3D Oil and Gas Data in ArcGIS Pro
Agenda

- University Lands
- Our Challenge
- 3D Data
- ArcGIS Pro
- Questions
University Lands
University Lands

- Land set aside beginning in 1838
- Appropriated Lands for University System in 1876
- 2.1 million acres primarily in West Texas
- Revenue Supports UT & A&M Systems
- Permanent University Fund (PUF) Value = $17.4 Billion
  - $9.4 Billion Deposited by UL
Our Challenge

- Horizontal drilling introduced a new issue
  - Laterals overlap in different horizons
- Need to quickly identify production sources
  - Land and Regulatory need to see info in 3D
- ArcReader
  - Can’t view 3D
Our Challenge - 3D Oil & Gas Data

- No GIS data was in 3D
- This meant that we needed to create or acquire the 3D datasets
  - Leases
  - Laterals
  - Perforations (first and last take points)
- This data needed to be integrated with the current enterprise GIS system
3D Oil & Gas Data - Leases

- **Problem**
  - Leases are stored as 2D Polygons
  - Leases are depth severed

- **Solution**
  - Leases could be extruded based on the top and bottom depths
  - Multipatch feature class of leases
3D Oil & Gas Data - Laterals

Problem
- Lateral information currently stored in 2D feature class
- There are close to 2000 laterals on University Lands
- Directional surveys are stored in Excel and PDF format

Solution
- Downloaded Lateral information from third party (1200 laterals)
  - Converted to GIS using ArcPy site package
- Data Conversion
  - Corrected with UL well spots
  - Added z and m value
  - m value stored the measure distance
- This allowed for the creation of perfs
  - Tool in ArcMap but would require manual entry of each point (no batch)
  - Used python script to create point along line based on measure value
ArcGIS Pro - 3D Integration

- Chose ArcGIS Pro
  - Easy to switch between 2D and 3D maps
  - Easy to integrate with current GIS architecture
  - Allowed for the building of tools
ArcGIS Pro - 3D Integration

- Visual Nightmare
  - Not useful in this form
Area Of Interest (AOI) Tool

- Created so that a specific area could be explored
- Developed using python – What its doing
ArcGIS Pro – AOI

- Result after running the AOI tool
  - Only Leases that intersect laterals are shown
Future Plans

- Recreate AOI as add-in
- Include formation tops and bottoms
Questions?

- Scripts can be downloaded from:
  - https://github.com/ULGIS/ESRIUC2017