

Integrating Geoscience Interpretation and GIS for New Ventures and Exploration

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PRIMARY USE

-Evaluations / Data Rooms
/ Bid Rounds / Joint
Studies

-Regional Interpretation /
Play Mapping / Prospects

- › Basemap for each project (classified and annotated wells types, fields types, block types, bathymetry, DEM, georeferenced maps, facilities)
- › Well location and deviation survey types (match with well logs)
- › Define CRS and projection transformation for project and data (unique for Borneo due to historical company defs, drilling, Petronas defs)
- › Create grids / surfaces, contours and isopachs from Horizons (apply smoothing and algorithms)
- › Depth convert source grids / surfaces with formulaes (quick velocity model)
- › Create Fault polygons and classify faults from fault sticks. Edit if necessary.
- › Create Contours from grids
- › Create Prospect from contours and faults (define closure and structural trap)
- › Petroleum systems mapping (reservoir, source, seal, trap and timing)
- › Lead and prospect digitizing, classification and mapping
- › Map based volume calculation / thickness map
- › Lithology, age and stratigraphy
- › Final evaluation montage and presentation

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- › Regional database for Seismic and Well database updates (data not in IHS or DII database). Well reports and publications.
- › Well correlated with stratigraphy
- › Identify key reservoir and source depositional environments using core logs, wireline log and seismic interpretation
- › Well Post-Drill analysis and mapping
- › Sedimentation thickness and basins map
- › Lithology
- › Plate tectonics and basin evolution map (based on agreed model)
- › Create GDE polygons map – Gross Deposition Environment
- › Create and Edit Play maps
- › Gridding (density map)
- › Source Presence and Maturity Maps (depend on basin)
- › Regional Gross Structures
- › CRS map (common risk segment) and block ranking
- › Leads and Prospect Mapping
- › Country screening
- › Global basin screening

WELL INTERPRETATION AND GIS

- Table Queries and Selections
- Spreadsheet and formulae
- Mapping attributes
- Gridding
- Overlay in well logs

- › What type of basins being explored? Does basin contain source rock? Are the source rocks mature for petroleum generation?
- › What is the stratigraphy, lithology and age of the basin? Structural impact in the basin?
- › GIS database and mapping used for analyzing basins
- › Typical workflow
 - Input biostratigraphy well data
 - Input well spreadsheet with values of TD, Well Tops, Cycle, Lithology, Heat, CO2, Geochemistry, VR. Typically in Excel.
 - Integrate with wireline log and seismic data. Well to well correlation
 - Overlay and merge with GIS functions (table join and/or spatial join GIS function)
 - Map series for each sequence (also show structural configuration and lithofacies distribution)
- › Generate map / grid from spatial intersect using GIS for well tops penetration (point) with interval thickness (polygon)
- › Create temperature and CO2 grid map
- › Petroleum migration pathways
- › Creaming curves and field size distribution (can be misleading)
- › Overlay reservoir and field distribution map. QC with well logs
- › Understanding lithology (changes as more exploration done) for each sequence. Reference with well logs.
- › Overlay well failure analysis

SEISMIC INTERPRETATION AND GIS

- Pick Assist
- Seabed
- Basement
- Map reference
- Regional overlay
- GDE
- Gross Structure

- › Overlay 2D / 3D window with basemap (lease, fields), gross structure map, basin outline
- › Overlay seabed depth grid xyz after seismic depth conversion
- › Overlay basement depth grid xyz after seismic depth conversion
- › Overlay GDE polygons and Play fairways
- › Overlay block ranking
- › Regional biostratigraphic correlation overlay in seismic interpretation
- › Overlay tectonic polygons, gross structure and markers in seismic interpretation
- › Overlay georeferenced publication maps and studies on seismic map view
- › Regional grids overlay in seismic cross section
- › Seismic Navigation survey line QC and transform (2D has more issues)
- › Check and verify seismic shot point and CDP X and Y location
- › Search and display SEG Y coverage / lines

WAR MAPS

- Senior Management presentations
- Quarterly basemaps and reference
- Business development
- Shared maps with development and production
- Global basins database
- Newsletter and online maps

- › Competitor environment
- › Bid rounds, relinquishments and farm-ins
- › Seismic activity and availability
- › Well activity and recent discovery
- › Drilling statistics
- › Field discovered volumes (total in-place, recoverable and production charts)
- › Production trends and development options
- › Propects and Leads (link with risk matrix / mapping)
- › Portfolio Analysis (partnerships, acquisition)
- › GeoPDF, Map Packages

GEOMATICS AND GEODESY

-CRS and Projection
Transformations

-Seismic surveys

-Drilling surveys

-Offshore surveys

-Site surveys

-Engineering and facility
drawings

- › Accurate location map
- › Acreage map
- › Facilities map (incl platforms and pipelines)
- › Maps of expiring PSCs or farm-in potentials
- › Pock marks on seabed
- › Geohazards
- › Remote sensing, satellite imagery / radar and multispectral scanning
- › Well site survey, bathymetry, shallow hazards, abandoned wells
- › Define seismic survey boundaries

KEY MAPPING SOFTWARE

- Proven
- Strengths and Weakness
- Performance
- Productivity
- Learning curve
- Integration
- Support

- › Petrel
- › Kingdom SMT
- › DSG / OpenWorks
- › ArcGIS and Player
- › Petrosys
- › Trinity
- › BM Geographic Calculator
- › EDIN
- › Open Spirit

KEY VENDOR DATA

- Accuracy
- Coverage
- Frequency
- Applied
- Support

- › Magnetic / NOAA
- › Gravity / Sandwell
- › IHS
- › Woodmac / Petroview
- › DII
- › Tellus
- › PGSEA
- › CoreLabs
- › GEBCO
- › SRTM, Landsat
- › AAPG

- › GE TECH
- › JMJ
- › USGS
- › SeaMagic
- › OCTEK
- › NOAA
- › SEAPEX
- › SEARG
- › FUGRO SEEPS
- › DOTSEA
- › GEOMARK
- › C&C DAKS
- › PLATES
- › NEFTEX

CARTOGRAPHY AND LAYOUT

- Map templates
- Symbology
- Well definitions
- G&G Reports
- Database
- Map Standards
- Web services and online maps

- › MXD templates and versioning
- › corporate Layer files
- › Interpretation Project templates and study area (Landmark)
- › Well symbology definition
- › Geological symbols standards
- › Horizon colormaps
- › Grid colormaps
- › Fault symbology
- › Basemap layout and logo
- › CRS and measurement definition
- › Publish maps online / sharepoint / map package

DATA MANAGEMENT

-Process

-Database

-Search Engine

-Regulation / PSC

-Backup

- › Standardise workflow for data management – corporate and departmental
- › Record incoming data, CA (confidentiality agreements), data room history
- › Get manager buy in for workflow processes and staff responsible
- › Update central database with new and updated data (i.e. from well reports and geological reports)
- › Maintain strict folder structure for technical data and projects
- › Follow local PSC guidelines for data delivery and formats (i.e. Petronas PPGUA)
- › Record company block history (relinquishments, farm-ins, farm-outs, unitization etc)

QC DATABASE

- Wells
- Seismic

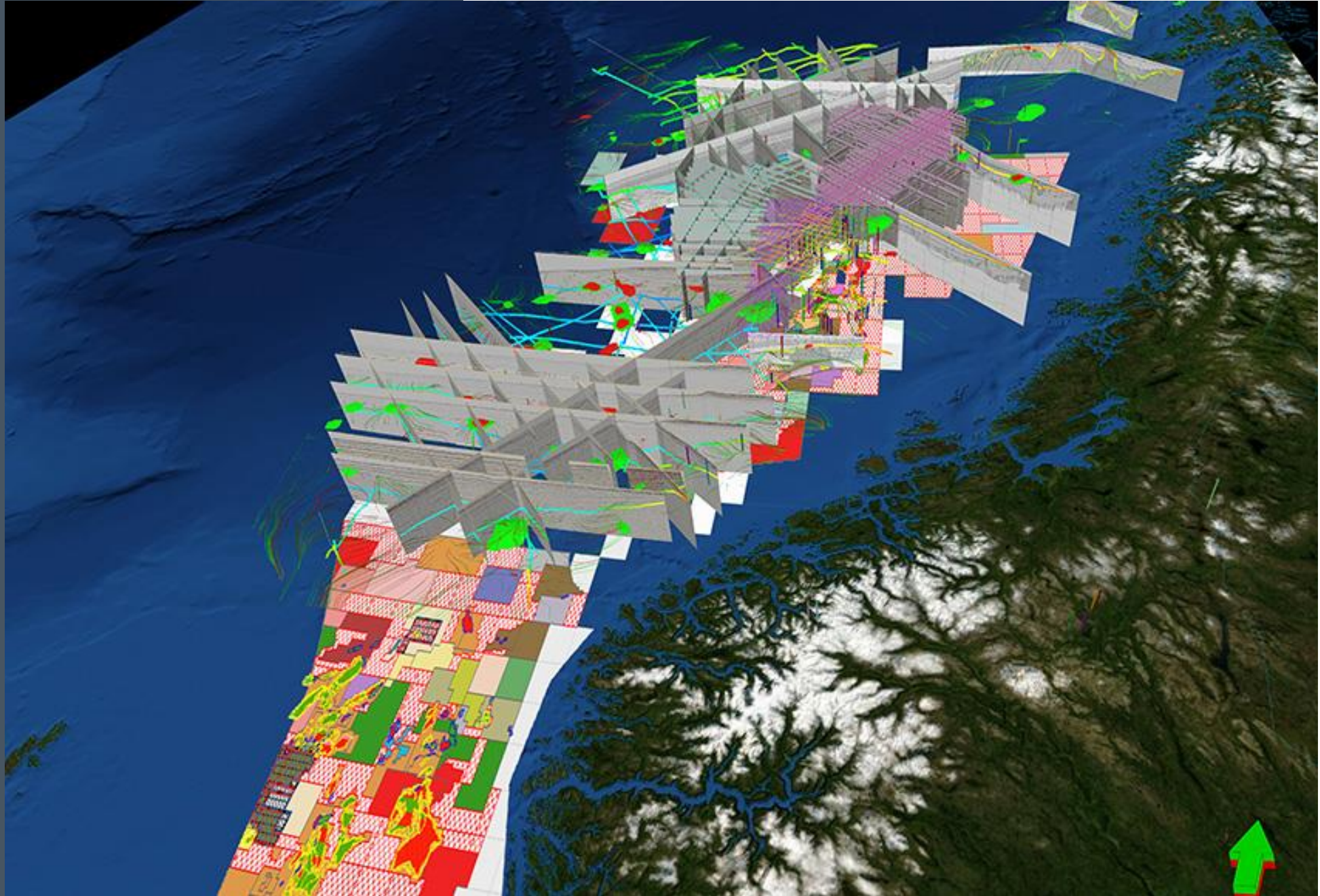
- › Overlay IHS and Woodmac wells and query buffer distance with data in interpretation software (i.e. Kingdom, Petrel, OW)
- › Query and Check wells with logs (i.e. gamma ray, SP etc), biostrat data, deviation surveys, check shots etc
- › Cross reference well reports and log charts
- › Check navigations for seismic with horizons (if matching) and mark errors
- › Check regional grids with seismic cross section
- › Check shot points, CDPs, nav lines in Geographic Calculator
- › Convert seabed grids (i.e. GEBCO) and QC imported seismic
- › Use Kingdom SEGY Explore for checks (with map)
- › Overlay wells (with checkshots) for seismic QC
- › Link with database using connectors (i.e. Open Spirit)
- › Seismic acquisition and survey maps

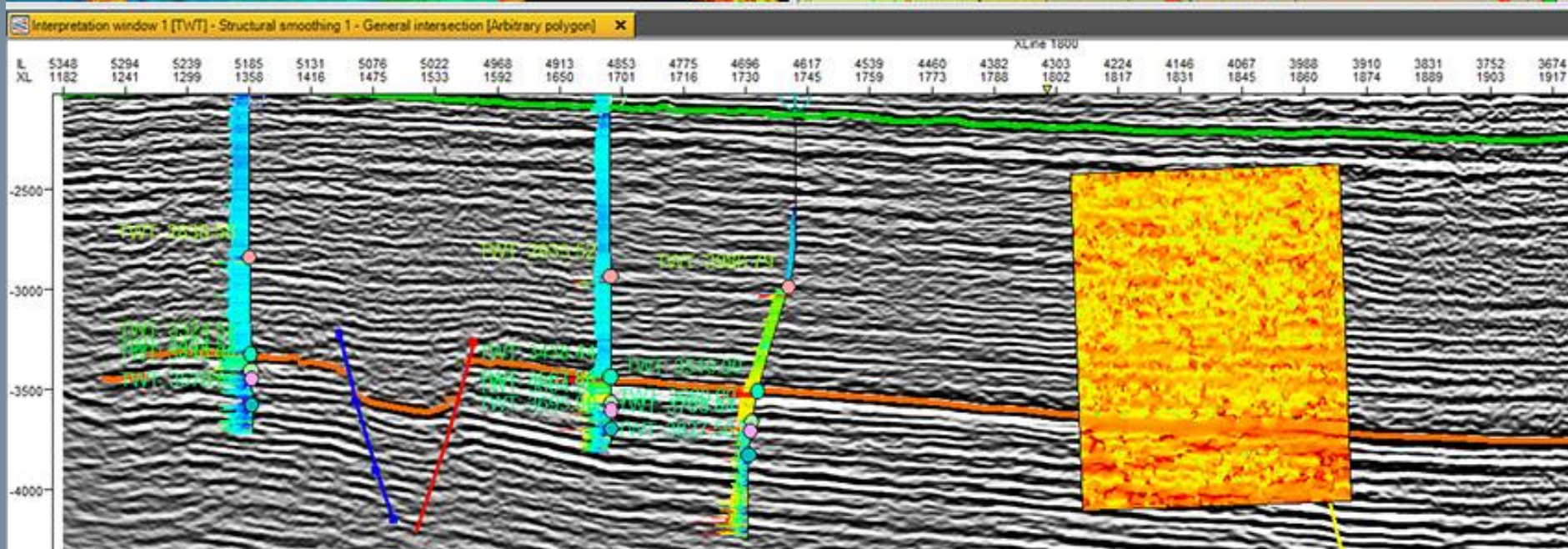
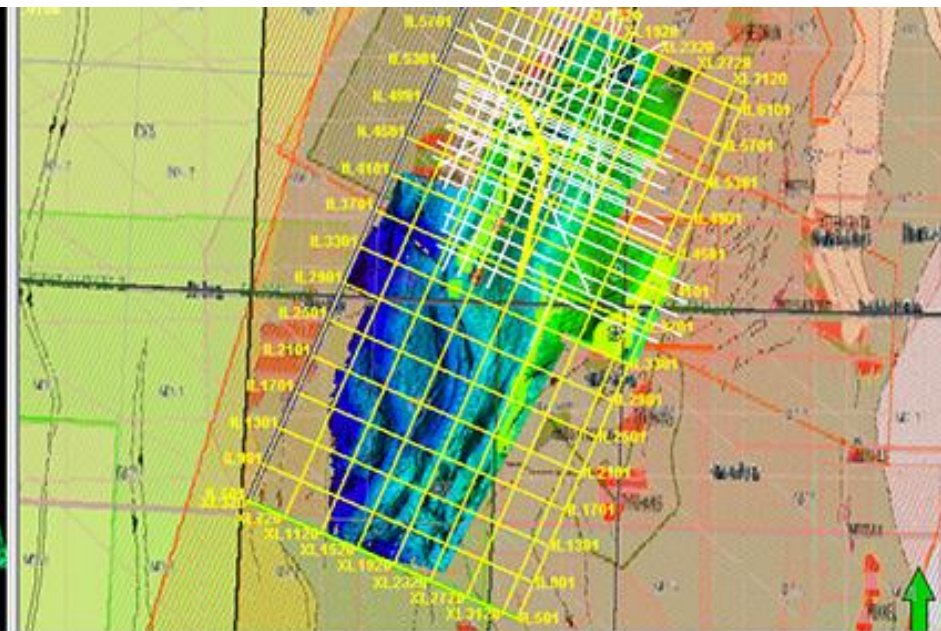
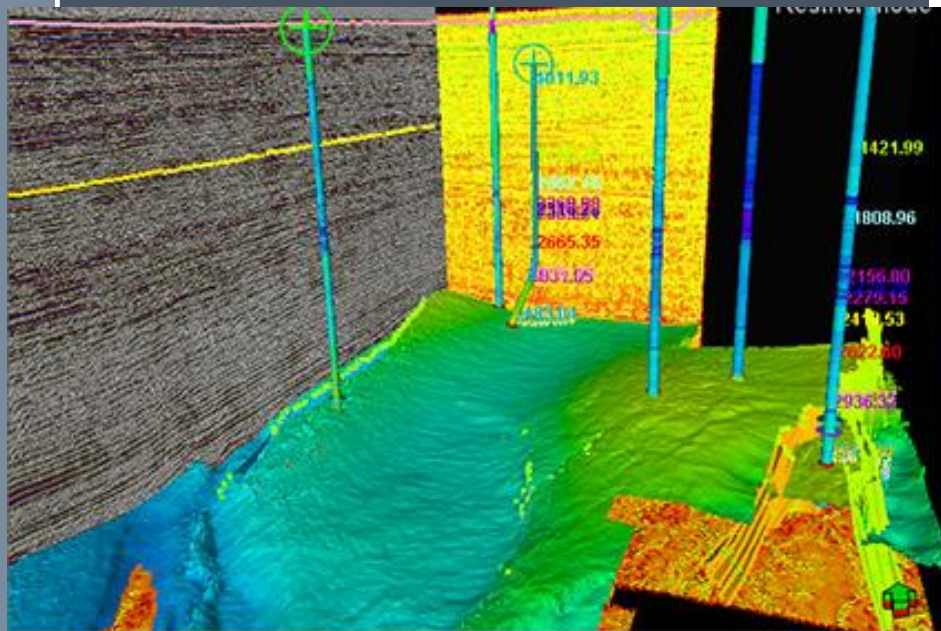
MAIN ISSUES

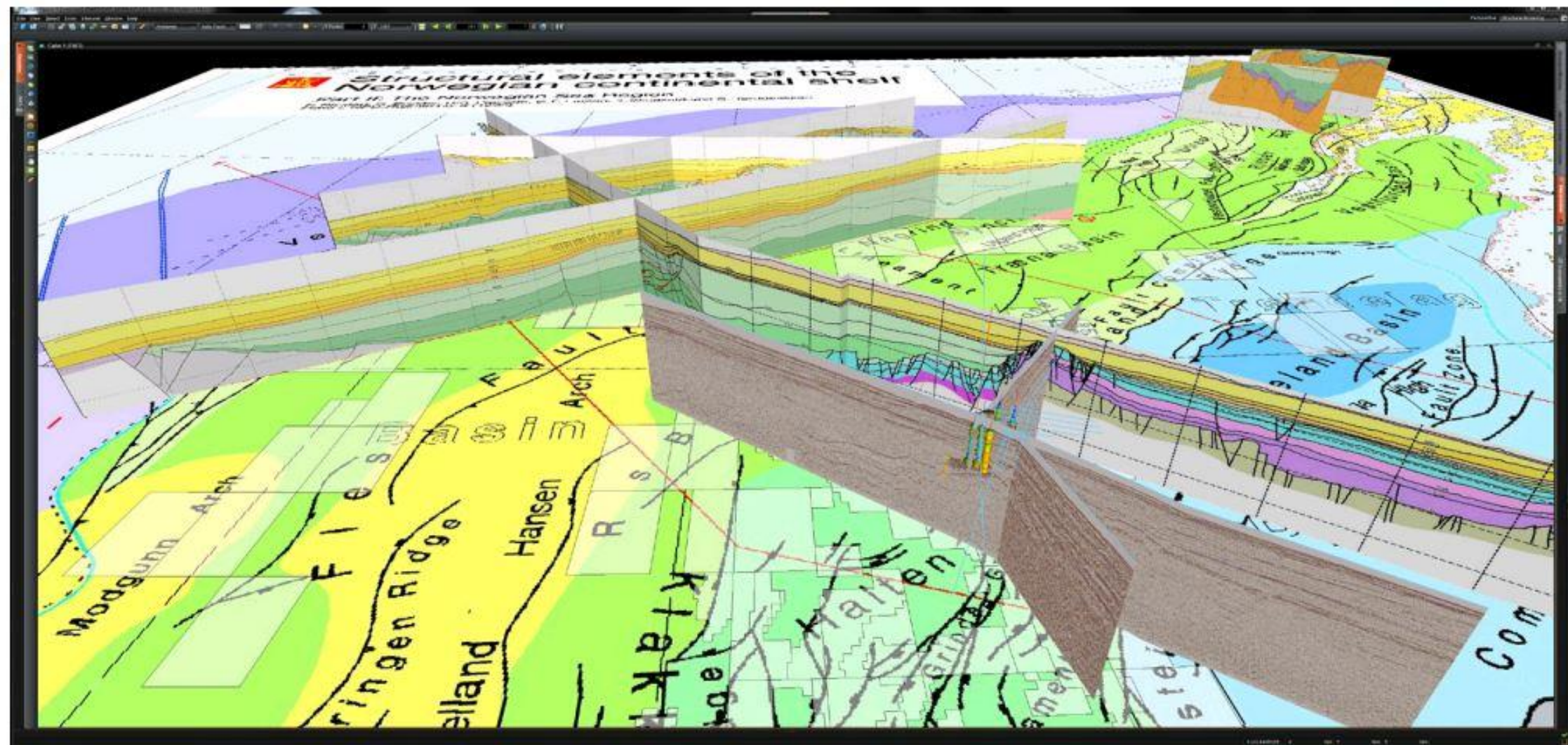
- Time and effort
- Recognition
- Integration
- Budget
- Best Practise
- Future trends
- Infrastructure

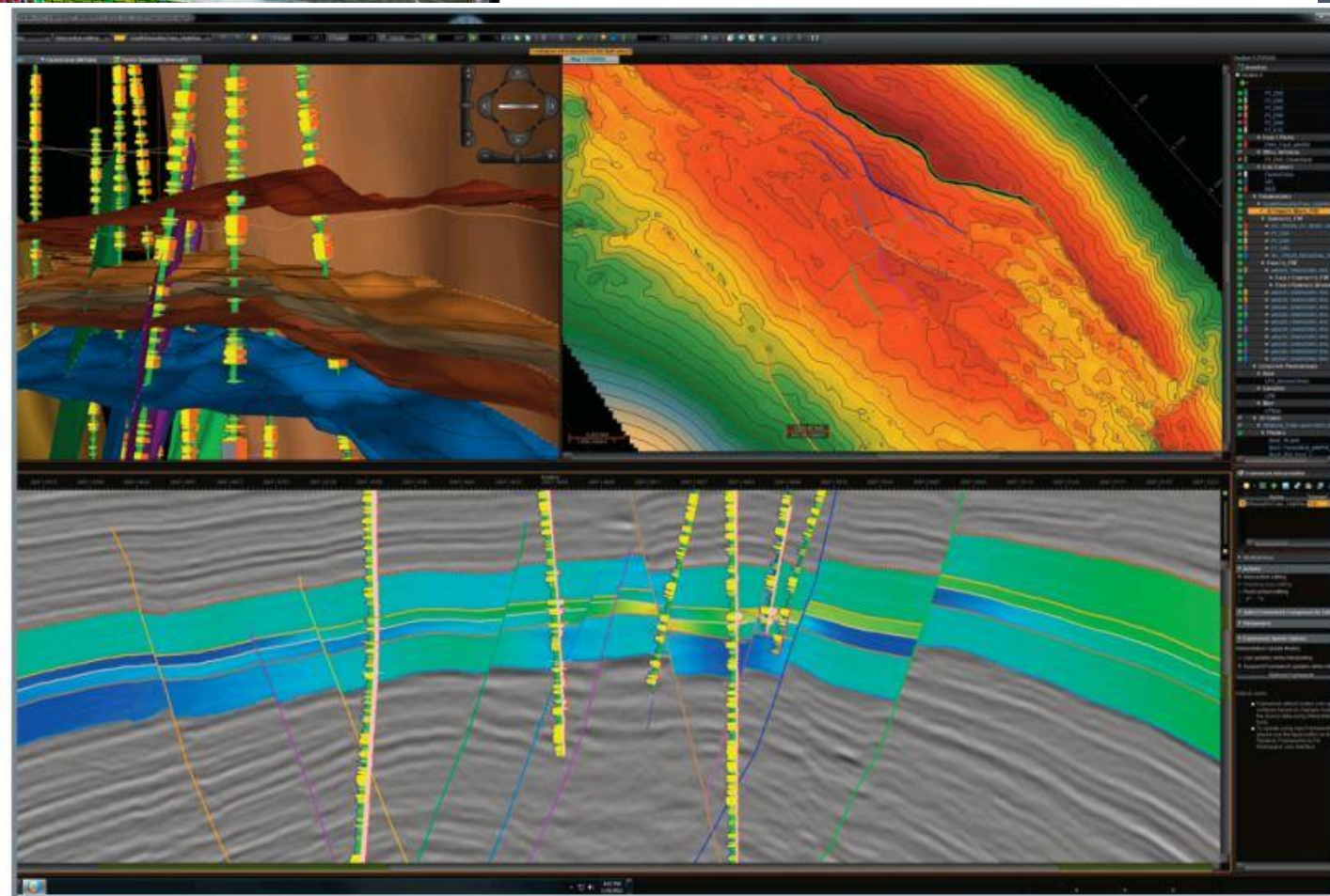
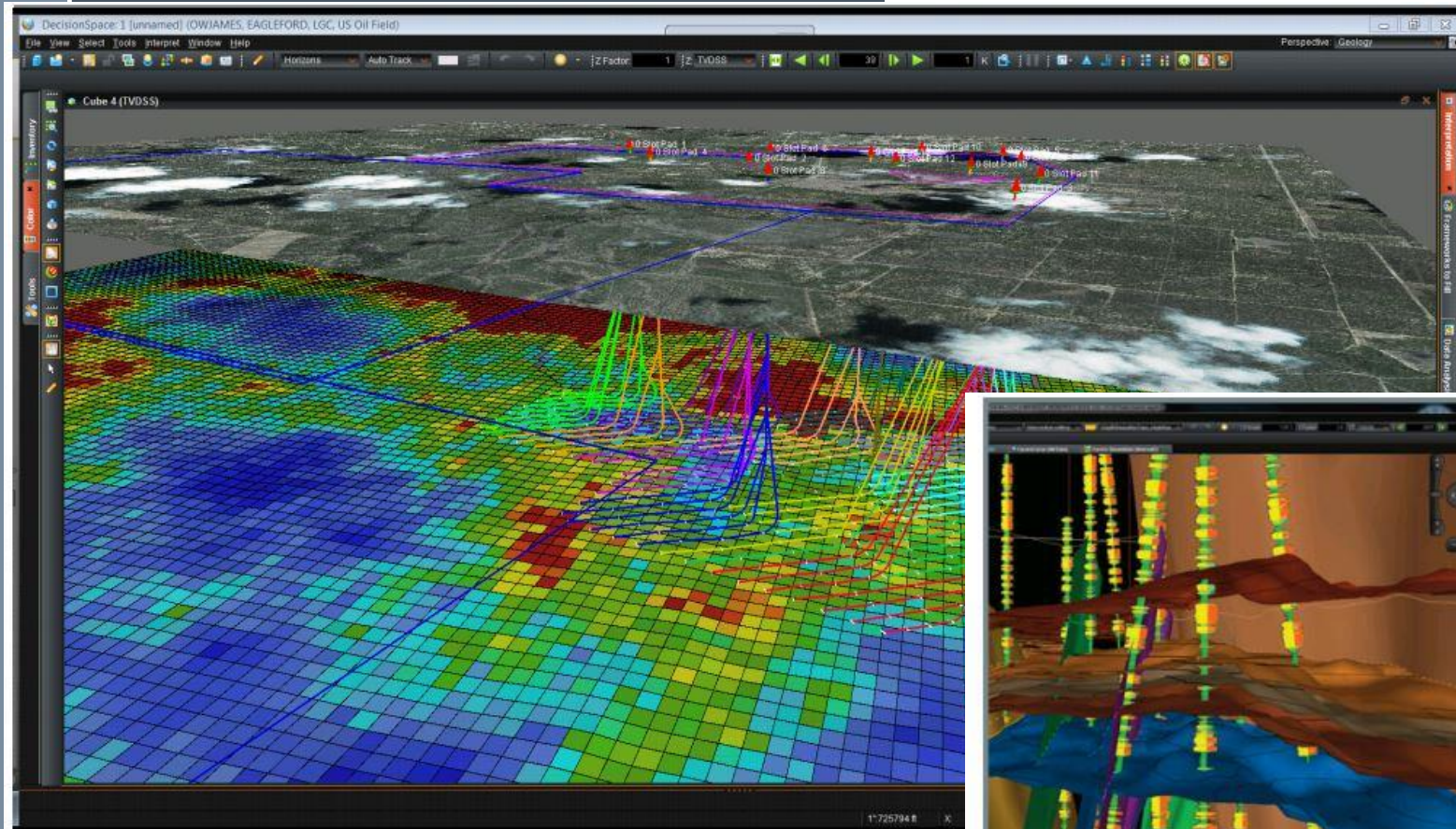
- › Map updates, frequency and metadata
- › References to interpreter, handovers and milestones archiving.
- › Management presentations in PowerPoints
- › Budget , support and expertise for technical G&G software and database
- › Understanding G&G technology and familiarity using proven tools
- › Pre-qualification tests, POC and pilot studies for software and database (upgrade or new)
- › Subsurface IT and data management workflow
- › GPU, SSD, CPU, Cloud Computing, Cluster, Blade, Fibre network / switches for workstation, and database pre-caching
- › Post drill well and drilling analysis
- › ArcGIS Pro 64bit and 2D/3D cross section
- › Petrel centralized database
- › Corporate database and inventory. Include physical data

REFERENCES



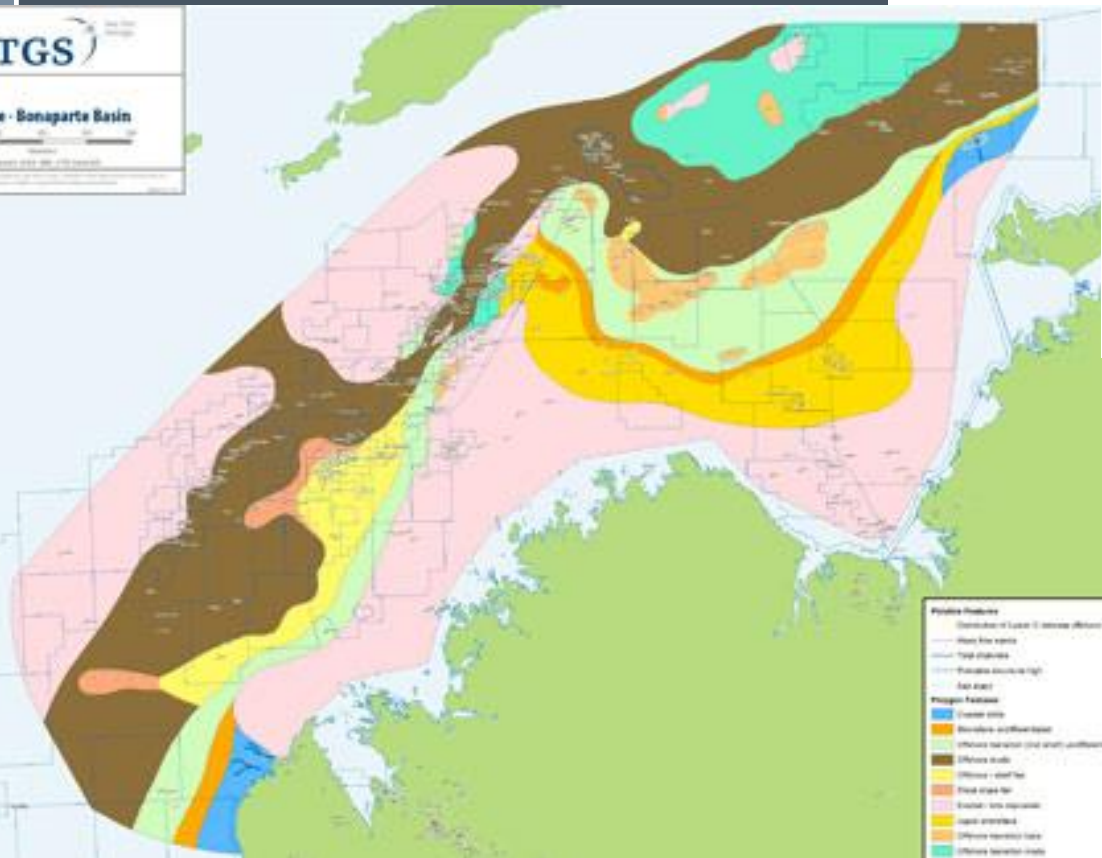






TGS

Browse - Bonaparte Basin



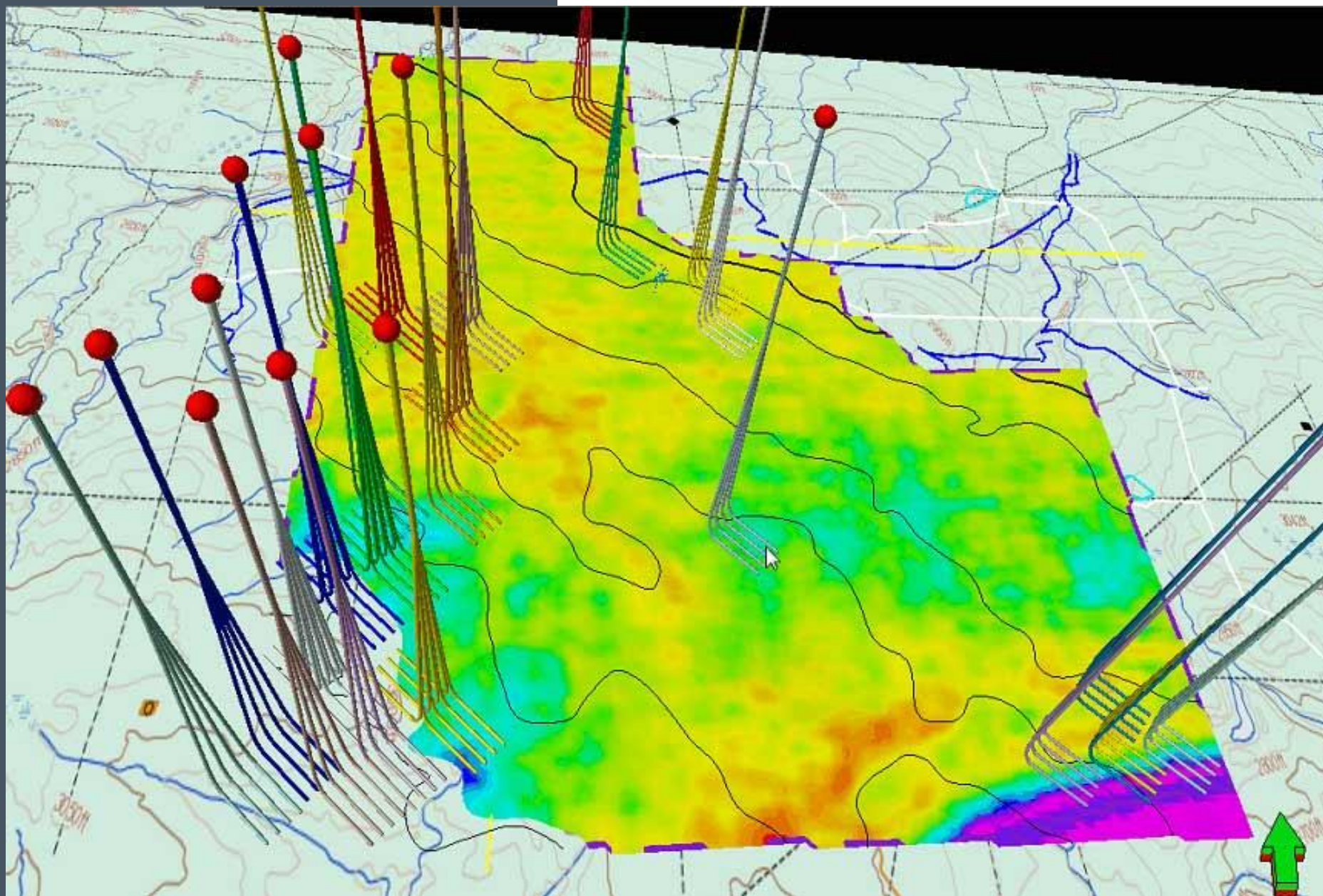
View:

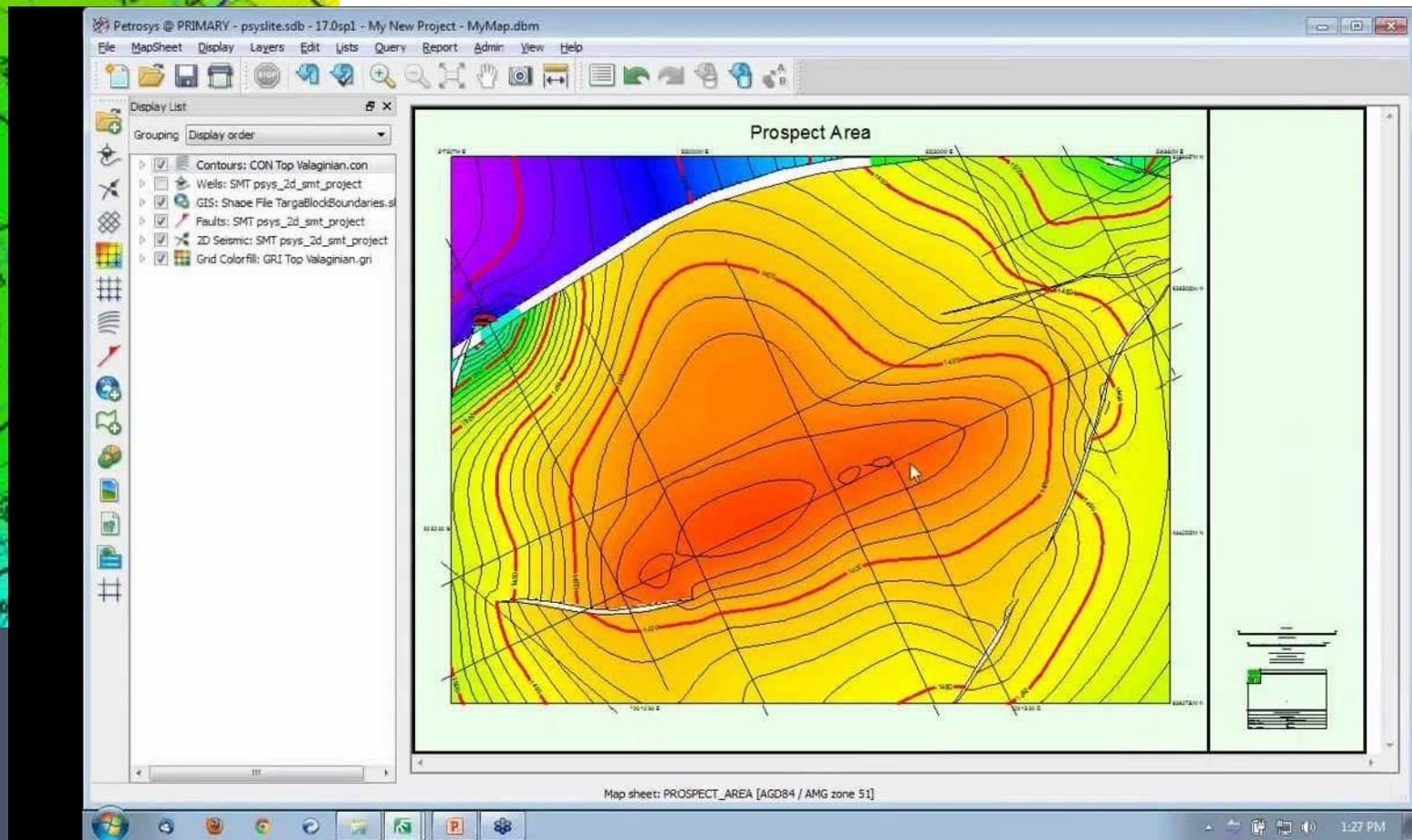
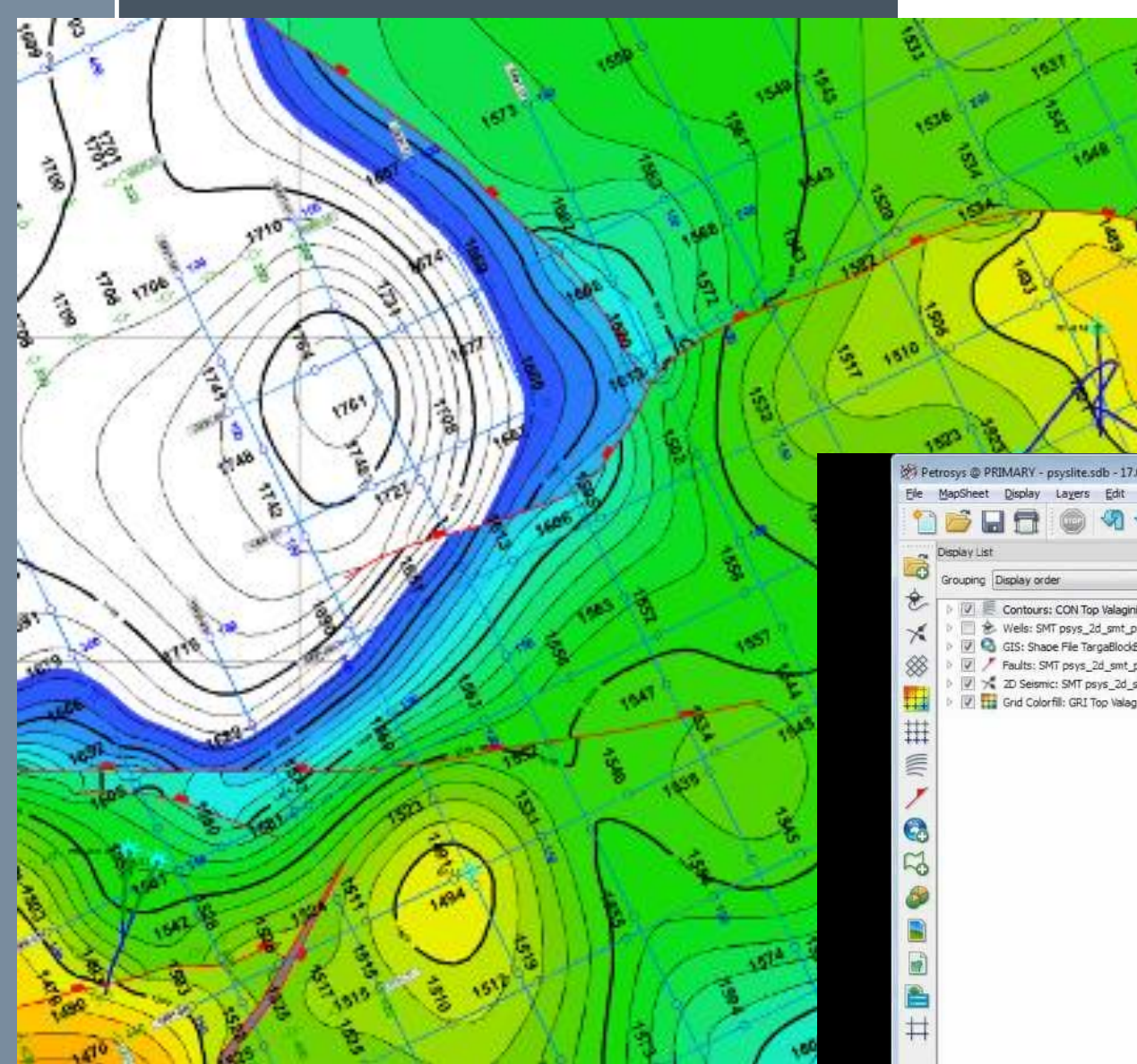
Wells & Fields
Prospects
Exploration activity
Pipeline & LNG

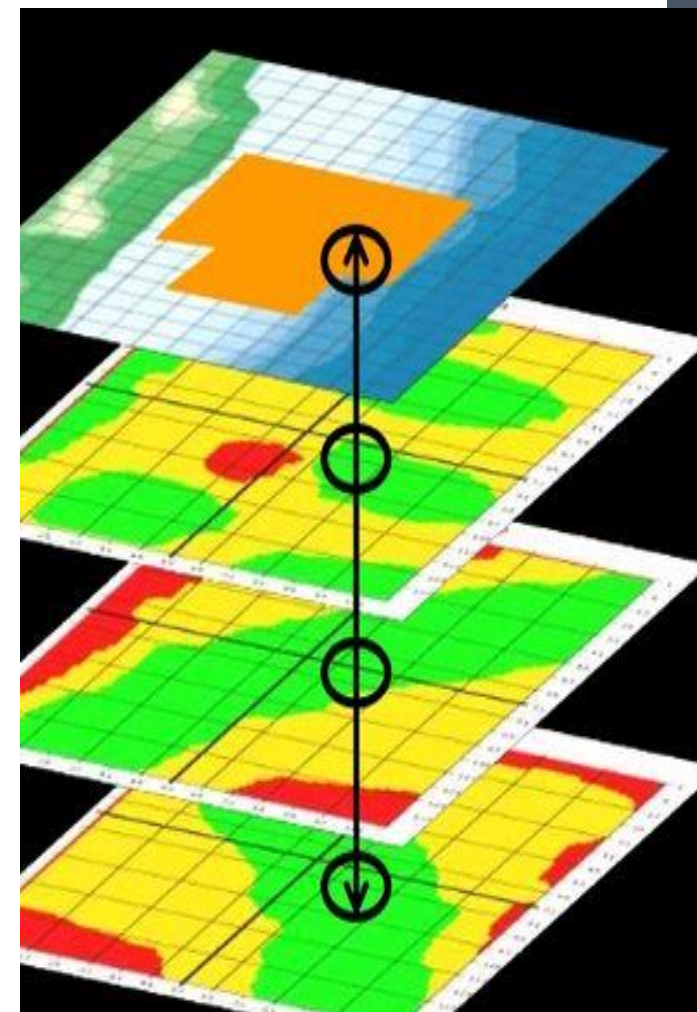
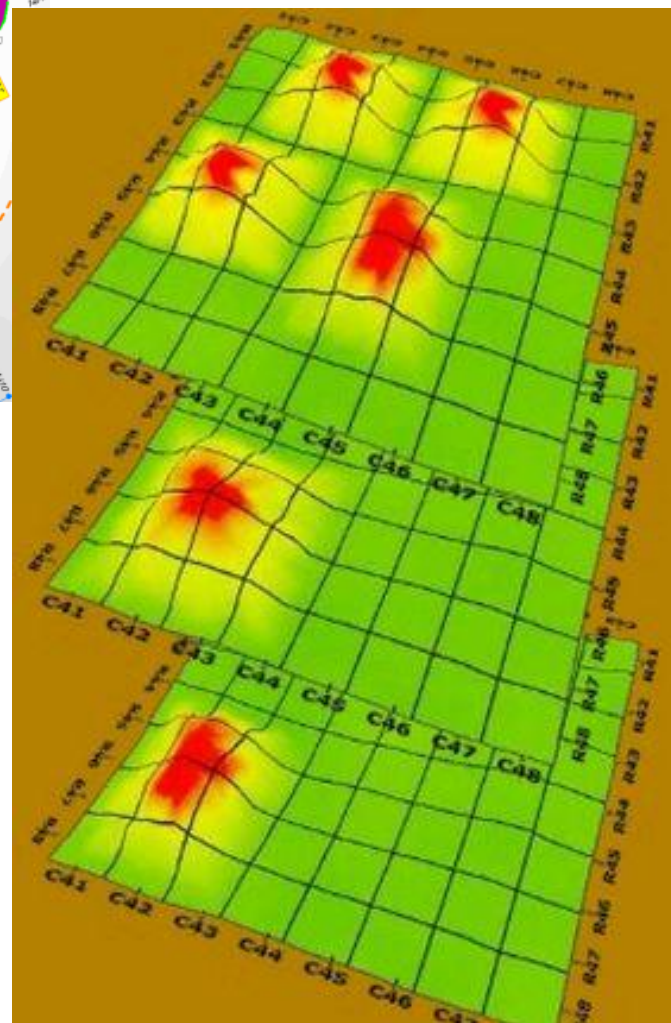
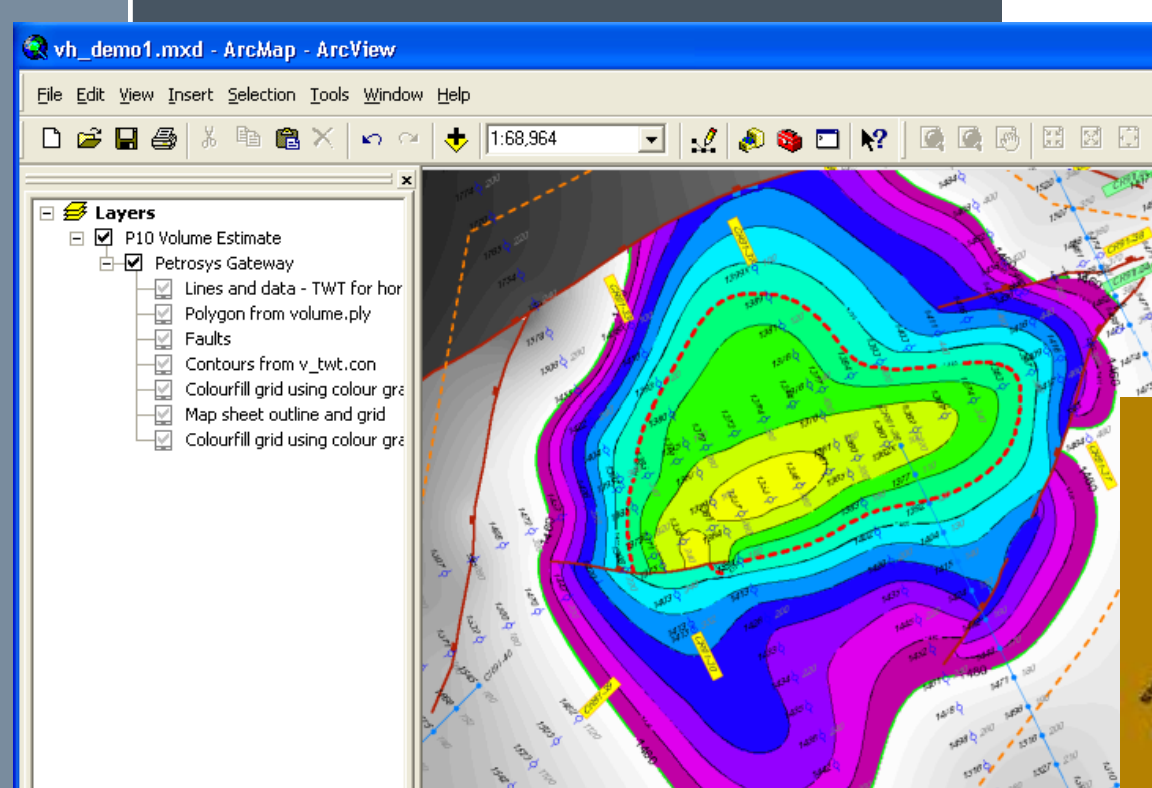
Bidding blocks
Refineries
Storage

Get details on:

Operators
Production
Fiscal terms
Protected areas
Capacity







Geographic Calculator 64 bit 2015 - roadshow2014.sp1

File Options Datasource View Window Help

Project Manager

- Project
 - Interactive Conversion
 - Point Database Conversion
 - Seismic Survey Conversion
 - Vector Data Conversion
 - Raster Transform
 - Point Database Conversion 1
- New in 2014
 - Vertical Transformations
 - Land Survey Summary
 - Line Intersection
 - Area Calculation
- Special Features
 - 14 Parameter Time Dependent
 - Concatenated Transformations
 - Best Fit
 - CAD Layer Splitting
 - DEM
 - Direct Coordinate Transformation
 - Derive Datum Shift
 - Geoid12a
 - Georeference
 - HTDP
 - LatLong Swap
 - LIDAR
 - Multiple Column Conversions
 - PDC Search
 - SEG P1-11
 - SEGY
 - Vector Scale Rotate
 - Vdatum

Viewer Point Database Conversion 1

Input Data

Data: C:\Users\samknight\Desktop\geoidtest\uspoints.xlsx

	LONGITUDE	LATITUDE	Ell Height	Lat2	Lon2	geoidheight	Lat3
R1	-108.827270612	36.437963368	0	36.43796337	-108.82727061	20.85	
R2	-92.588917795	38.813594088	0	38.81359409	-92.58891780	33.40	
R3	-108.865416794	40.397347902	0	40.39734790	-108.86541679	15.91	
R4	-103.344949029	40.615122338	0	40.61512234	-103.34494903	19.64	
R5	-98.443164652	35.933137696	0	35.93313770	-98.44316465	27.98	
R6	-106.976584755	44.566883109	0	44.56688311	-106.97658476	10.98	
R7	-101.488898865	42.456095272	0	42.45609527	-101.48889886	19.37	
R8	-107.33122504	35.433284044	0	35.43328404	-107.33122504	21.12	
R9	-104.510503410	30.127455454	0	30.12745545	-104.51050341	10.05	

Clear Data Column Settings Header Display Error Plot Search

Conversion Settings

Input Coordinate System

System: WGS 84

Horizontal: World Geodetic System 1984

Date: 12/16/2014

Units: Degree

Vertical: Ellipsoidal Height

Coordinate Transformation

USEGM96

Output Coordinate System

System: WGS 84

Horizontal: World Geodetic System 1984

Date: 12/16/2014

Units: Degree

Vertical: EGM96 geoid height

Calculation Settings

Operation


☒ Convert ☐ Forward ☐ Inverse ☐ Best Fit ☐ Scale & Translate ☐ Derive Datum Transform

Calculate Metadata Save

Ready

transform Map File Conversion Point Database Conversion Interactive Conversion

Overview



Cursor

Longitude: -84.57 deg

Latitude: 33.83 deg

Selected Tile

Tile Name

00000000

Tile Origin

Longitude: -84.58 deg

Latitude: 33.82 deg

Tile Size

Width: 00.02 deg

Height: 00.02 deg

Ready

Conclusion

Thank you