

# Components

- A component is a datatype or a class
  - justified by a use case
  - conceptually in scope
  - with a machine-readable schema
- The values of a datatype or properties of a class need required ability to represent whatever it is that they communicate.
- There were originally twenty-five proposed components in four groups:
  - Core,
  - Time Coordinate,
  - Uncertainty,
  - Visual Positioning Support

# Review of Components by WP

- Before: Twenty-five proposed components in four groups. Review by looking a group diagram, then each component in sequence. Discussion embedded in process. About 1 minute of explanation per component.
- After: Twenty components:
  - Core – 4
  - Time Coordinate – 4
  - Uncertainty – 4
  - Visual Positioning Support - 8
- These are incorporated into the MSF Visual Positioning Prototypes and will provide some feedback on implementation and practicality in time for the October workshop.

# Core Components Before and After

Geodetic or geographic position defined by two angles and a height

Position
+number lat +number lon +number h

Orientation defined by the three vector and one scalar components of a unit quaternion

Quaternion
+number x +number y +number z +number w

Orientation defined by three angles in degrees: yaw, pitch, and roll

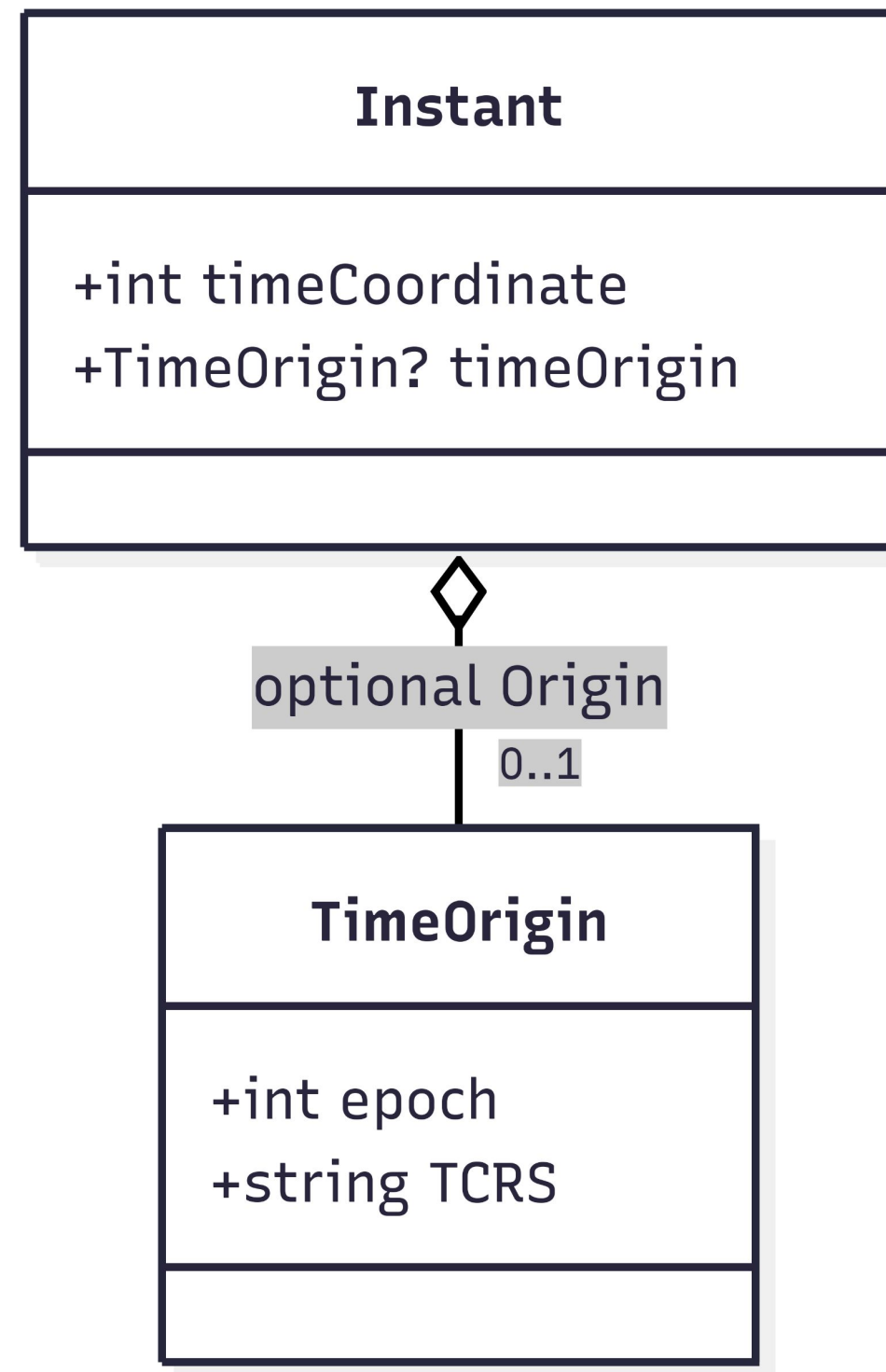
Angles
+number yaw +number pitch +number roll

A variable length array of coordinate values

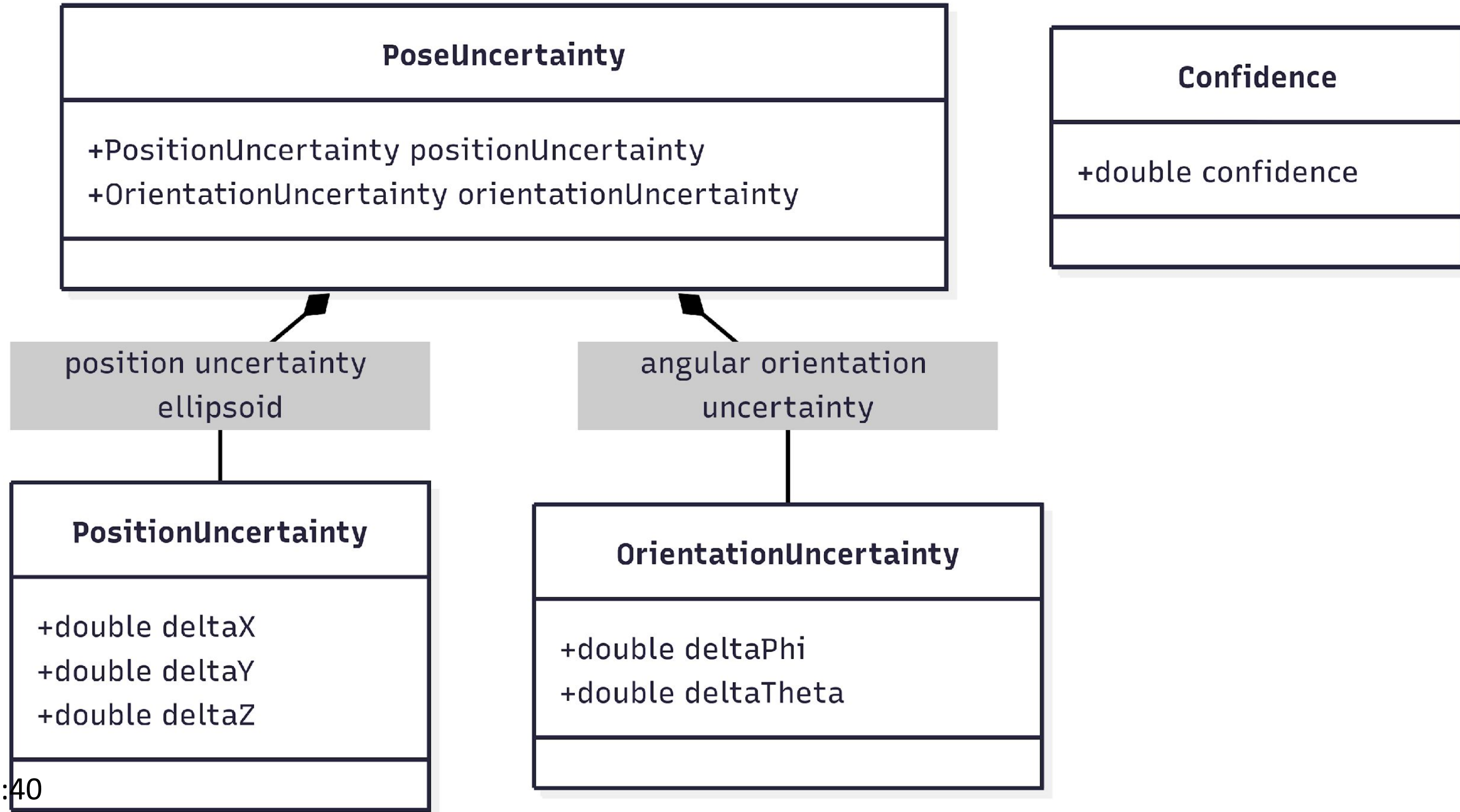
Coordinates
+number[] coordinates



# Time Coordinate Components - After



# Uncertainty Components - After



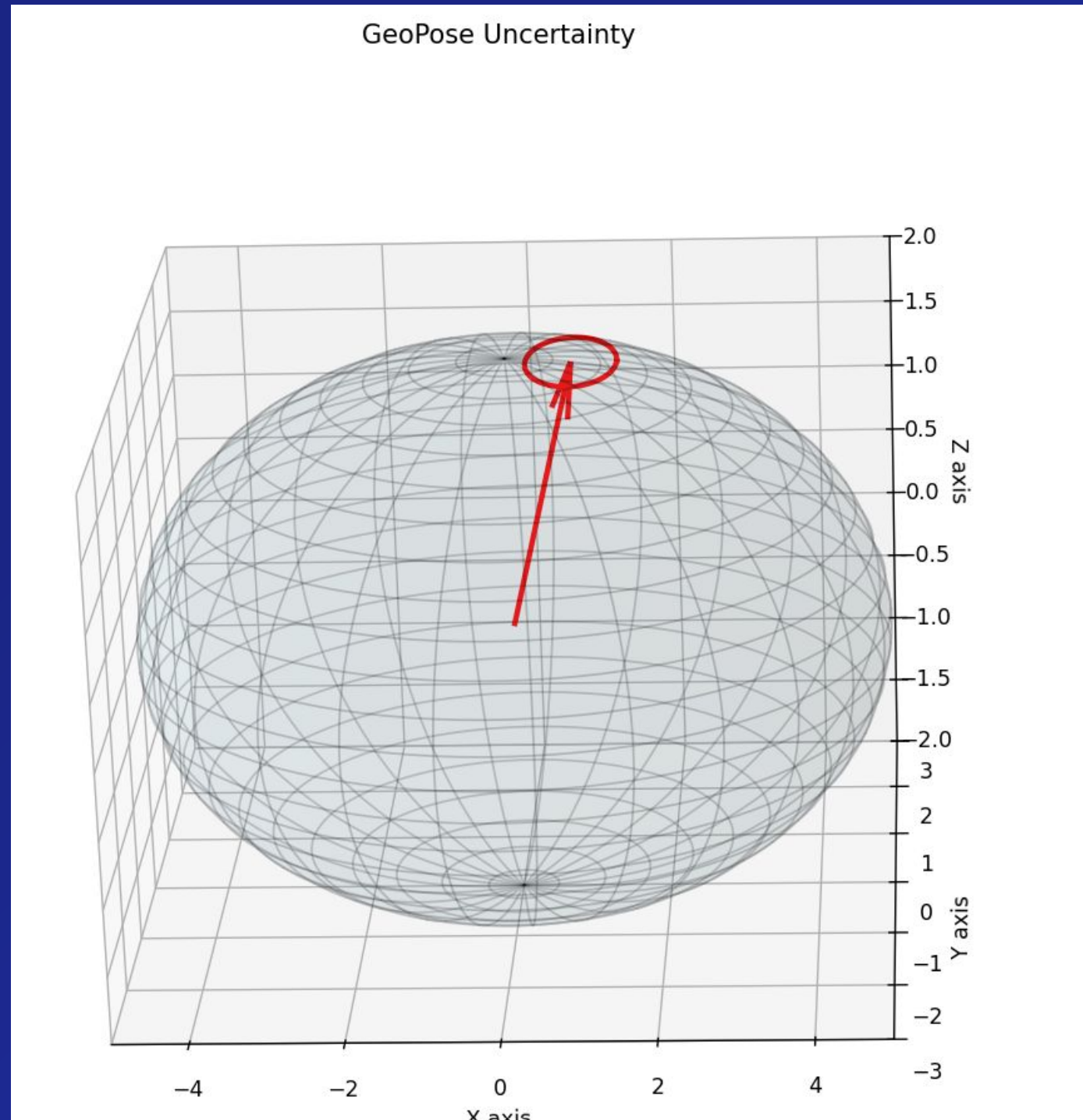
2:40



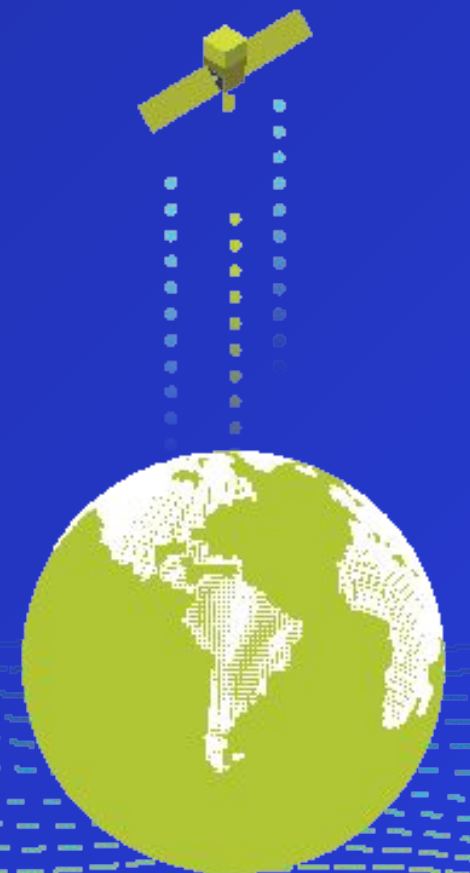
# Uncertainty Components – PositionUncertaintyEllipsoid



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- A 3D position uncertainty ellipsoid, visualizes the spread and orientation of uncertainty around a central point in space. The red arrow indicates the mean (expected) position, and the ellipsoid's shape and orientation are derived from the covariance matrix, representing positional variance in all directions.

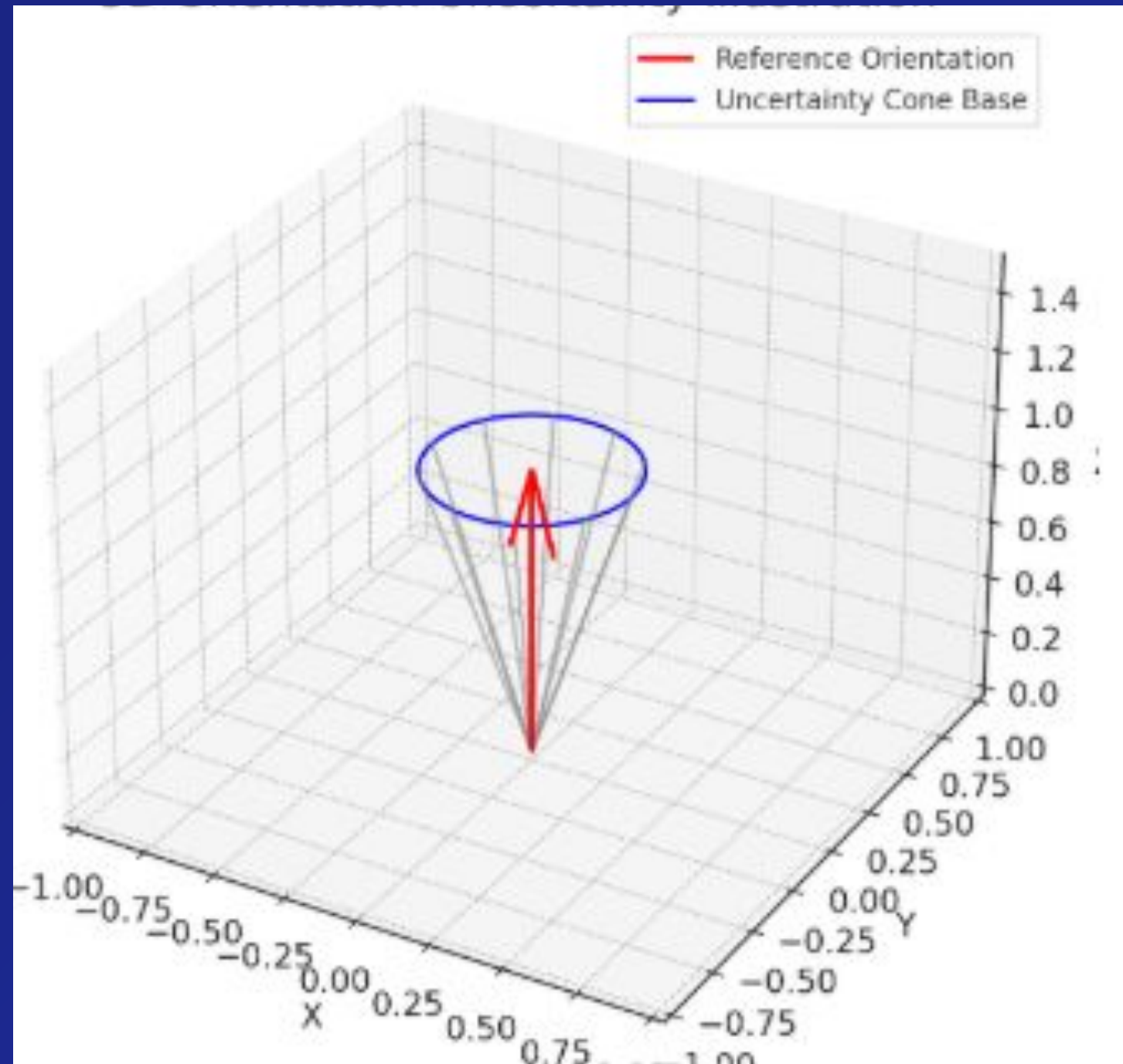




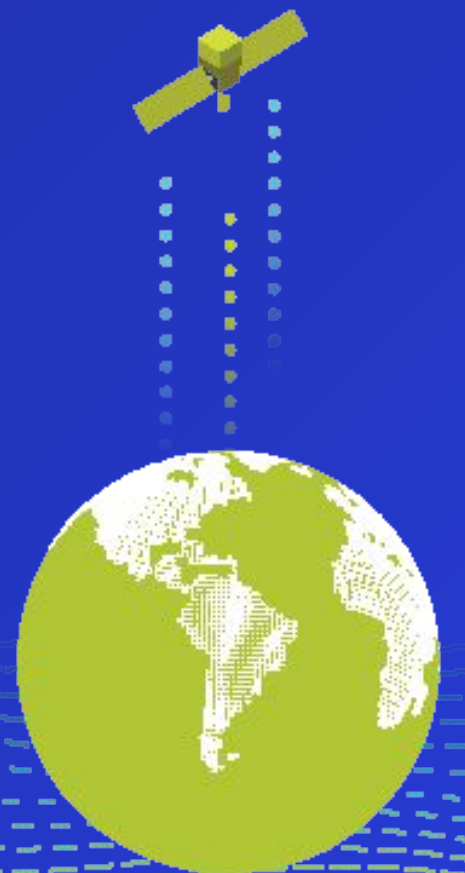
# Uncertainty Components – OrientationUncertaintyAngles

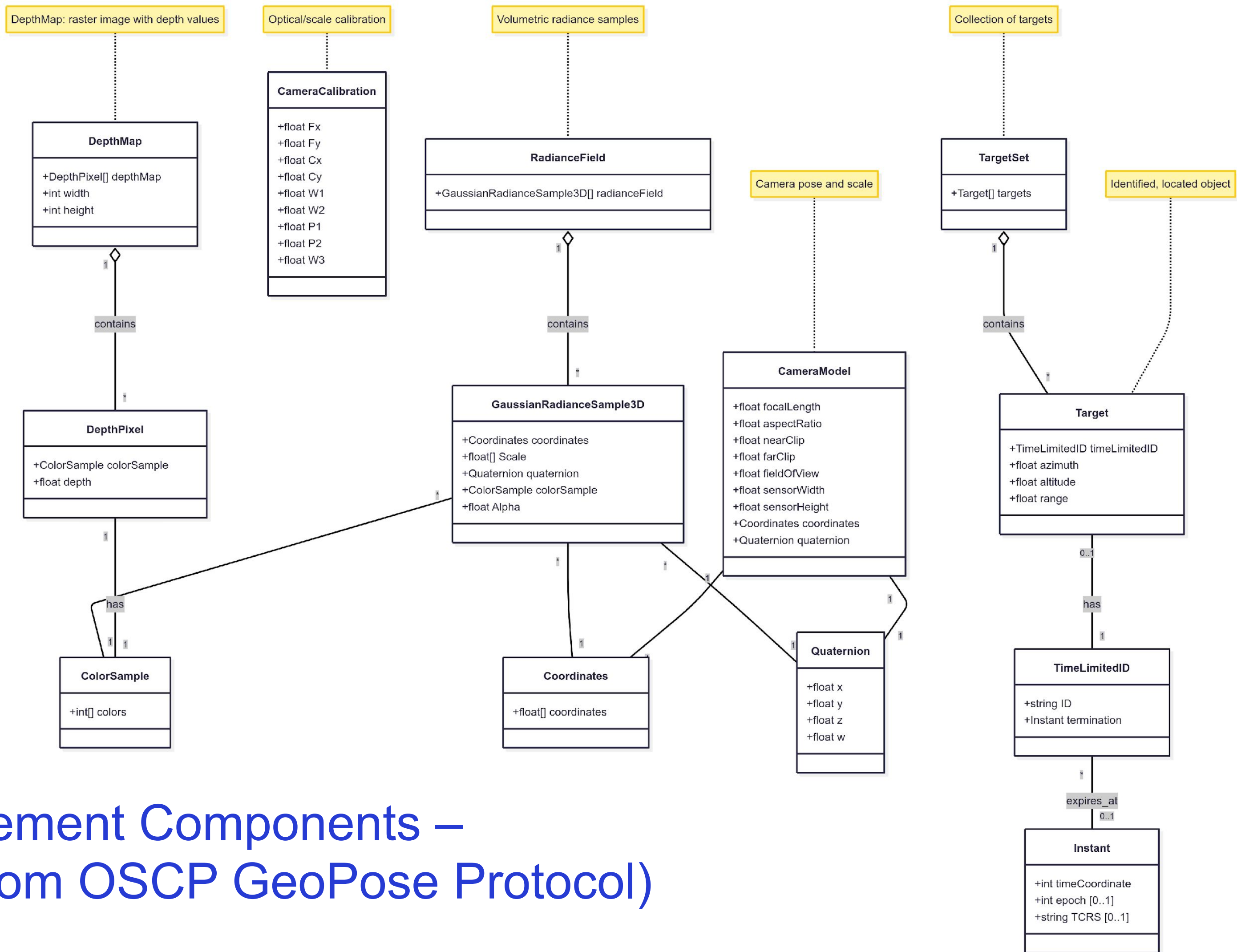


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- Here is a 3D illustration of orientation uncertainty. The red arrow represents the **reference orientation**, and the blue circle and gray lines form a **cone** showing possible deviations within a 20-degree uncertainty range. This captures the idea that the orientation could point in any direction within the cone's spread.





# Image Element Components – (Mostly from OSCP GeoPose Protocol)



# GeoPose 1.X Status



- WP1 and 2 Decoupling of JSON Encoding and Conceptual Model
  - Definition of GeoPose Components and Componetized GeoPose
  - Developing 25-008 and 25-009 in repositories
  - What are “GeoPose Components?”
- WP 5 Time Coordinates (see next slide)
- WP 7 Uncertainty
  - See [Feb 20 proposal](#) especially slides 5, 6, and 7 with regard to some issues raised by Jim A.
  - Voice concerns/support as soon as possible
  - There was a meeting on this topic on Tuesday May 20
- WP 8 Support for MSF Real Virtual World Integration Prototype: RideHailing use case (using Hillyfields Data Bubble)
  - Please refer to MSF slides on                      for details
  - Getting “deep images” from [OpenEXR](#)
  - Will work on this during next (2<sup>nd</sup> May) meeting

# WP 1 GeoPose Components & Componentized GeoPose

*No Changes in over 60 days*

- Definition: units of description that are used to compose GeoPose and Standardization Targets
- <https://github.com/opengeospatial/GeoPose/issues/89>
- Covers all existing use cases
- Fully backward compatible
- See more in [these slides](#) for WP 1 and [these slides](#) for WP 2

# GeoPose 1.1 JSON Encoding

- This will define JSON Encoding for all GeoPose components

*MIKEL, ROB SMITH, JIM*

# WP5: Time Questions -> See Proposal



- It would probably be a good idea to have a chat about how time integrates with the revised component structure. For example, time sequences may be superseded by the new component approach.
  - Time as just a coordinate axis, with temporal points in a 1-D sequence..
  - Issue: How do you specify which axis – temporal CRS? For example, TIA.
  - Issue: Axes with discontinuities or backwards jumps or stretching and squeezing are probably not good choices.
- On a related topic, are GeoPose components designed to be embedded in other formats or extended to encapsulate them, or both?
  - GeoPose objects are (unordered) compositions of GeoPose components
  - GeoPose components may be embedded in other formats, where they can be recognized and properly interpreted, using the component name (e.g. “quaternion”) as a key or unique identifier.
- We should agree what is in and out of scope for time support in GeoPose 1.x. **For instance, should we consider time interpolation - given the spline discussion last week?**
  - My opinion is that time interpolation is out of scope for time but nevertheless interesting and important for some use cases
- Do we have a list of identified use cases for timestamped GeoPose? For example, trajectories should probably already be on that list.
  - Any application where time is used for synchronization between independent platforms
  - Any application where travel time is a factor in interactions.
  - Navigation and motion capture would be two concrete ones.