offset  
    Limited offset  
    2D vs 3D consequences
- 6. Aspect Ratio (3:30-5:00)**  
Bin Size versus Statistics  
“Analogue” statistical patterns  
Box Size versus Statistics  
Aspect Ratio  
    Imaging considerations  
    Operational considerations  
    Cost considerations

### Day Two

- 7. Geometry Imprinting (8:30-9:30)**  
Statistical patterns  
Patterns due to perturbation  
Skid and Offset guidelines  
Examples
- 8. LiDAR (9:30-10:00)**  
As a mapping and planning aid  
Analogy to 3D Philosophies  
  
**- 15 Minute Coffee Break -**
- 9. Model Types (10:15-12:00)**  
Three Orthogonals  
Two Bricks  
Two Diagonals  
Random  
Available statistics  
    Fold, Midpoint Scatter  
    Deviation in Offset  
    Missing Offsets  
Data Simulation  
  
**- 1 Hour Lunch Break -**
- 10. Design Considerations (1:00-2:30)**  
Overall Size and Shape  
    Rolling the Patch  
    Recording limitations  
    Migration margin and artefacts  
Deciding on the Desired Fold  
    Basic Structure  
    Wavelet Analysis  
    AVO  
    AVA  
    Structural Complexity  
    Noise  
  
**- 15 Minute Coffee Break -**
- 11. More Design Considerations (2:45-4:30)**  
Offset Considerations  
Source / Receiver line spacings  
    Flared Grids?  
Bin Size  
Bin geometry and mid-point scatter  
    Migration  
    Pre-Stack Migration  
    Limits of Spatial Resolution  
    Spatial sampling of 3D operators
- 12. Case History and Wrap-up (4:30-5:00)**