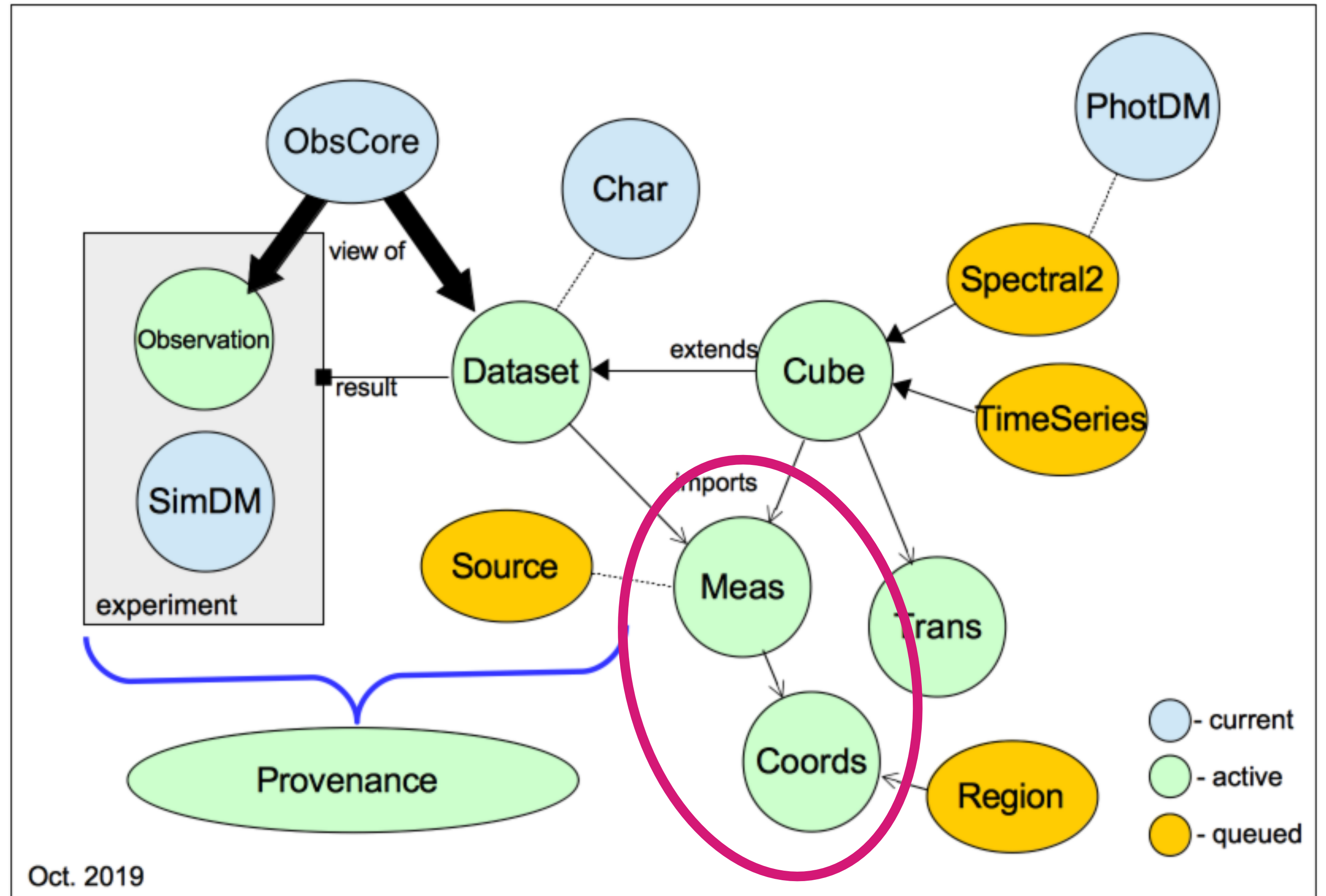


Meas/Coords Data Model Roadmap Status

Data Model Landscape

- Set of small, building block models used to construct complex data structures.

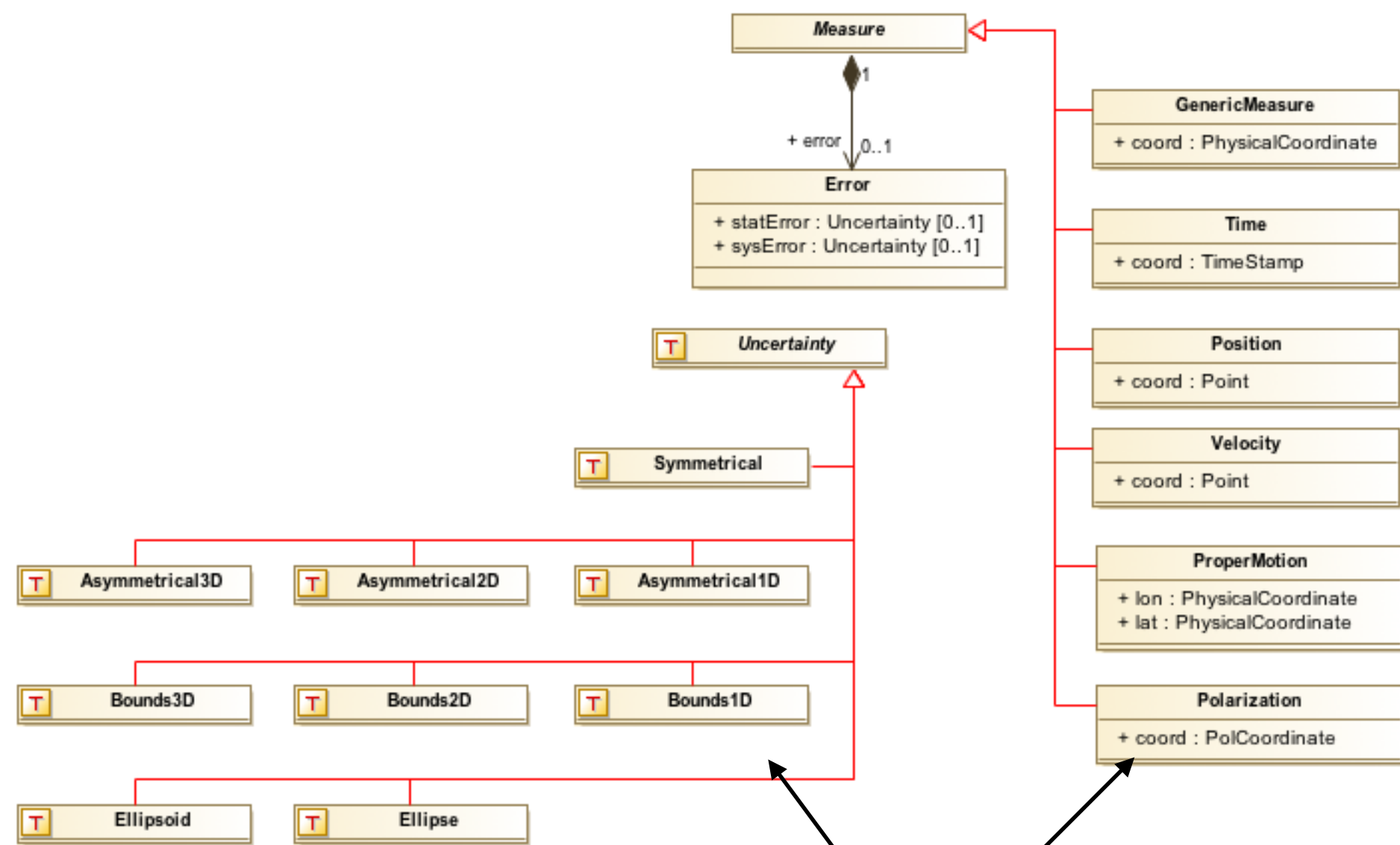


Introduction

- RFC2 period (2020-10-26 -> 2020-12-07)
 - Twiki pages ([CoordsRFC2](#), [MeasRFC2](#))
 - Most significant feedback related to documented use cases and implementations
- DM Workshop (May 2021)
 - **Exercise models-in-progress in real world usage, on real world data**
 - Exercise ability of annotation syntax proposals to map existing datasets to model instances
 - Demonstrate compatibility with common existing software (e.g. Astropy)
 - See comparison details ([pdf](#), [png](#)); presented at Northern Fall 2020 Interop.
 - **Demonstrate the potential for supporting “Interesting Science”**

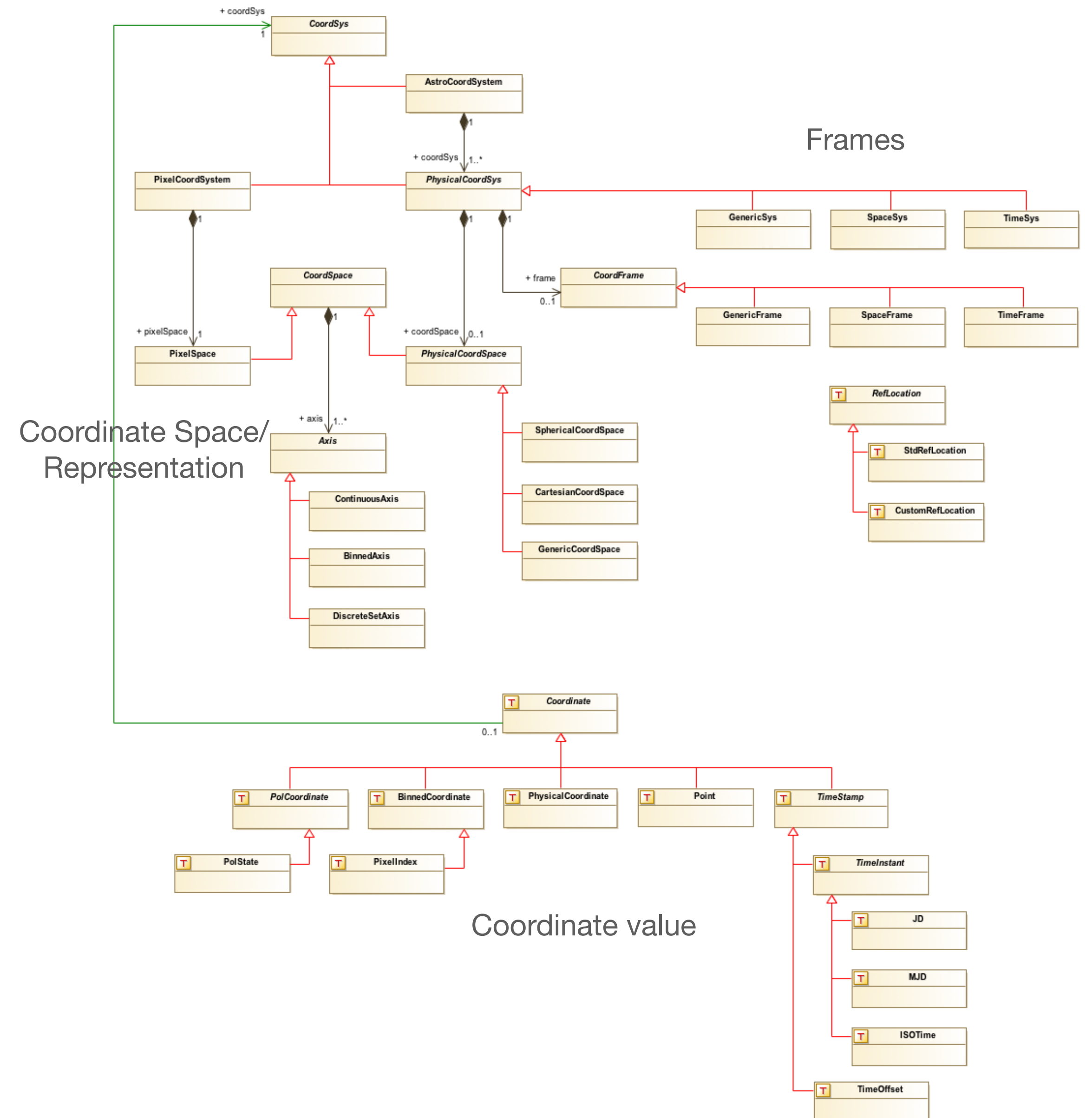
Model Overview:

Measurements



Combines value and error.

Coordinates



Coordinate Space/
Representation

Coordinate value

Workshop Conclusions

Ability to support workshop cases

- Models
 - Models provided high level of support for the workshop cases from very simple to very complex
 - Core models: Identified a couple adjustments to make, but the framework is sound.
 - Mango provided good experience for handling different sorts of data moving forward
 - Additional physical properties (Photometry, Hardness Ratios)
 - Other flavors (Flags, Classifications)

Case 3b

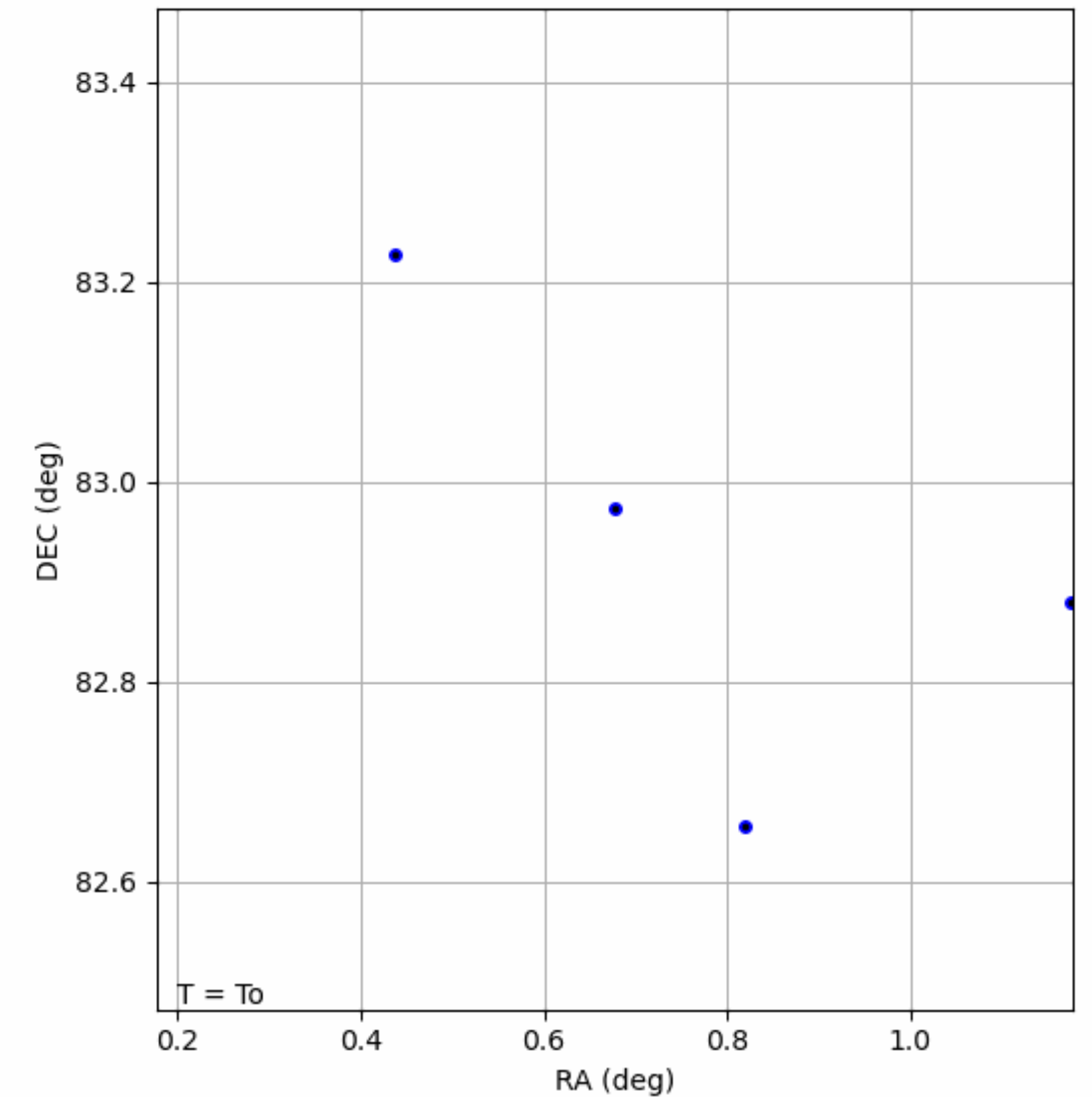
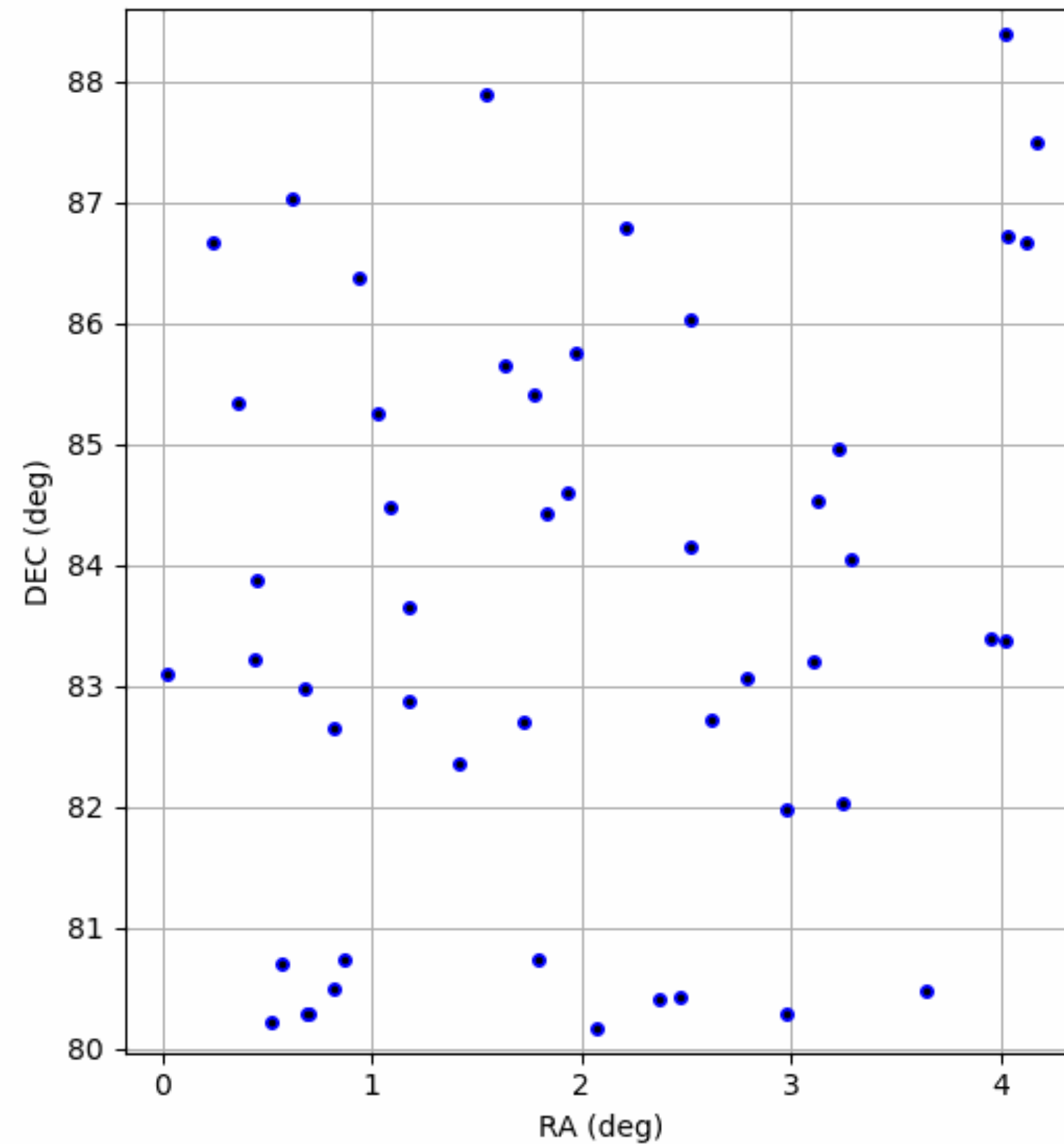
Proper Motion Slider

Animation: [Proper Motion Animation](#)

- * Any data annotated to Meas/Coords model position and proper motion elements.
- * Convert to Astropy SkyCoord
 - * Positions were automatically converted
 - * Proper motion integrated into them
- * Utilize
 - * Astropy SkyCoord `apply_space_motion` method
 - * Matplotlib `FuncAnimation`
- * To propagate sources over time

Note: `cosDec` application info is important here.

Proper Motion Demo: [Positions and Proper Motions - North (Roeser+, 1988)]

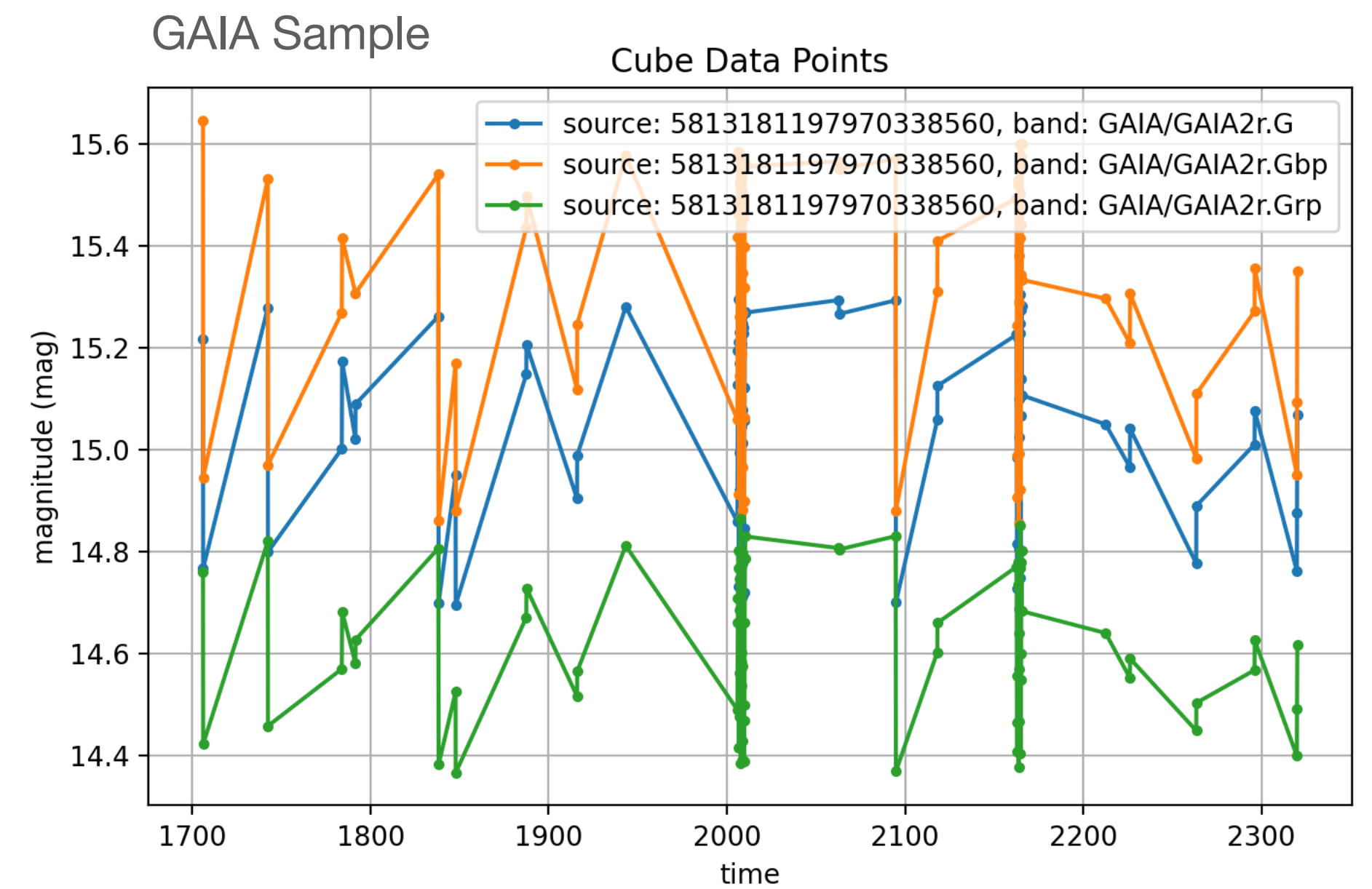
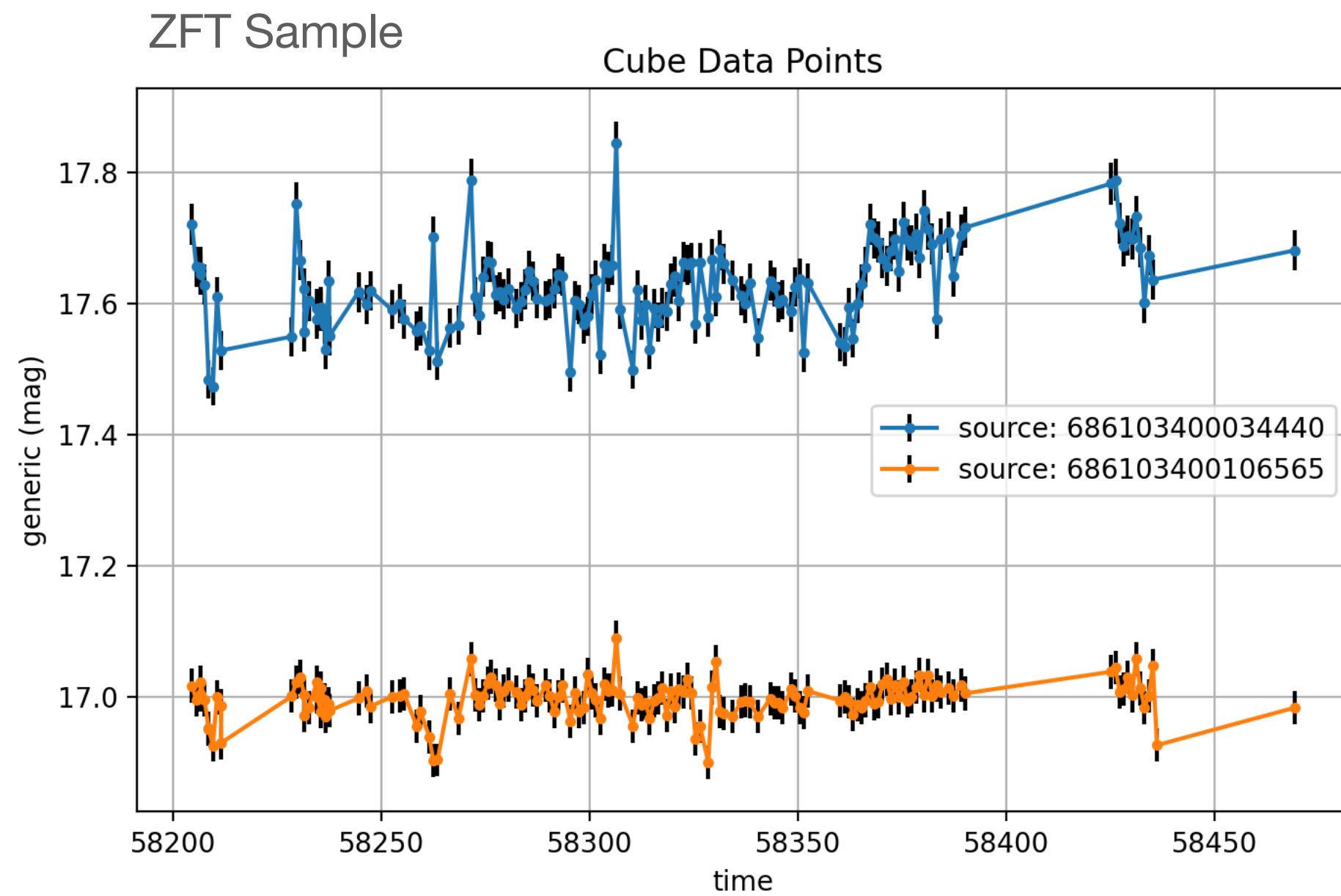
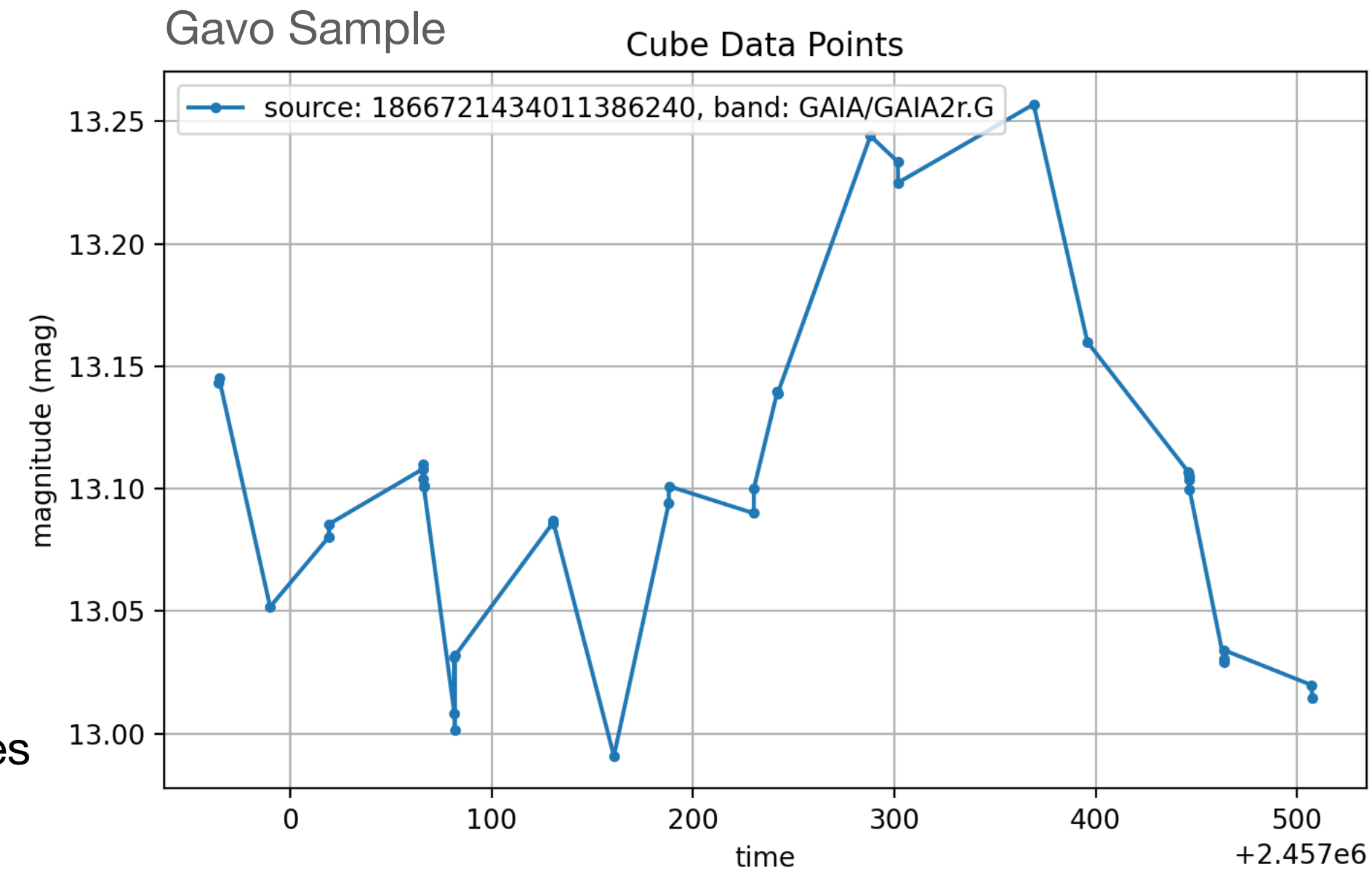


Case 4

Time Series

Code: [GitHub Implementation Page](#)

- * Any data annotated to Cube model (TimeSeries)
- * Regardless of native data structure, the client sees a homogeneous view of contents: Set of TimeSeries
- * Same code can handle all samples.



Roadmap

Coordinates Model

- **Version 1.0**
 - Point: Restore Space-centric flavors
 - LonLatPoint/SphericalPoint
 - CartesianPoint
- **Version 1.1**
 - Add PhotometryCoord
 - extension of PhysicalCoordinate to constrain Frame
 - Add PhotFrame
 - extension of GenericFrame; referencing photDM:PhotCal

Roadmap

Measurements Model

- **Version 1.0 (additive changes to current)**

- Measure: Add 'ucd' attribute, to convey 'physics' of the measure
 - Constrain value in specialized types (Time, Position, Velocity, ProperMotion, Polarization)
 - User provided for GenericMeasure
 - Some concern about using UCD since a single word conveys more than just the type (phys.angSize.smajAxis), and covers non-measure information ([meta.id](#))
- ProperMotion:
 - Change to use coords:Point for the coordinate; enables alternate representations (eg: Polar)
 - Add 'cosDec_applied' flag (True|False)

- **Version 1.1 - options to explore in action**

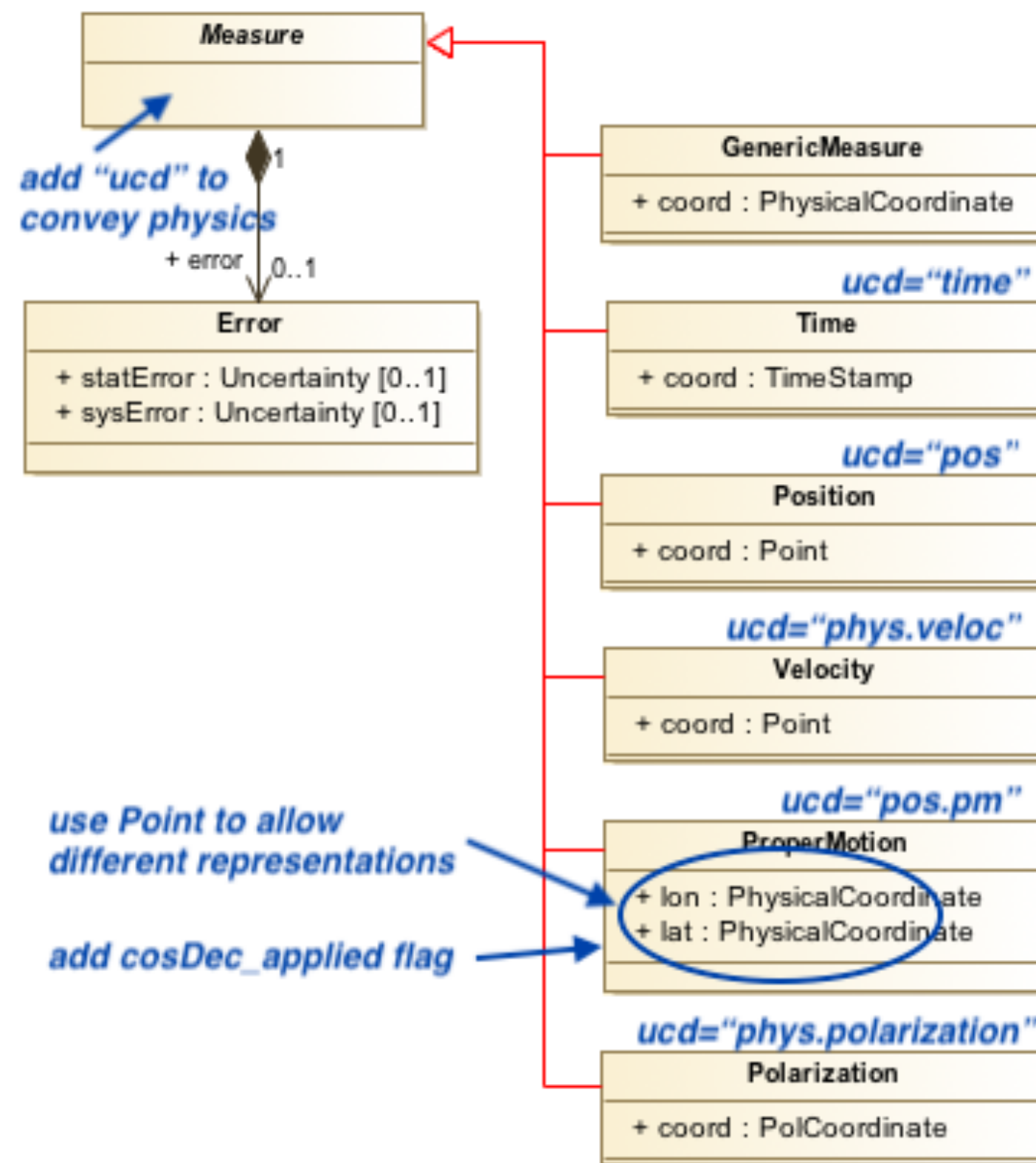
- HardnessRatio: add extension of Measure as Ratio type with associated Photometry Filters.
- Photometry: add as extension of GenericMeasure for flux/magnitude with associated Photometry Filter

- **Version 1.2**

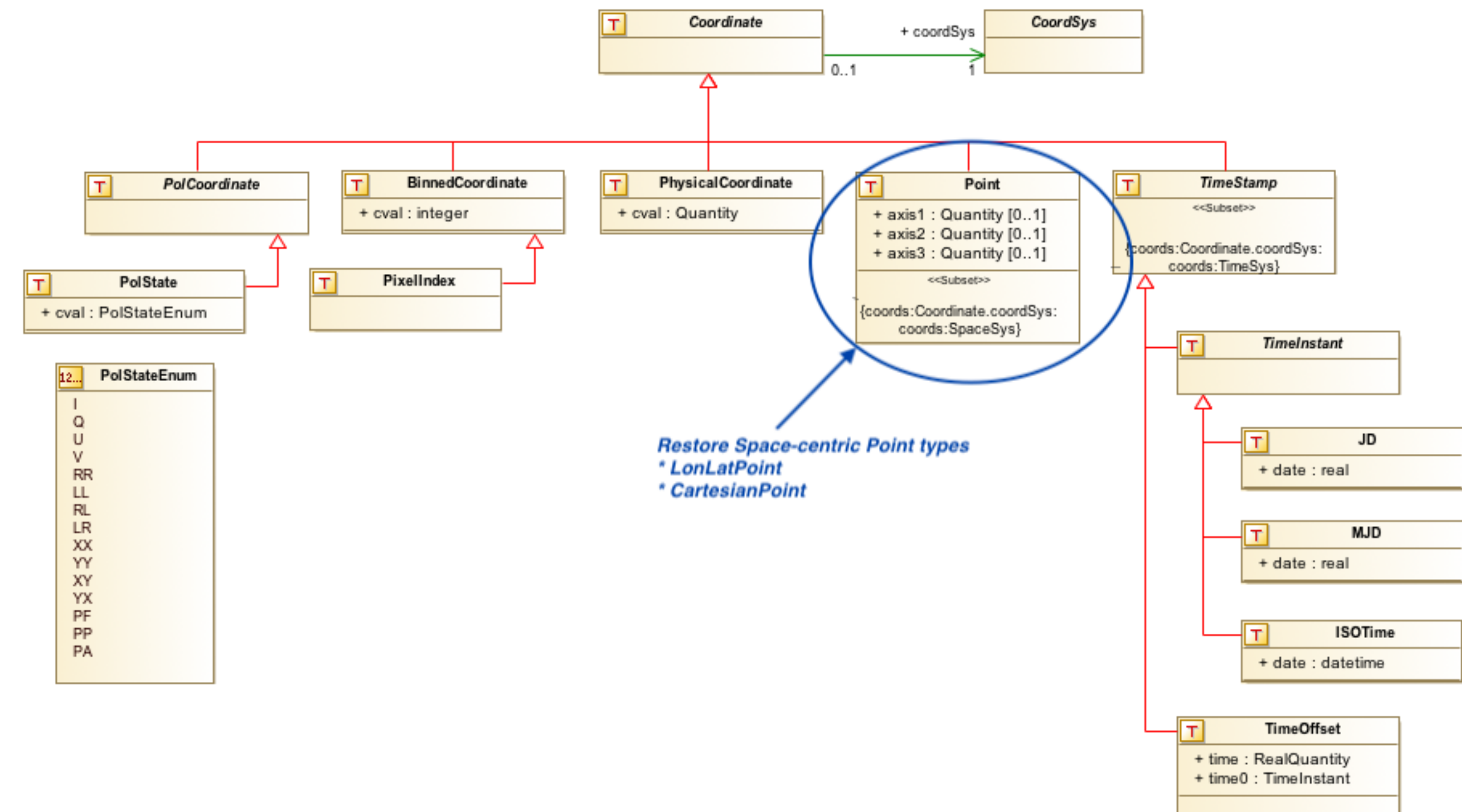
- Redshift: hold for special cases covering usage.

Requested Changes:

Measurements

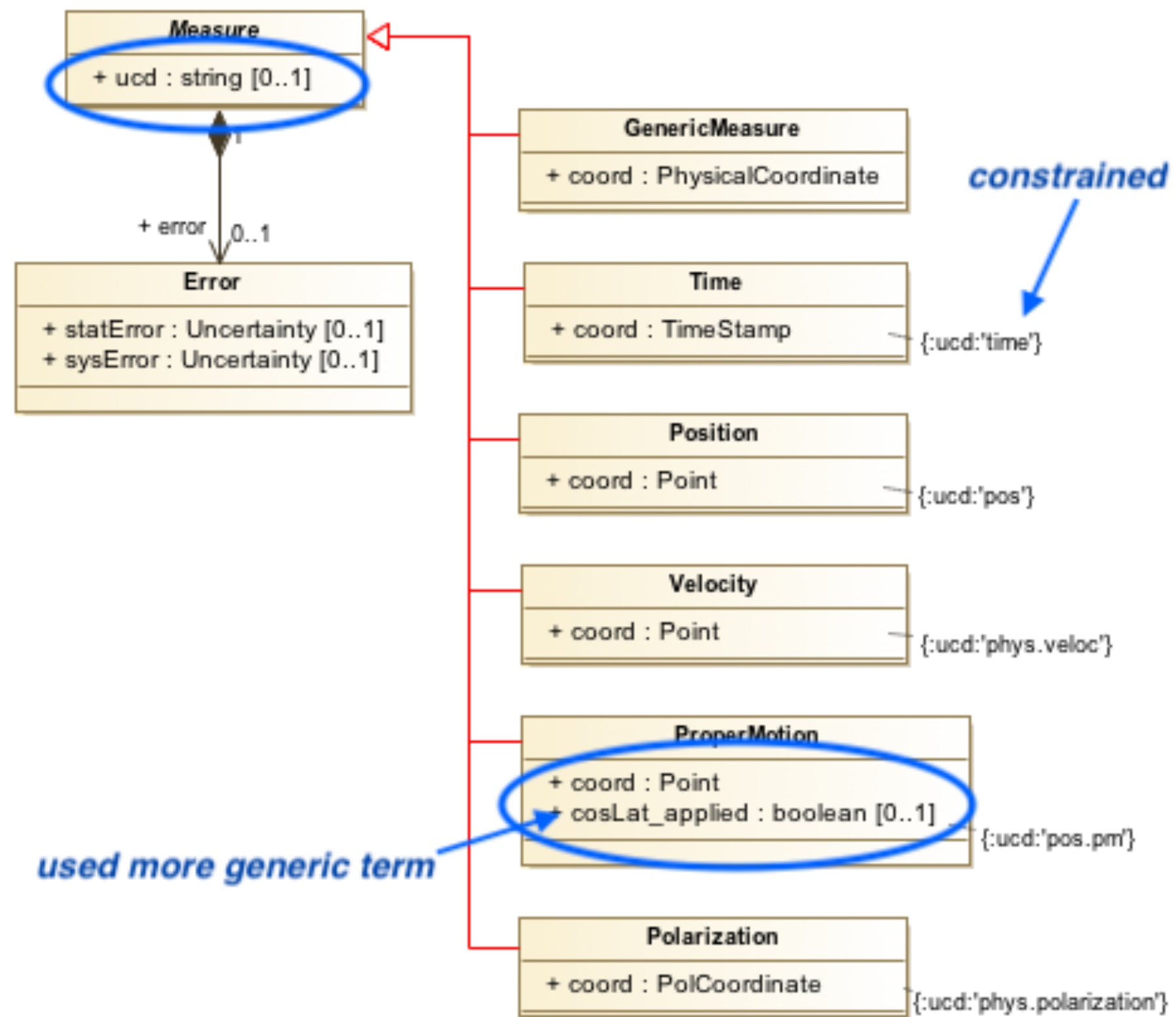


Coordinates

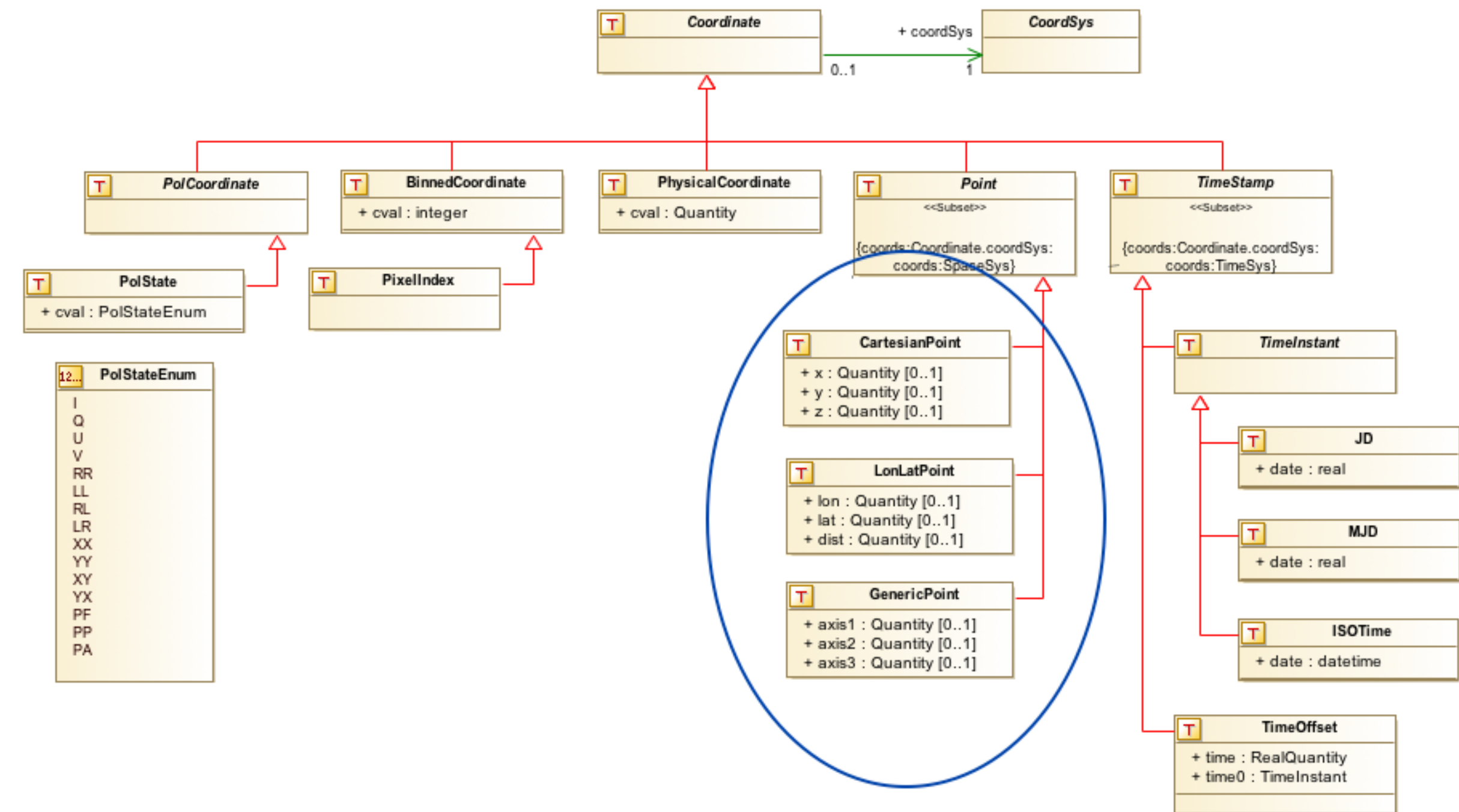


Actual Changes:

Measurements



Coordinates



Checklist

What is done?

	<u>Measurements</u>	<u>Coordinates</u>
• Migrate current model to Git (ivoa-std)	✓	✓
• Update model	✓	✓
• VO-DML Validation	✓	✓
• (Re)generate vo-dml/XML, HTML, schema	✓	✓
• Update ivoaTex/PDF document	✓	✓
• Use Jovial to update example file suite	✓	✓
• Use Jovial to update python model classes	✓	✓
• Install and test new python classes is Rama	✓	✓
• Update workshop implementations using updated files/classes	✗	✗
• Update Meas/Coords twiki pages	✗	✗
• — — — Ready for REC — — —		
• Update Jovial/Rama to include merged annotation syntax		
• Update workshop implementations		

Loose ends

What is still to do?

- My Actions (quick and easy)
 - Update workshop implementations
 - Review/update twiki pages
- External Implementations! Would be great to get these current.
 - Several projects developed along the way have concluded and were not maintained through iterations of the models.
 - [ivoa-dm-examples](#) gitlab space (Omar Laurino)
 - Meas/Coords examples
 - Cube/Dataset with Time Series data
 - Hubble Space Telescope Catalog Demo (with Tom Donaldson) ★
 - VODML Parser demo (notebooks with plots)
 - TDIG: Cube as TimeSeries using SPLAT ★
 - pyVO: `extract_skycoord_from_votable()` from Paris Hack-a-Thon

← Overlap with workshop cases
using same tools