



ArcGIS & 3D Simulation Life of Field Planning Tool

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■ Outline Brief of ArcGIS and VROV Capability

- Why we did this?
- What does it do for us
- Additional benefit it provides

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■ Why we did this?

- Gendalo & Gehem required a tool to enable field layout architecture to be established
- ArcGIS already utilized within CVX community
- Tool enabled global field from onshore facility to subsea wells to be visualized
- Enabled project decisions to be made based on comprehensive and accurate data

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■ What Does it Do For Us

- Enables CVX to generate/manage **field layouts in-house**
- Reduces project risk by enabling field layout to be **established early** in project life
- Provides a structured mechanism for field layout generation **compatible with other GIS** based disciplines
- Maintains project historical data in **centralized location** (CVX server)
- Latest revision **drawings controlled** and readily exported from data base
- **All disciplines represented** in single field layout design tool
- Enables field layout **solutions to be verified** utilizing 3D simulation
- Provides **life of field** support
- Provides information **link to e-room**

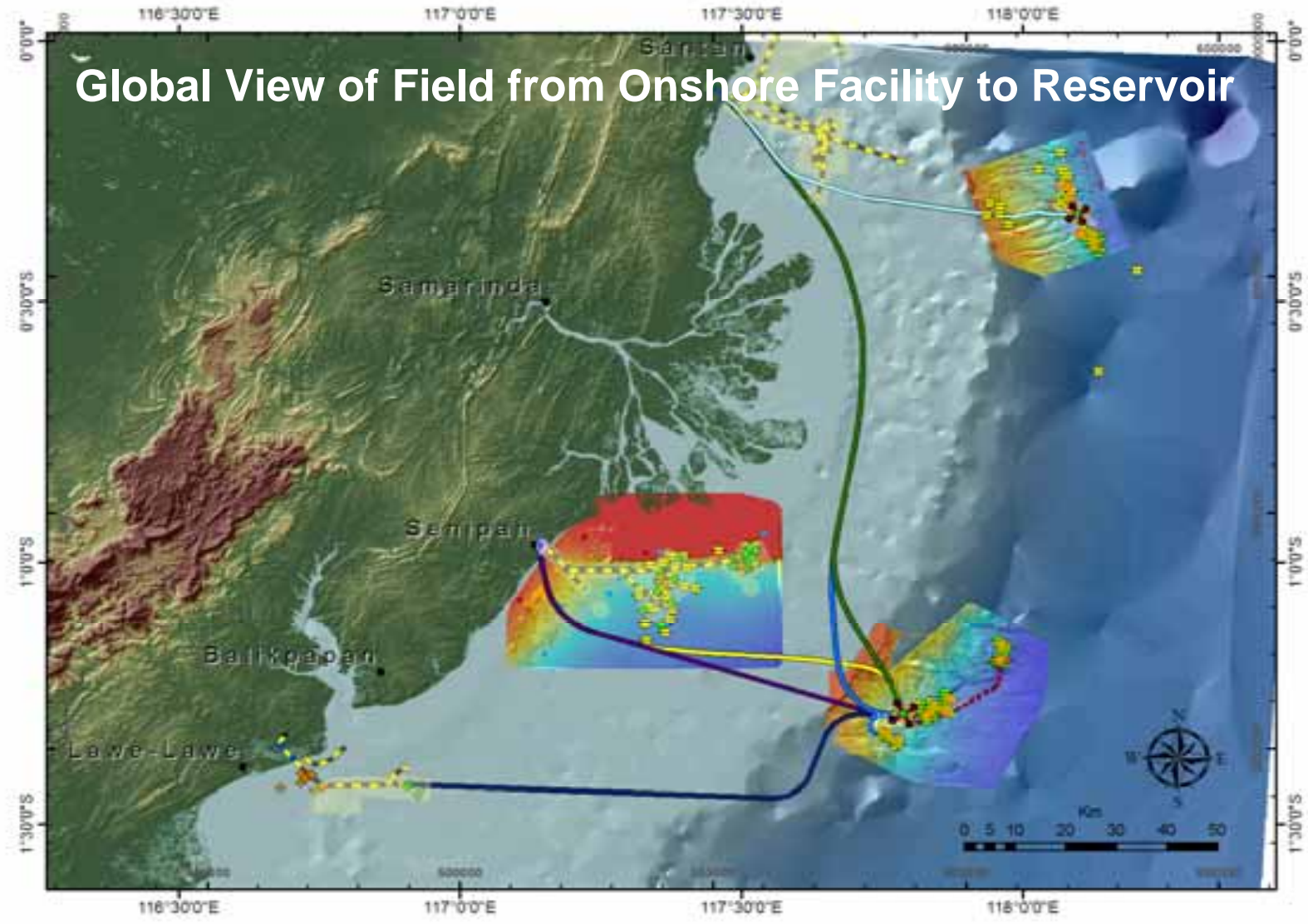
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■ Additional Benefit It Provides

- Utilizes existing data available within CVX to **generate seabed maps** (3D seismic /AUV)
- Enables equipment to be installed in **flat terrain** free from surface and subsurface geo-hazards.
- Enables equipment **clash checks** (host moorings, MODU moorings, flowline routes)
- Enables pipeline / flowline deployment scenarios to be verified (lay away from host / anchor lengths)
- Enables pipeline to be routed to **facilitate flow assurance**
- Enables pipelines to be routed clear of **geo-hazards**
- Enables completion and tree's to be **positioned accurately** relative to drill center
- Enables desk top metrology and **early jumper fabrication**. Early jumper fabrication improves first oil
- All components and critical interfaces **uniquely tagged**

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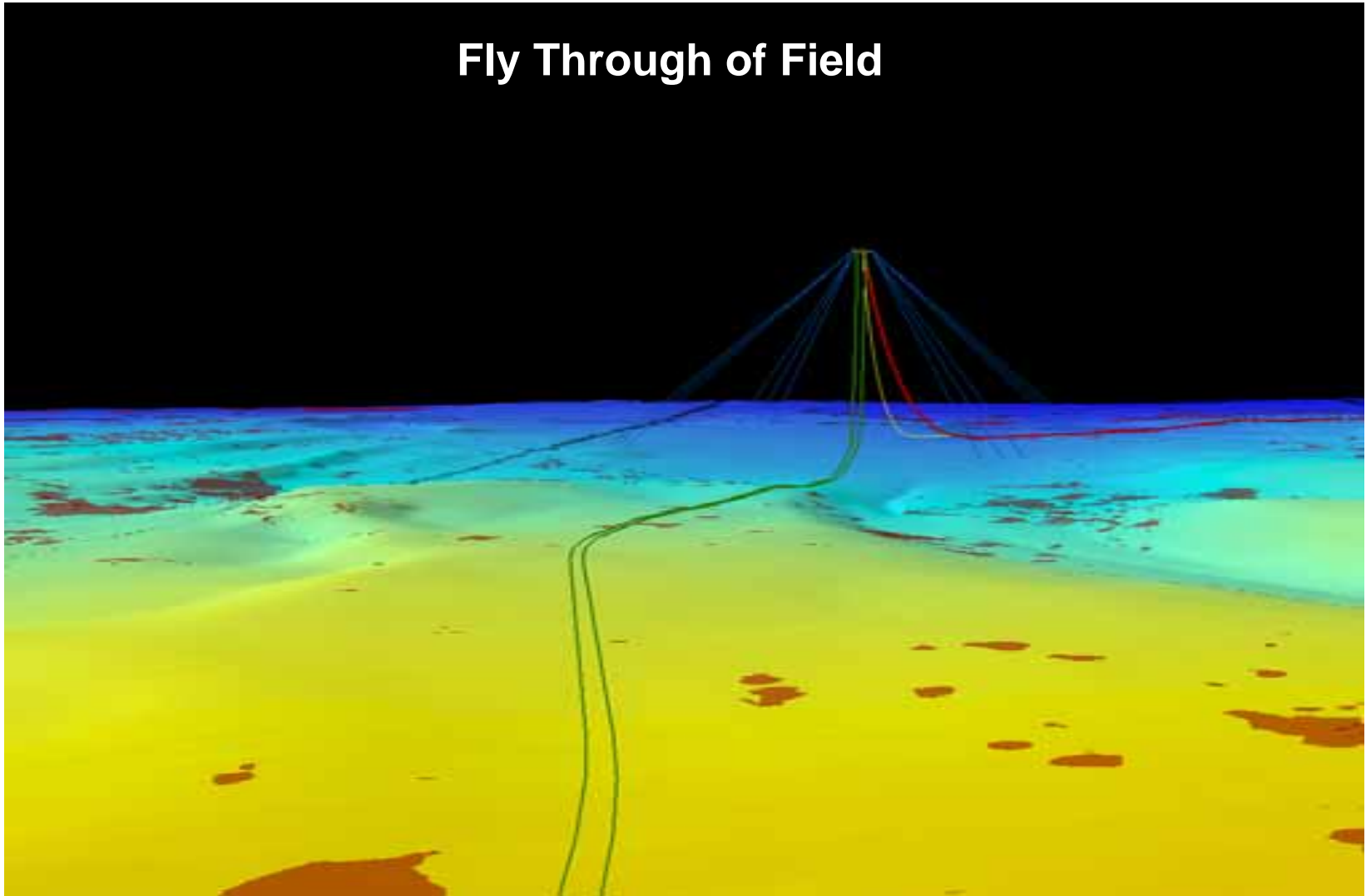


Global View of Field from Onshore Facility to Reservoir

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Fly Through of Field



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Working With Data in ArcGIS Video

**ARC GIS FIELD LAYOUT
PLANNING AND
DEVELOPMENT TOOL**



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VROV Simulation Tool Video



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Example of Database – Subsea Equipment



Attributes of Equipment

| FID | Shape | Sub_Theme | Date_Entred | Author | Taglum_Key | Abbrev | Conn_From | Conn_To | Loc_Name |
|-----|----------|-----------|-------------|------------|-------------------------|--------|-----------|---------|------------------------|
| 0 | Point ZM | Manifold | 1/1/1901 | Gus Colyer | GEH_SSE_MFLD12_03_01_00 | MFLD12 | NA | NA | Gehem SWC Manifold-12H |
| 16 | Point ZM | Well | 1/1/1901 | Gus Colyer | GEH_SSE_WELHED_03_01_00 | WELHED | NA | NA | Gehem SWC WELHED |
| 17 | Point ZM | Well | 1/1/1901 | Gus Colyer | GEH_SSE_WELHED_03_02_00 | WELHED | NA | NA | Gehem SWC WELHED |
| 18 | Point ZM | Well | 1/1/1901 | Gus Colyer | GEH_SSE_WELHED_03_03_00 | WELHED | NA | NA | Gehem SWC WELHED |

Attributes of Equipment

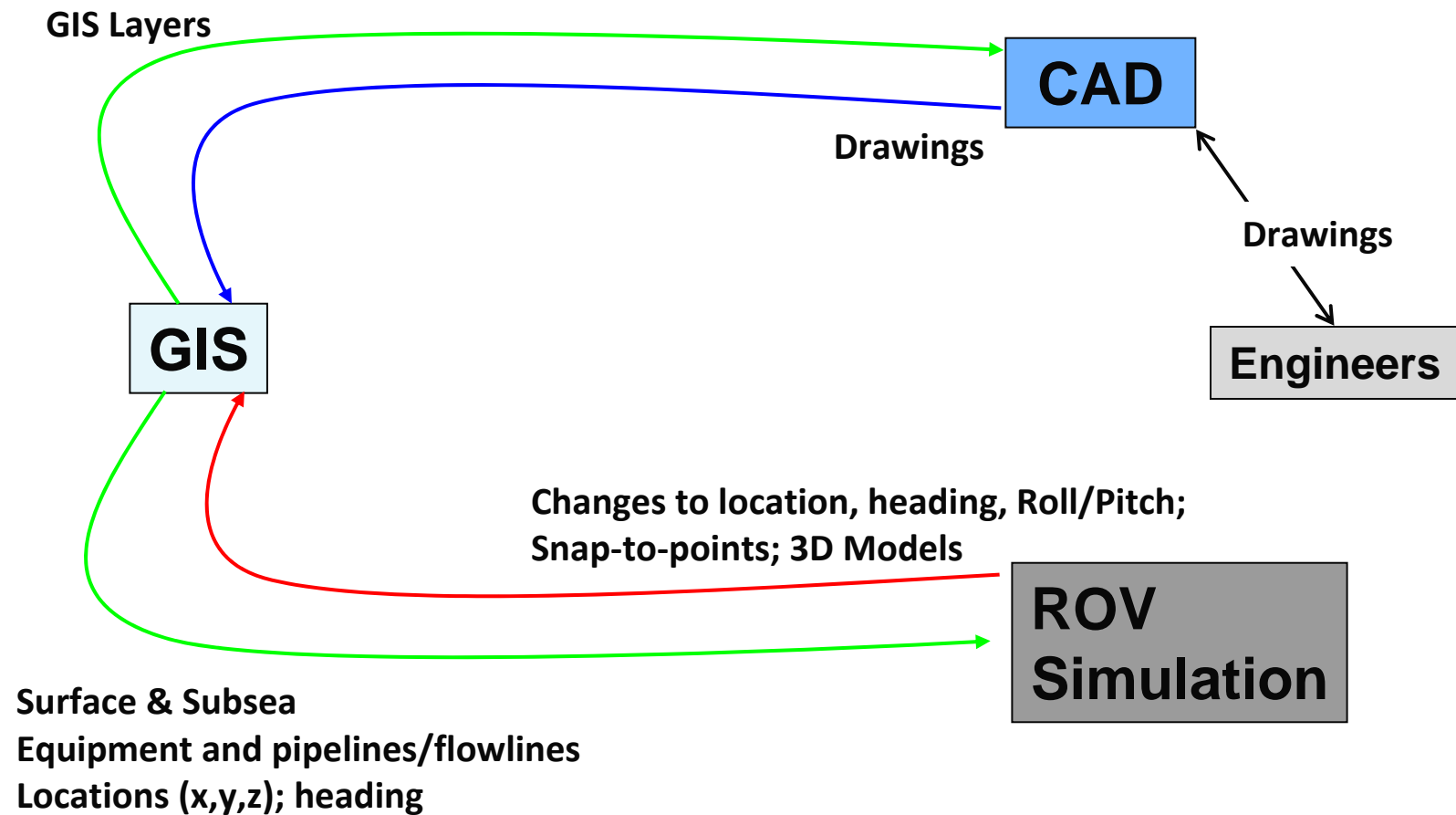
| Loc_From | Loc_To | Mfgr | Eqpt Det | Const_Mat | Ctrl_Oprtn |
|----------|--------|---------------------------|---|-----------|-----------------------------------|
| NA | NA | Subsea Equipment Supplier | Dual Header, Vertical Connections, Pigging Loop | CRA/Clad | Electro-Hydraulic Multiphased SCM |
| NA | NA | Subsea Equipment Supplier | Manufacture Wellhead Type | CS/Inlaid | |
| NA | NA | Subsea Equipment Supplier | Manufacture Wellhead Type | CS/Inlaid | |
| NA | NA | Subsea Equipment Supplier | Manufacture Wellhead Type | CS/Inlaid | |

Attributes of Equipment

| Pressure | Insulatr | Prod_Svc | Size | Weight | Inst_Date | Elevation | Ref_ID Num | | | |
|----------------|----------|---------------|--------------|------------|-------------|-----------|------------|---|---|-------|
| 10K MVP | None | Sweet Service | 10" x 10" | 0 | 1/1/1901 | Manifold | NA | | | |
| 10K MVP | | Sweet Service | 30" x 10.34" | | 1/1/1901 | | NA | | | |
| 10K MVP | | Sweet Service | 30" x 18.34" | | 1/1/1901 | | NA | | | |
| 10K MVP | | Sweet Service | 30" x 10.34" | | 1/1/1901 | | NA | | | |
| 10K MVP | | Sweet Service | 30" | | | | | | | |
| 10K MVP | | Sweet Service | 30" | | | | | | | |
| 10K MVP | | Sweet Service | 30" | | | | | | | |
| 10K MVP | | Sweet Service | 30" | | | | | | | |
| 10K WHSP | None | Sweet Service | 6" | 625524.06 | 9956851.13 | -1785.0 | -1000 | 0 | 0 | 350 |
| 10K WHSP | None | Sweet Service | 6" | 625525.335 | 9956815.001 | -1784 | -1000 | 0 | 0 | 0 |
| 10K WHSP | None | Sweet Service | 6" | 625507.696 | 9956830.067 | -1785 | -1000 | 0 | 0 | 0 |
| 10K WHSP | None | Sweet Service | 6" | 625542.316 | 9956830.399 | -1787 | -1000 | 0 | 0 | 0 |
| 10K WHSP | None | Sweet Service | 6" | 625506.092 | 9956871.061 | -1786 | -1000 | 0 | 0 | 0 |
| 10K WHSP | None | Sweet Service | 6" | 625540.401 | 9956872.770 | -1786 | -1000 | 0 | 0 | 0 |
| LP= 3K HP= 10K | NA | NA | Le | 625522.445 | 9956887.125 | -1784 | -1000 | 0 | 0 | 0 |
| LP= 3K HP= 10K | NA | NA | Le | 625526 | 9956815 | -1784 | -1000 | 0 | 0 | 359.7 |
| | | | | 625543 | 9956831 | -1785 | -1000 | 0 | 0 | 317.8 |
| | | | | 625540 | 9956873 | -1787 | -1000 | 0 | 0 | 220 |
| | | | | 625508 | 9956871 | -1786 | -1000 | 0 | 0 | 135.3 |
| | | | | 625522 | 9956887 | -1786 | -1000 | 0 | 0 | 177.2 |
| | | | | 625508 | 9956830 | -1784 | -1000 | 0 | 0 | 42.5 |
| | | | | 625538.54 | 9956888.29 | -1784 | -1000 | 0 | 0 | 0 |
| | | | | 625553.91 | 9956817.98 | -1784 | -1000 | 0 | 0 | 0 |

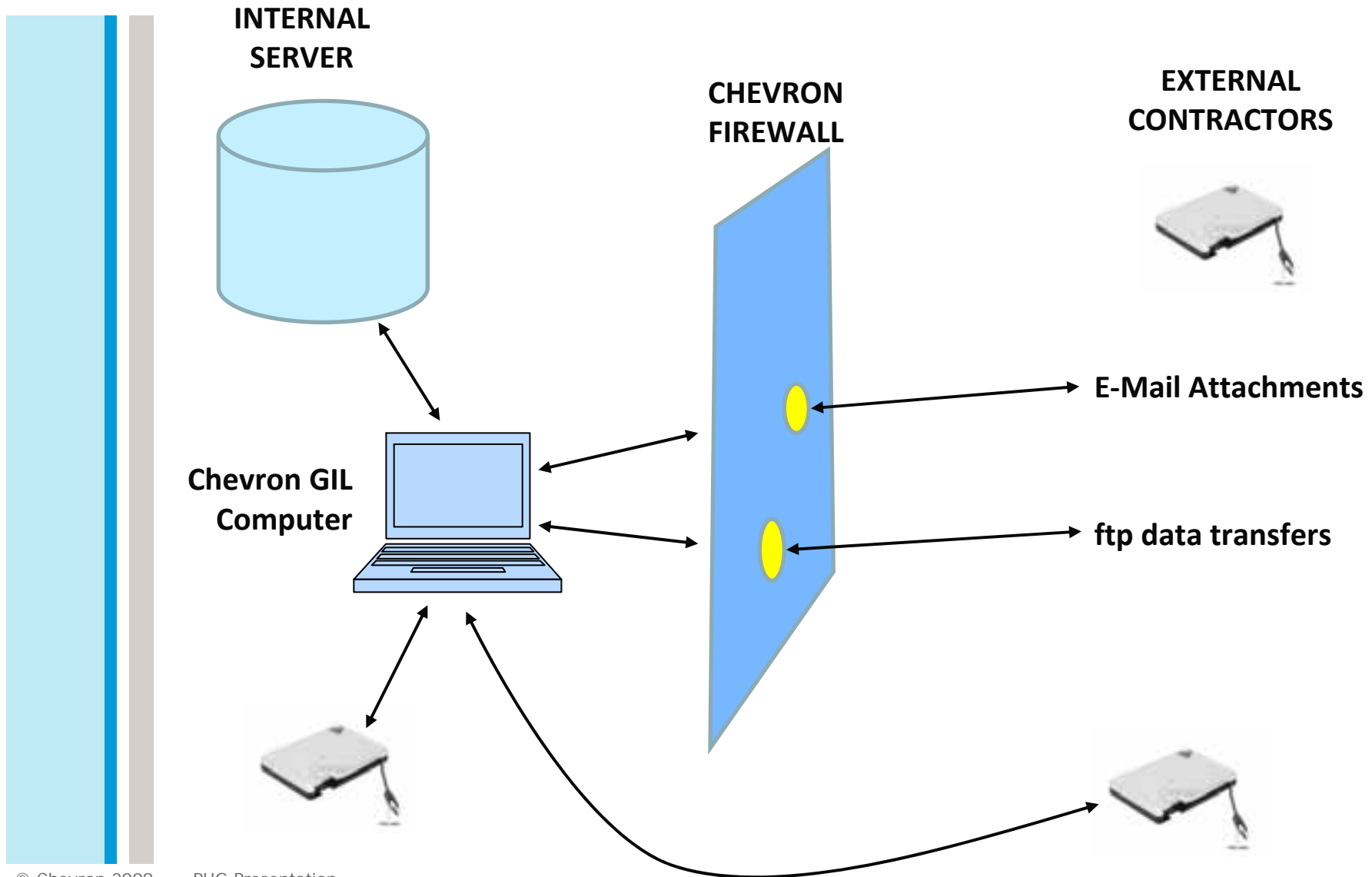
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Data Exchange & Update



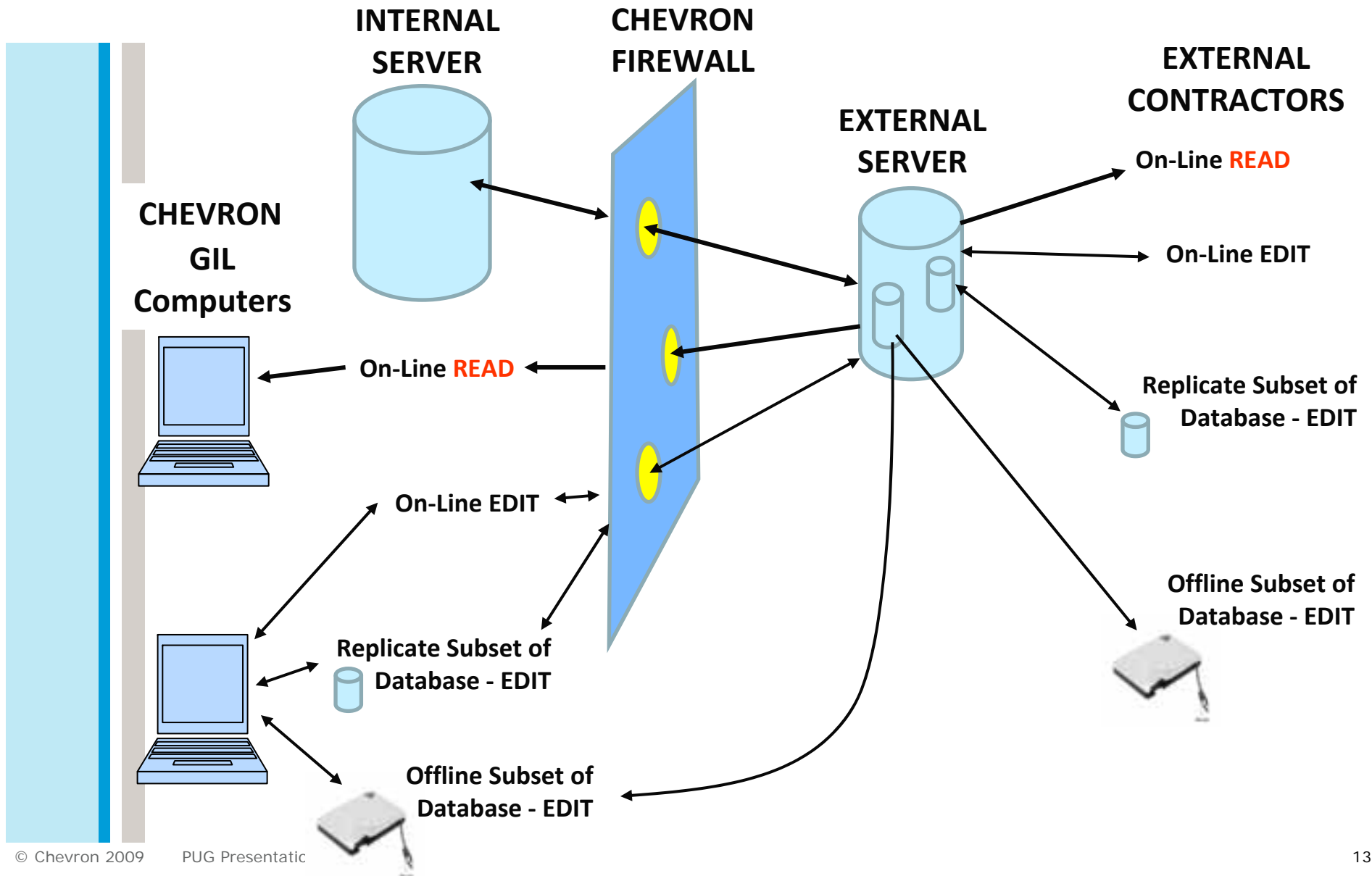
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Prototype GIS Access & Distribution



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Access & Distribution via Web-Based GIS

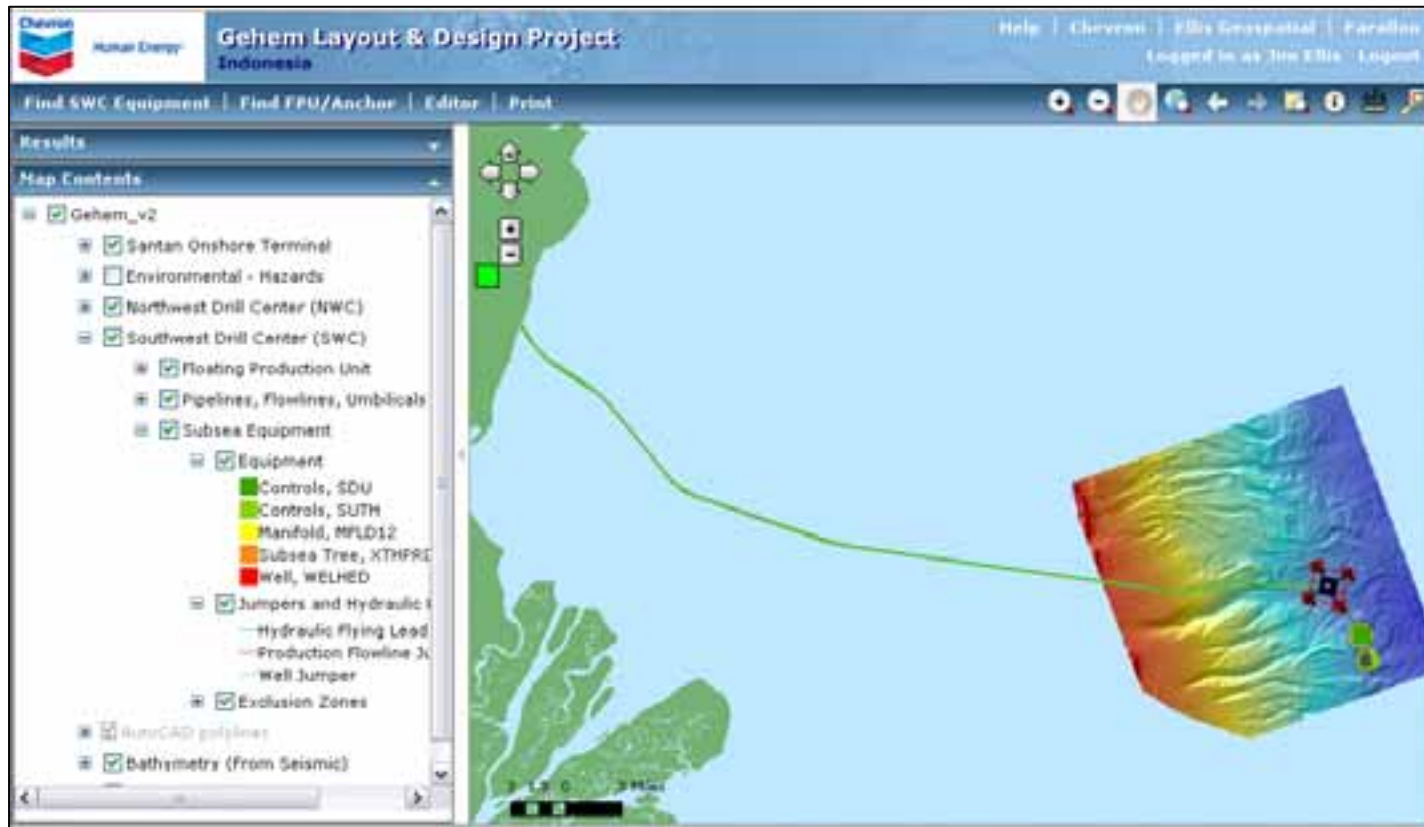


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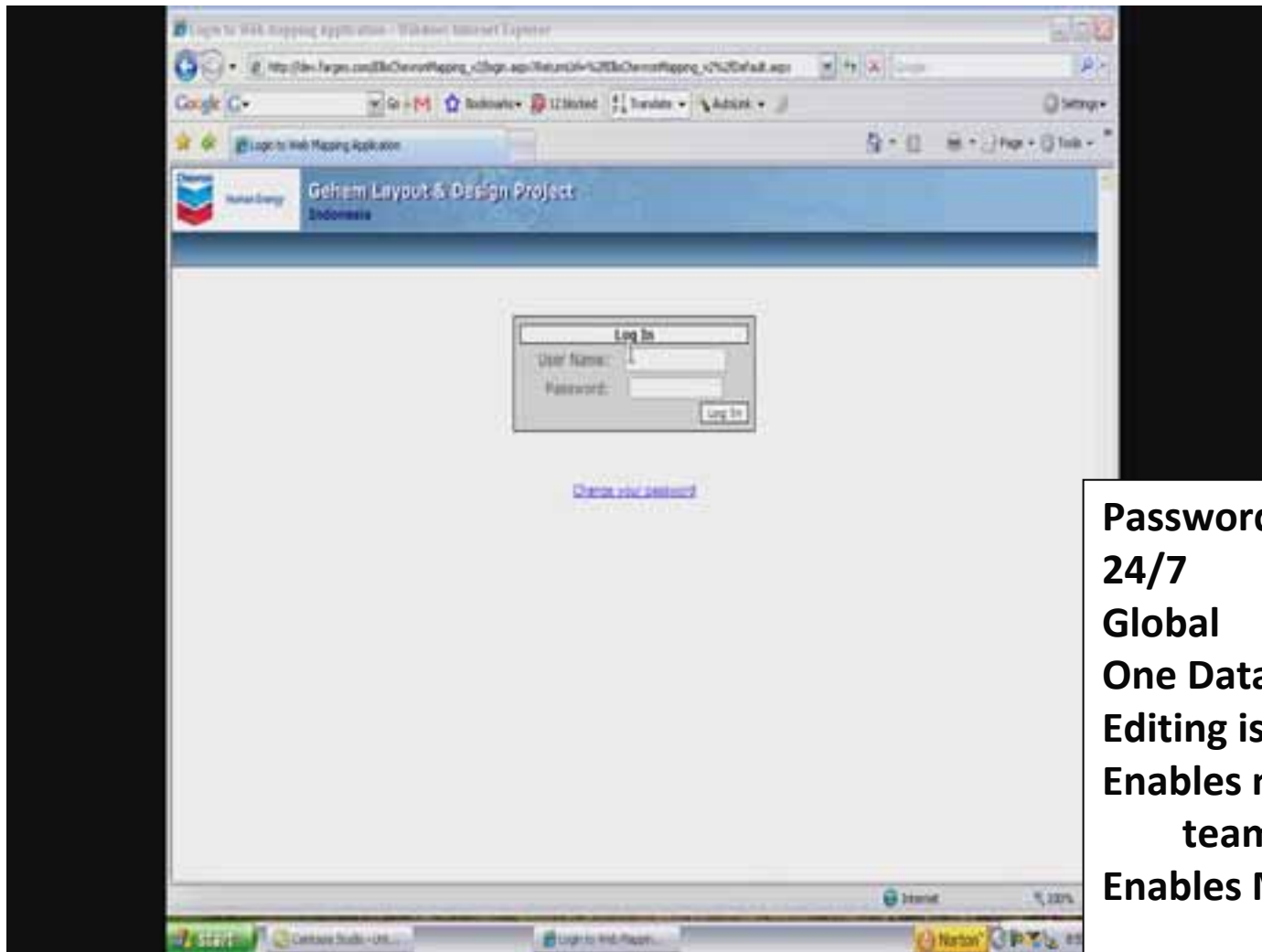
Access & Distribution via Web-Based GIS

- Converted prototype shapefile database to geodatabase
- Used ArcGIS Server 9.3 Advanced Enterprise software with ArcSDE technology
- Microsoft's SQL Server 2005 database (RDBMS)



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Access & Distribution via Web-Based GIS



**Password-Protected
24/7
Global
One Database
Editing is controlled
Enables non-GIS
team members
Enables Managers**

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A Special Thanks To The Team Members That Made This Possible

| | |
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Questions?

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