Creating and Maintaining Your 3D Basemap

Brian Sims
Dan Hedges
Gert van Maren
Complementary Resource Email
(no marketing)

• A copy of the presentation
• Links to today’s web demos
• Links to training materials
Agenda

Why 3D?

What is a 3D Basemap?

Creating a 3D Basemap

Maintaining + Sharing Best Practices

Understanding + Engaging

Q&A
Why 3D?

Brian Sims
Why 3D?

Traditionally we manage our cities like this...
Why 3D?

Yet cities look like this
Why 3D?

Across all industries ArcGIS users are going 3D to:

• Visualize within the context of the real world
• Present with more realism and remove interpretation
• Communicate with non-technical audiences

• Drive more informed decisions faster
What is a 3D Basemap?

Brian Sims
What is a 3D Basemap?

- 3D Buildings
- Trees
- Water Bodies
- Basemap
- Terrain
Creating Your 3D Basemap

Dan Hedges
Local Government 3D Basemap Solution

File01.las
File02.las
...
File99.las

Lidar
(minimum ground
classified)

Building
Footprints

Local Government
Information Model

Elevation,
Roof and Tree
Parameter
Extraction

Procedural
Rules

Basic Scene

Schematic Scene

Realistic Scene
Local Government 3D Basemap Solution

- Task-based workflows
  - Documentation in tasks and online

- Semi-automatic generation
  - Automatic extraction of main roof form and trees
  - Procedural representation
  - Confidence measurement
  - Manual clean-up for complex roofs

- Quality depends on building footprint accuracy and Lidar point density
  - $> 3$ feet point spacing $\rightarrow$ LOD1 buildings
  - $< 3$ feet point spacing $\rightarrow$ LOD2 buildings
Roof-Form Extraction for Procedural Building Modeling

- Extract information about roof shape and height from lidar-derived surfaces
- Symbolize buildings in 3D using procedural rules
- Review output against LAS dataset
Automated Roof-Form Extraction for Schematic Buildings

- Classify areas of like slope & aspect in DSM
- Create roof-plane polygons
- Extract attributes
Procedural Modeling

Ridge Height
Eave Height
Base Elevation
Ridge Direction
Roof Form: Gable
Procedural Modeling

• Roof types automatically classified

• Other types supported:
  - Shed
  - Dome
  - Vault
  - Mansard
Reviewing Output

- Prioritize review based on confidence metrics
- Compare procedural symbols directly against lidar
  - Manual changes update on-the-fly
Demo: 3D Basemap Creation
In ArcGIS Pro
Maintaining + Sharing Your 3D Basemap

Brian Sims
Maintaining + Sharing Your 3D Basemap
Maintaining + Sharing Your 3D Basemap

Best Practices

First Capture

Second Capture

Feature Extraction

Extract New Building
Maintaining + Sharing Your 3D Basemap

Best Practices

ArcGIS Online

ArcGIS Pro
Create Scene Layer

Scene Layer Package

ArcGIS Online
Scene Layer

Zipped GDB

ArcGIS Online
Scene Layer

ArcGIS Pro
Share Web Scene

ArcGIS Online
Feature Layer

Web Scene

Desktop

Web

Devices
Maintaining + Sharing Your 3D Basemap

Best Practices

Portal for ArcGIS

ArcGIS Pro
- Share as Web Layer
- Share Web Scene

Portal for ArcGIS

Scene Layer

Feature Layer

Web Scene

Desktop

Web

Devices
Maintaining + Sharing Your 3D Basemap
Best Practices

3D Editing

Feature Extraction

Import 3D Models

ArcGIS Pro*

Scene Layer

Feature Layer

Web Scene

Desktop

Web

*Share Multipatches in Pro with layer in a Map or in 2D Features section of a Scene
Understanding + Engaging with Your 3D Basemap
How to Get Started
How to Get Started

Local Government Solutions

Local Government 3D Basemaps
Publish a collection of local government 3D basemaps that serve as a foundation for desktop, mobile and web mapping applications.

Planning and Development
Review Proposed Developments
A collection of maps and apps used to visualize proposed developments and assess the impact of each new development on the existing community.

Visualize Proposed Development
Conduct Visibility Assessment
3D Enablement Workshop
Organized as a phased set of workshop activities

Dive deep into working with 3D in ArcGIS
• Learn advanced 3D workflows and techniques
• Hands-on, one-on-one
• Your data in your environment
• Align with a current project for immediate ROI

1. Create Your 3D Basemap
2. Learn 3D Symbology
3. Perform Analysis
4. Configure Web Apps
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Tuesday
- Authoring 3D Scenes in ArcGIS Pro | 9:30 am
- 3D Basemaps: An Introduction | 12:30 pm

Wednesday
- Point Clouds and 3D Mesh | 12:30 pm

Thursday
- 3D Enable Your Campus and Workplace | 9:30 am
- Refining 3D Buildings Extracted from LiDAR | 12:30 pm
- 3D Web Apps for Community Engagement | 4:30 am
- Hands on with VR and AR | 5:30 pm
- VR with ArcGIS | 5:30 pm

Creating and Sharing Awesome 3D Web Scenes

ArcGIS Pro: 3D Tips and Tricks