How GeoPose Aligns with Web Map Use Cases and Requirements

Christine Perey (PEREY Research & Consulting) and Josh Lieberman (OGC)

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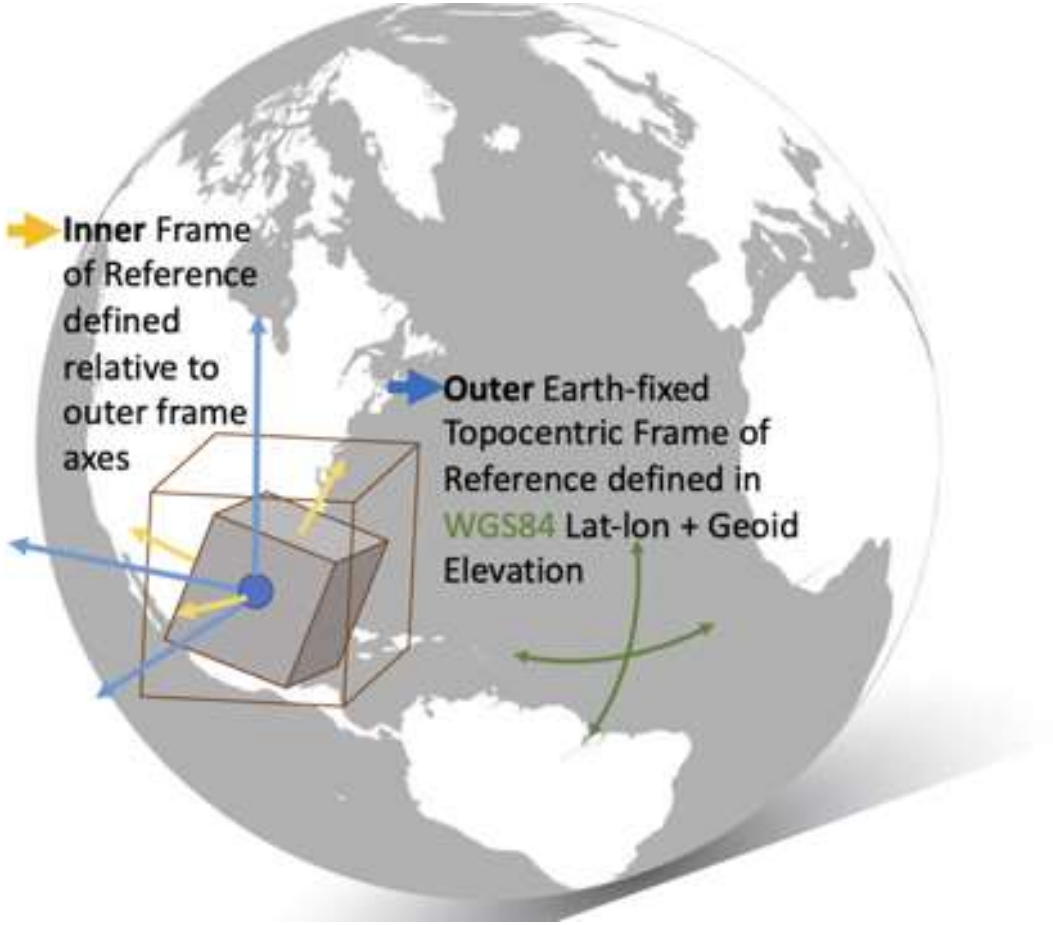
Agenda

Duration	Item
5 min	What is (and is not) GeoPose
7 min	Alignment to Web Map Use Cases & Requirements
3 min	New Use Cases and Next Steps

What is GeoPose?

- Pose: (Cartesian) Frame relative position + orientation (6DOF)
- GeoPose: Pose with (ultimate) geocentric frame of reference
- Frame graph: collection of frames of reference connected by poses into a graph.
- Fundamentally 3D but relevant to placing objects (real, virtual, symbolic) into 2D projections such as maps
- Frames can be fixed to feature orientations, to feature perspectives, or to observer viewpoints



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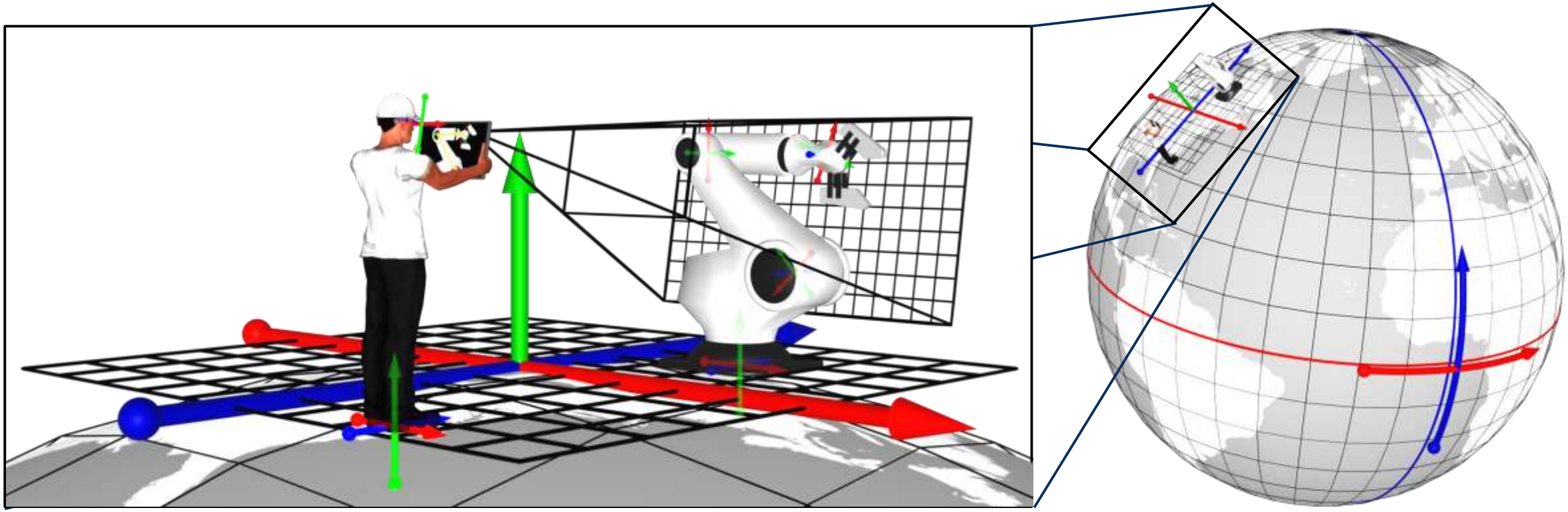
3D Requirements and Use Cases

- GeoPose and the capabilities that can use it are fundamentally 3D



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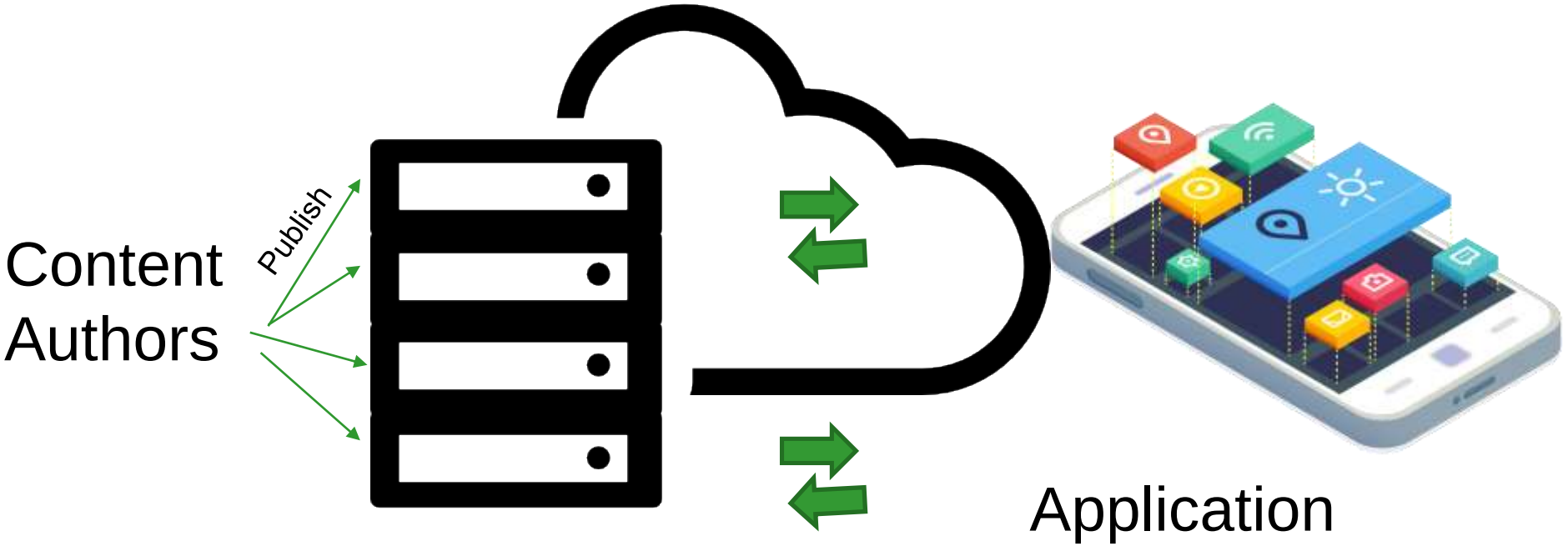
Web Map Target Actors



https://maps4html.org/HTML-Map-Element-UseCases-Requirements/

Content Author Use Cases

	Use Case	GeoPose role
3.1.1	Display an Interactive map within a web page	
3.1.2	Display a map centered on a point location	Map oriented and/or scaled to user's viewpoint
3.1.3	Display a region of map data as a static image	
3.1.4	Display multiple point locations as map markers	
3.1.6	Display routes/paths or regions	2/3D posed route indicators
3.1.6	Display custom web content describing map features	2/3D content posed with respect to the map
3.1.7	Display custom imagery as a map layer	
3.1.8	Combine multiple layers of map tile data or features	Layers of 2/3D objects
3.1.9	Provide alternative map layers which the user can select	
3.1.10	Display drawings or schematics without geographic coordinates	
3.1.11	Include animated spatial data in a layer	Insert and maintain position + orientation in 6 DOF
3.1.12	Require interaction before allowing pan/zoom (or opt-out of such potentially default behavior)	

GeoPose-Assisted Creator Paradigm

- Position content in a map
- Position a map according to user viewpoint
- Assemble a map layer from diverse features
- Insert and/or track animated or moving objects in a map

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Web Site Visitor Use Cases

	Use Case	With GeoPose
3.2.1	Reposition or scale a map to find more context for the displayed locations	Track user viewpoint
3.2.2	Reset the map to the initial view	
3.2.3	Rotate a map, or reset the bearing	Track user viewpoint or feature perspective
3.2.4	Access additional information about a point on the map	Add more detailed object (3D)
3.2.6	Show/hide map layers or feature sets	
3.2.6	Bookmark a location	With 2.5/3D view perspective
3.2.7	Search or sort within a set of geographic features	Distinguish elevation or perspective
3.2.8	Customize the color scheme (light/dark or high contrast)	
3.2.9	View the current location on a map, without disclosing to the website	
3.2.10	View a map in fullscreen mode	
3.2.11	View a map as a Picture-In-Picture media object	
3.2.12	View a map in Augmented Reality	6DoF map scene perspective
3.2.13	Save map content for offline use	Store object positioning

GeoPose-Assisted Viewer Paradigm

- Orient & scale map to my viewpoint
- Retrieve & view detailed objects for points of interest
- Filter content by 6DoF positioning
- Save objects offline with 6DoF positioning

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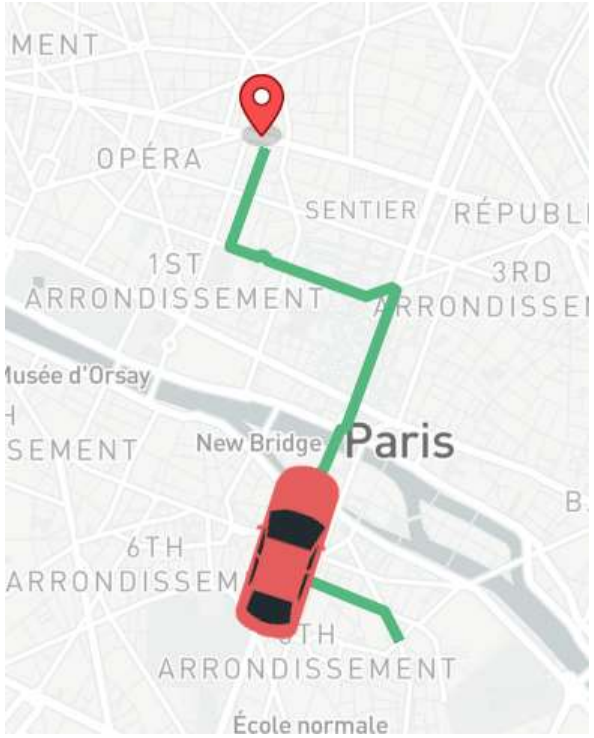
Application Developer Use Cases

	Use Case	With GeoPose
3.3.1	Add a custom control to a map	
3.3.2	Provide feedback to a user as they manipulate the map	Map plane extent positioning in user viewpoint
3.3.3	Move a map to a new position and/or zoom level	In 2.5/3D
3.3.4	Animate a map through a sequence of points	In 2.5/3D using a GeoPose sequence
3.3.6	Change the bearing of a map	Relative to 2.5/3D user viewpoint
3.3.6	Control which layers are currently visible & which can be hidden by the user	
3.3.7	Generate new vector features from data	6 DoF feature positioning from GeoPose
3.3.8	Generate a heatmap overlay from point intensity data	
3.3.9	Enable drag & drop for map layers	Of (geo)posed 2.5/3D features

GeoPose-Assisted Developer Paradigm

- Leverage user GeoPose for map plane and extent positioning
- GeoPose sequences for animation of map positioning
- Generate new features from data including GeoPoses
- Drag and drop GeoPosed features
- New: drag and drop GeoPoses to reposition / animate map features.



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Functional Requirements

- Rendering Base Layers
- Vector Features and Overlays
- Interpreting Locations and Map Positions
- User Navigation

Rendering Base Layers

	Capabilities	With GeoPose
5.1.1	Embed an interactive map viewer, using HTML markup	
5.1.2	Generate a default map for a given area	In 2.5/3D
5.1.3	Display an image file as a map layer	Positioned as a swath
5.1.4	Display a map using tile data from an author-specified web map service	
5.1.6	Display a basic map without JavaScript	
5.1.6	Display map content in a users preferred language	

Vector Features and Overlays

	Capabilities	With GeoPose
5.2.1	Show pinpoint locations or custom markers on the map	6 DoF marker positioning
5.2.2	Draw polygons or polylines as stylable, interactive vector graphic	
5.2.3	Support hyperlinks from markers or vector features	
5.2.4	Display a map using tile data from an author-specified web map service	In 2.5/3D

Interpreting Locations and Map Positions

	Capabilities	With GeoPose
5.3.1	Select map view from latitude and longitude point	Including 6DoF orientation
5.3.2	Select map view from street address or place name	Including 6DoF orientation
5.3.3	Display map tiles defined in various common coordinate systems	In 2.5/3D
5.3.4	Reproject map tile data into a new projection or globe view	In 2.5/3D

User Navigation

	Use Case	With GeoPose
5.4.1	Zoom the map independently from the rest of the page	
5.4.2	Pan the map display	
5.4.3	Load additional map tiles when they pan into view	User viewpoint in 6DOF
5.4.4	Wrap/duplicate data tiles when panning around the globe	
5.4.6	Maintain reasonable scale of labels and lines when zooming	
5.4.6	Dynamically load different resolution map tile on zoom	
5.4.7	Hide or show (and maybe dynamically load) vector features and labels on zoom	

Summary

- GeoPose can address and extend many Web Map use cases and requirements
- GeoPose can also support new Web Map use cases
- Maps can leverage GeoPose to position, orient, and scale maps to user viewpoints
- **Content Authors** can publish sets and layers of objects with 6DoF symbol orientation defined by GeoPoses
- **Visitors with devices** that meet requirements can experience maps and objects corresponding to their viewpoints, optionally in 3D
- **Developers** can
  - Create animations with GeoPose sequences of map viewpoints or mapped object positions.
  - Implement drag and drop of GeoPosed data to add oriented objects to a map view or re-orient objects already within the view

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Questions?