ArcGIS Runtime: Building Augmented Reality Experiences

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Agenda

- Background and concepts
- Common scenarios
- APIs
- Calibration
- Flyover demo
- World scale demo
- Additional considerations
- Resources and conclusion

Background

What is augmented reality?

Background: What is AR?

- Blend virtual content with real-world experience (augment reality)
- Encompasses many possible scenarios
- Intuitive to use but hard to describe; deceptively simple
- For Runtime purposes, encompasses visual content only
- Uses platform frameworks: ARKit and ARCore

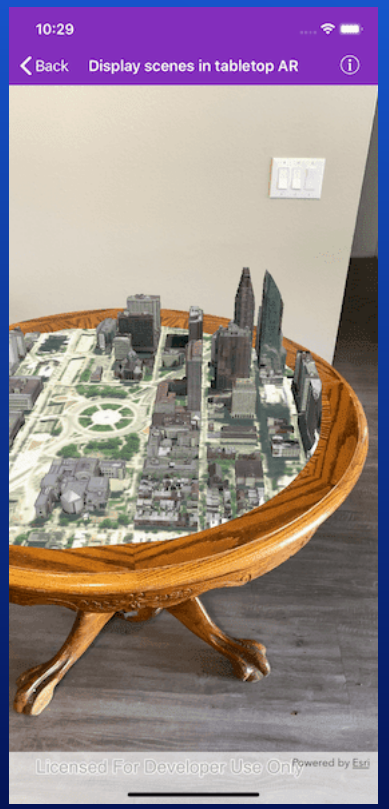
- Note: this presentation does not cover game engines, Unity, or Unreal

Background: Cameras and APIs

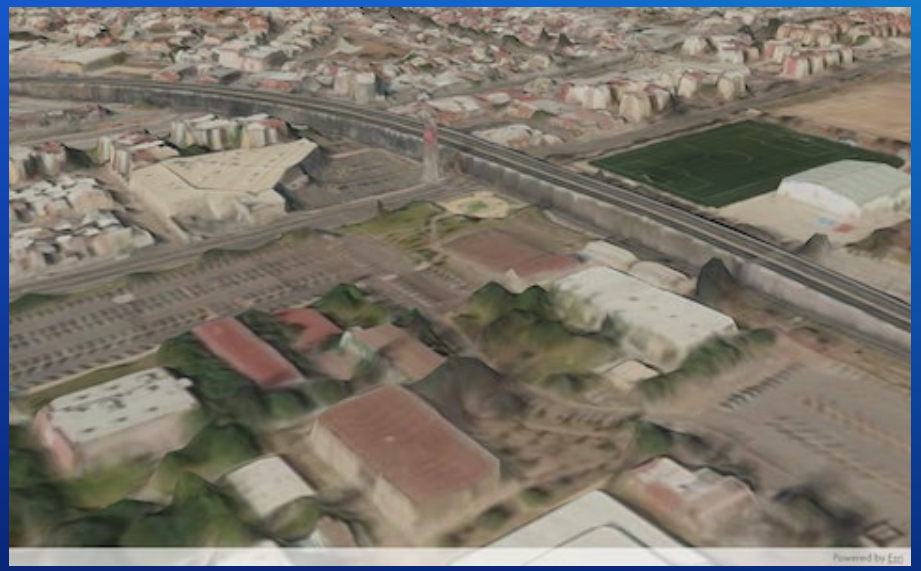
- Runtime renders a scene using a virtual camera
  - Runtime simulates a ‘real’ camera
- Phones/tablets have a physical camera
  - ARKit and ARCore know the characteristics of the physical camera
  - ARKit and ARCore use sensors to precisely measure camera movement (as a Transformation Matrix)
- Runtime AR Toolkit merges physical and virtual camera feeds
  - Maintains a relationship between the movement of the physical and virtual cameras
  - Adjust parameters of relationship to implement different experiences

Background: AR scenarios/patterns

World-scale



Tabletop



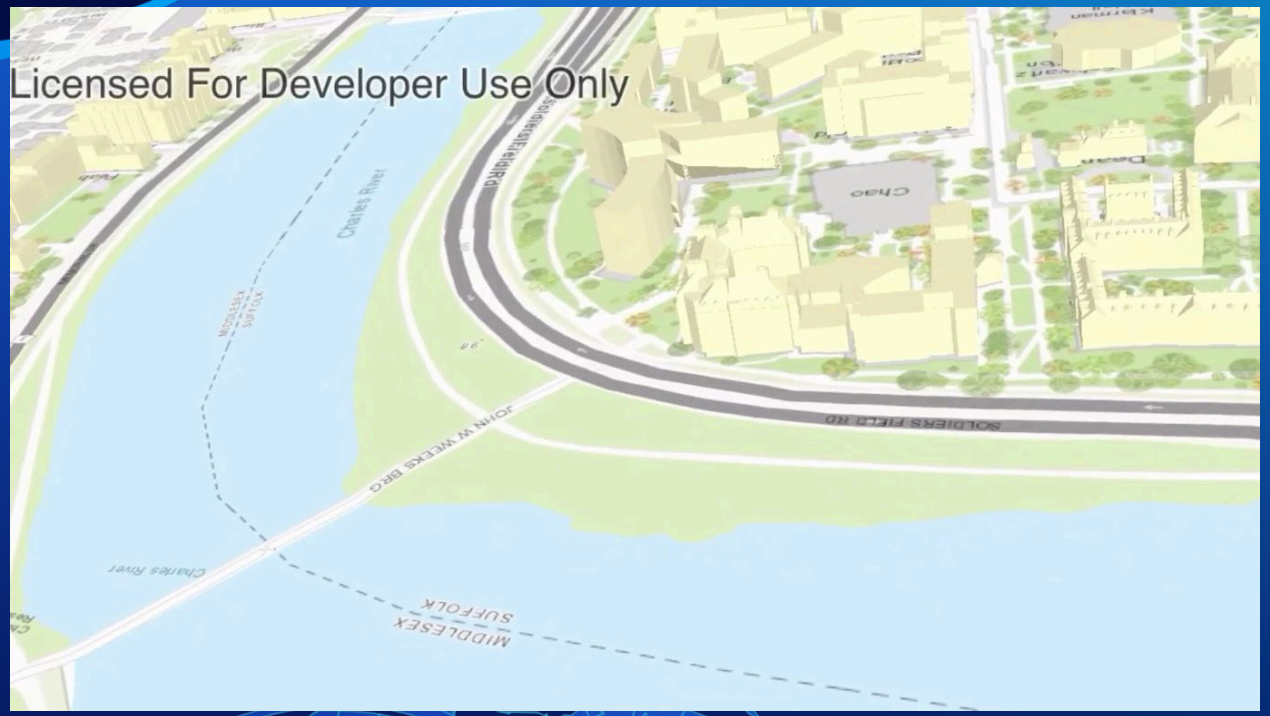
Flyover

Overview: Runtime APIs for each scenario

- `ARSceneView` – **renders scene, interfaces with ARKit, ARCore**
- `OriginCamera` – **Defines camera origin; transformed by position from ARKit/ARCore**
- `TranslationFactor` – **scales transformation from ARKit/ARCore (move faster/slower)**
- `LocationDataSource` – **Manages non-ARKit/ARCore location source (e.g. GPS)**
- `ARLocationTrackingMode` – **Defines how location updates from data source are used**
- `SetInitialTransformation` – **mostly used when pinning content (e.g. to a tabletop)**

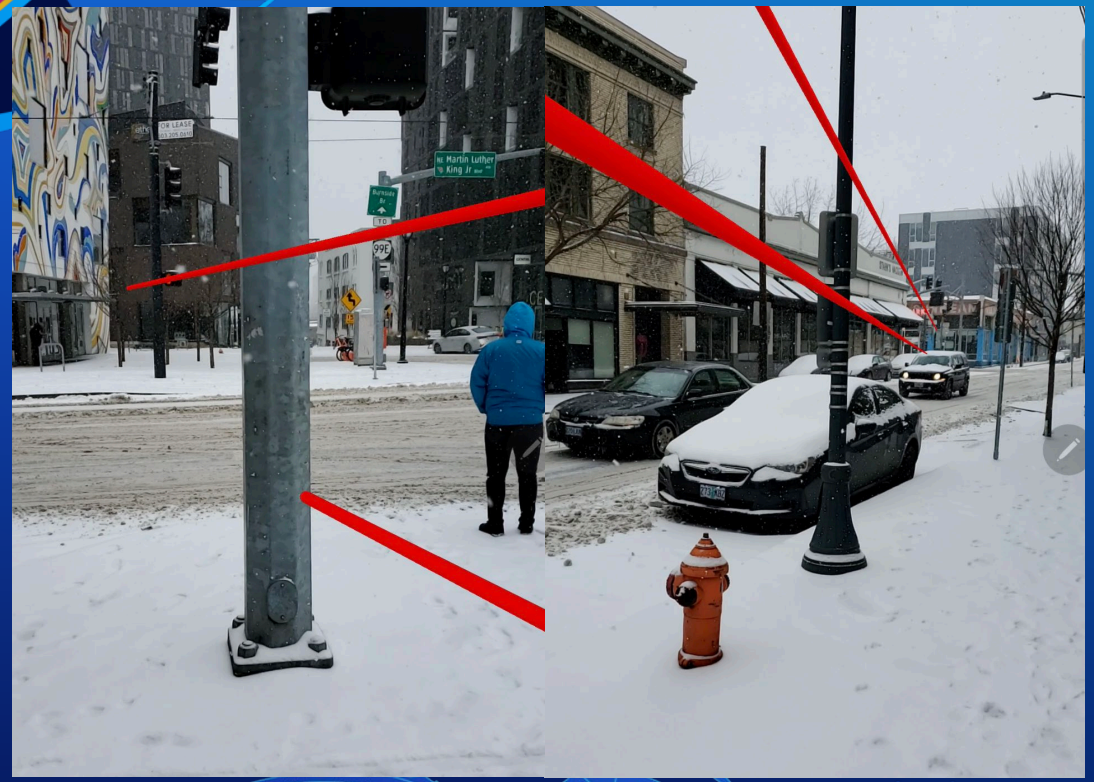
Calibration

- The hardest part for world-scale experiences
- Need to correct for multiple kinds of errors:
  - X,Y/Lat,Long Position
  - Vertical Position (Elevation/Altitude)
  - Orientation/Heading
- Many strategies; you need to design an approach that works for your specific needs



Flyover

Demo



World scale

Demo

Resources

- **Article & Tutorial (iOS): https://www.codeproject.com/Articles/5254219/Augmented-Reality-with-the-ArcGIS-Runtime-SDK-fo-2**
- **Platform-specific documentation (in Toolkit repos)**
- **Full documentation available through developers.arcgis.com dashboard**
  - **Go to the downloads page, and select the guide download for your platform**
- **Runtime samples available for each platform; ready-to-use and show real-world scenarios**

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