3D @ Esri
Core 3D Capability

Anywhere In Any Environment

- Transform 2D and 3D GIS into a single GIS workflow
- Reuse dynamic services across clients
- Securely collect, manage, curate 3D data
- Conduct analysis across real-time and historical data
- Create tailored experiences for different types of users

Cross-platform  Open  Accessible

Server  Online Content and Services
Desktop Professional 3D GIS

**Powerful 2D/3D desktop authoring and data management**
- 3D streaming for global and local scenes
- Rich spatial analysis for advanced 3D workflows
- LiDAR classification, feature extraction and editing
- BIM (IFC) and KML (KMZ) interoperability support
- ArcGIS Pro SDK for Microsoft .NET to extend workflows

**Advanced authoring tool for Urban Design**
- Interactive design/modeling tools
- Procedural rule authoring
- Dynamic 3D streets and blocks
- Virtual reality with ArcGIS 360 VR

**ArcGIS Extensions**
- 3D Analyst
- Spatial Analyst
- Network Analyst
- Data Interoperability
3D Apps

3D Tools For The Field, Office, and Community

<table>
<thead>
<tr>
<th>App</th>
<th>Description</th>
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<tbody>
<tr>
<td>ArcGIS Earth</td>
<td>Easy-to-use 3D data exploration for Enterprise users</td>
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<tr>
<td>Drone2Map</td>
<td>Streamline the creation of professional imagery products from drones</td>
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<tr>
<td>Web Scene Viewer</td>
<td>View 3D maps in any standard web browser</td>
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<tr>
<td>Web AppBuilder</td>
<td>Build powerful 3D GIS apps without writing a single line of code</td>
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<tr>
<td>Story Maps</td>
<td>Combine 3D maps with narrative text, images, and multimedia content</td>
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Enterprise Hosted 3D In The Cloud and/or On-Premise

**ArcGIS Online**
- Content and services for sharing ideas in 2D and 3D

**ArcGIS Enterprise**
- Scalable 2D/3D enterprise content distribution and geoprocessing

**GeoEvent Server**
- Connect and manage real-time information (IoT)

**Enterprise data and services**
- Web Scene
  - Vehicle for cross-platform 3D capability
  - Collection of layers, environment settings, slides, animation
  - Essential for 3D apps on any platform or experience
- Scene Layer
  - Scalable cache of graphics, styles, and attributes
  - 3D Objects, 3D Points, Integrated Meshes, Point clouds
Open Software, Standards and Data enable organizational resiliency

- Ensure access to data
- Guarantee interoperability
- Enable innovation
- Encourage usage and adoption

<table>
<thead>
<tr>
<th>I3S</th>
<th>Scalable 3D scene content for visualization and distribution</th>
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<tbody>
<tr>
<td>LERC</td>
<td>Raster (imagery and elevation) compression technology for 2D and 3D</td>
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<tr>
<td>GeoREST</td>
<td>Esri open REST APIs for access to any kind of GIS content and services</td>
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</table>
Esri and 3rd Party Partner Content

Ready-to-Use Maps and Data
- Global Coverage
- Compiled from Best Available Sources
  - Basemaps
  - Imagery
  - Demographics
  - Landscape
- Tens of Thousands of Open Datasets

ArcGIS Marketplace
3rd party geospatial apps and data from Esri’s global Partner Network

Living Atlas
3D and 2D content for use throughout mapping applications
Developer Tools

Development and Scripting Tools For Extending/Customizing

- 3D Everywhere
- Vector Tiles
- Smart Mapping
- Leverage User Roles
- Data Flows Between Apps

ArcGIS Runtime SDKs

Developer tools for 2D and 3D native iOS, Android, Windows solutions

ArcGIS JavaScript API

Developer toolkit for building and extending 2D and 3D web apps
3D in ArcGIS Pro
Scenes are 3D maps

Global Scene (3D)

Local Scene (3D)

Map (2D)

Data from Open Street Map and National Data Buoy Center
“Tilting the map” – Navigating around scenes

- Pan, Zoom, and Orbit
  - (Orbit = “Tilt the Map”)
- Use bookmarks
- Explore mode
- Allow underground navigation
- Previous/Next extent
- Keyboard navigation

- New Navigator control

Can’t be orbited (It’s flat!)

Orbited
Scenes have elevation

- Add local file elevation surfaces
- Add non-ground elevation surfaces
- Add multiple elevation surfaces
- Shade surfaces
- Use surfaces in GP analysis
Scenes can have many types of data

- **3D layers**
  - Multipatch feature layers
  - 3D point, line, polygon feature layers
  - Extruded 2D feature layers
  - Scene layers (3D Point, 3D Object, Integrated Mesh, point cloud)

- **2D layers**
  - CSV/TXT
  - 2D point, line, polygon feature layers
  - Imagery

- **KML layers**
  - 2D/3D
  - NetworkLinks
  - Overlays

- … and much more
Symbols in 3D

• Preset layers
• Apply 3D models, bilboarded symbols to points
• 3D models can be textured
• Extrude 3D points, polygons, and lines
• Use procedural rule packages (RPK) on polygons
• New 3D symbols for Pro and web
3D cartography in ArcGIS Pro

- Geometric Effects in 3D
- Advanced cartographic options
  - Military, Scientific
3D editing

- Create new 3D objects
- Geometric shapes
- Snap to scene layers
- Apply procedural rules
- Use standard OBJ, DAE formats
Environment and effects

- Atmosphere
- Sun
- Moon
- Daylighting
- Shadows
- Time
More ways to use scenes

Web AppBuilder

Story Maps

JS API Custom apps
Overview of working with 3D in ArcGIS Pro

Nathan Shephard
Using Sliders with 3D
Time and Range sliders

- Visual filtering of data by interactive control
- Enabled on data with appropriate attributes
- Time and Range are separate capabilities
- Time is integrated into Web Maps
- Time and Range will be integrated into Web Maps and Web Scenes

- TIP: Can be used in Animations!
Time awareness

- Temporal information in an attribute
- Feature layers, NetCDF, Mosaic data sets
- Configure current time, time zone
- Display partial or entire range
- Playback
Range awareness

- Range information in attributes
- Integer and float fields
- Use multiple fields simultaneously
- Configure range queries
- Display partial or entire range
- Playback
Using the time and range sliders in ArcGIS Pro

Nathan Shephard
Intro to Animation with Pro
Animation for static and dynamic story telling

Data from Vricon
TIP: How to find the Animation ribbon

- Go to the View Ribbon
- Click on Add on the Animation Tab
- *Don’t click Remove unless you want to delete your current animation keyframes*
Animation in ArcGIS Pro
Steve Heidelberg

Data from Vricon
Future directions

• Environment and effects
  - Water
  - Material handling
  - More realistic and thematic 3D symbols (people, rocks, cars)

• Animation
  - Editing animation curve
  - Look-at control for waypoints
  - Multiple animation tracks

• Analysis
  - Interactive analytical tools

• More 3D editing

• … and much, much more
Thank you
@_ChrisJAndrews
@NathanCShephard
@SteveHeidelberg