

STC-2.0

Toward the finish line.

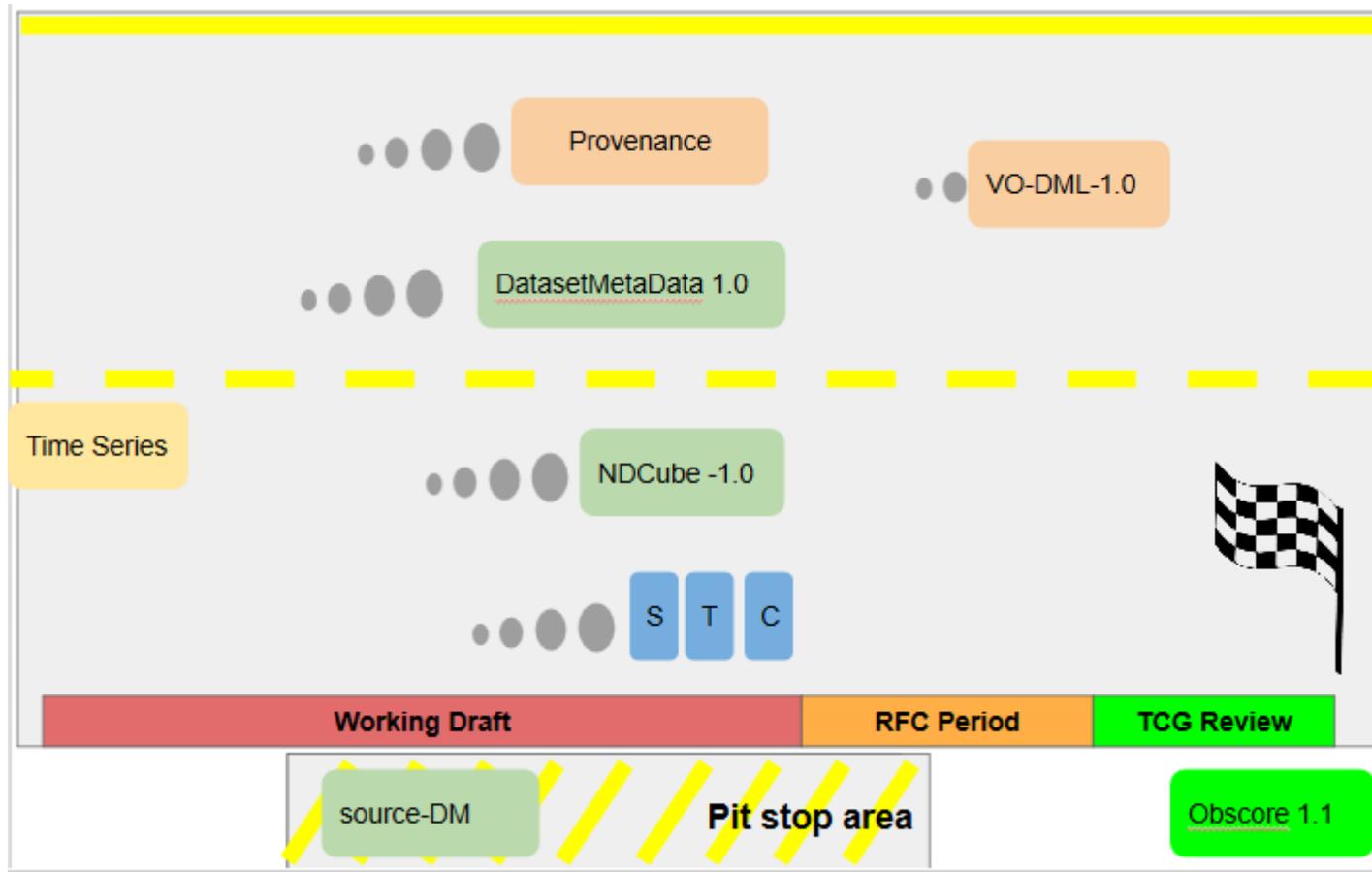
Mark Cresitello-Dittmar
Arnold Rots

May 31, 2018

IVOA Interop – Victoria



Roadmap



News

- Arnold Rots ~ retired
- Feb: Face2Face in Baltimore
 - Working application threads for this interop
 - Models branched: rapid evolution since then based on experience/usage in Cube, TimeSeries
- AR has made some drops of his 'big picture' versions of the models for future reference
- Exec telecon re: Domain Specialist(s)
 - Have 2 candidate volunteers!



STC v1.33 (2007)

Coordinates

Regions

Errors

Frames

Transforms

Areas

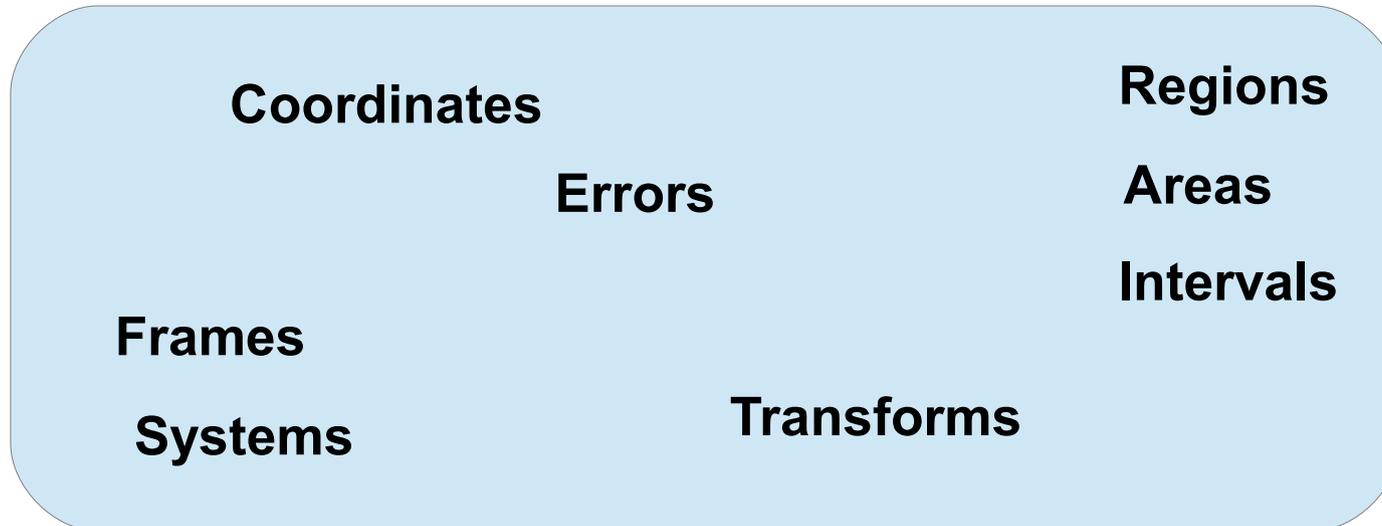
Systems

Intervals

- **Large domain space**
 - Topics
 - Physical (space, time, pixel, spectral, redshift)
- **Complex content**
- **Difficult to implement fully/generate libraries**



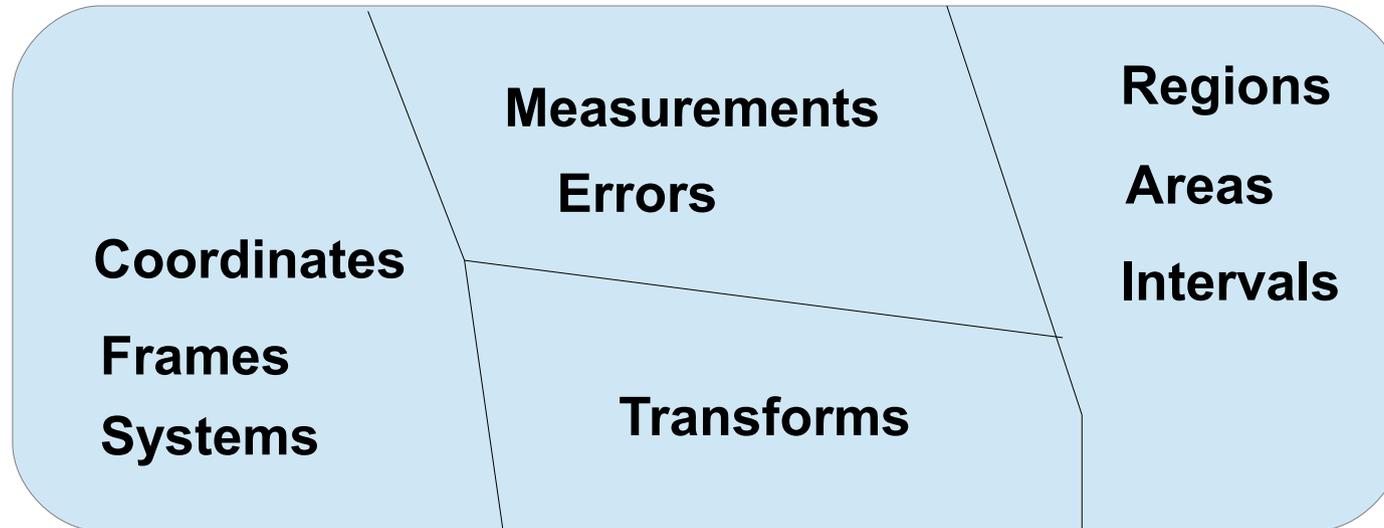
STC v2.0



- Effort to revamp the model
 - VO-DML compliant
 - Reduced domain space
 - Content to support Cube model development
 - More manageable



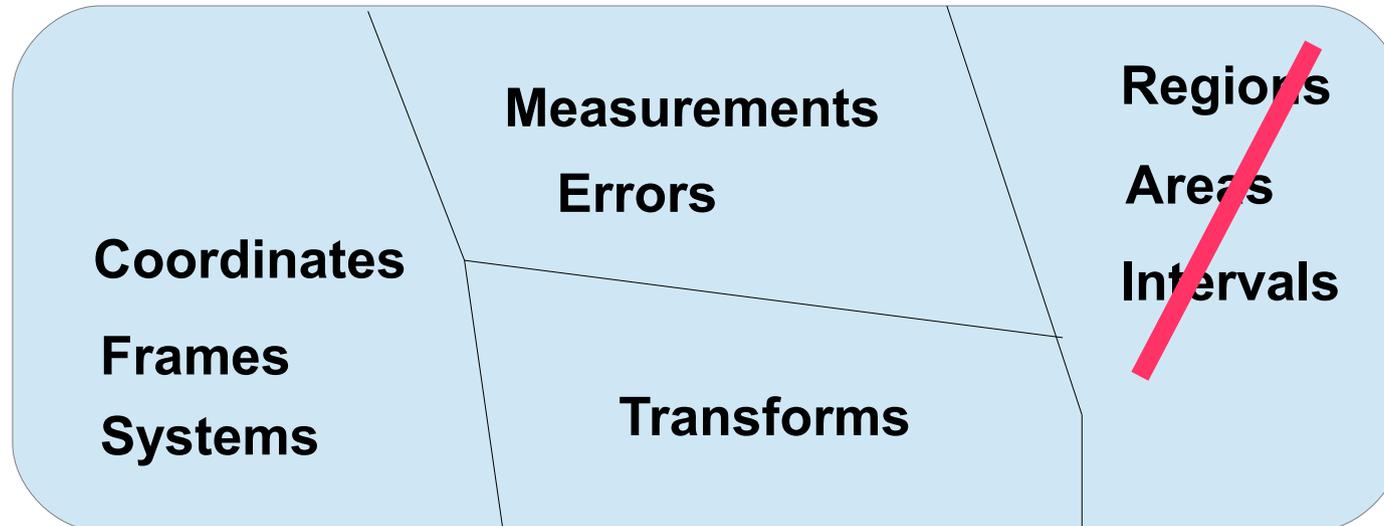
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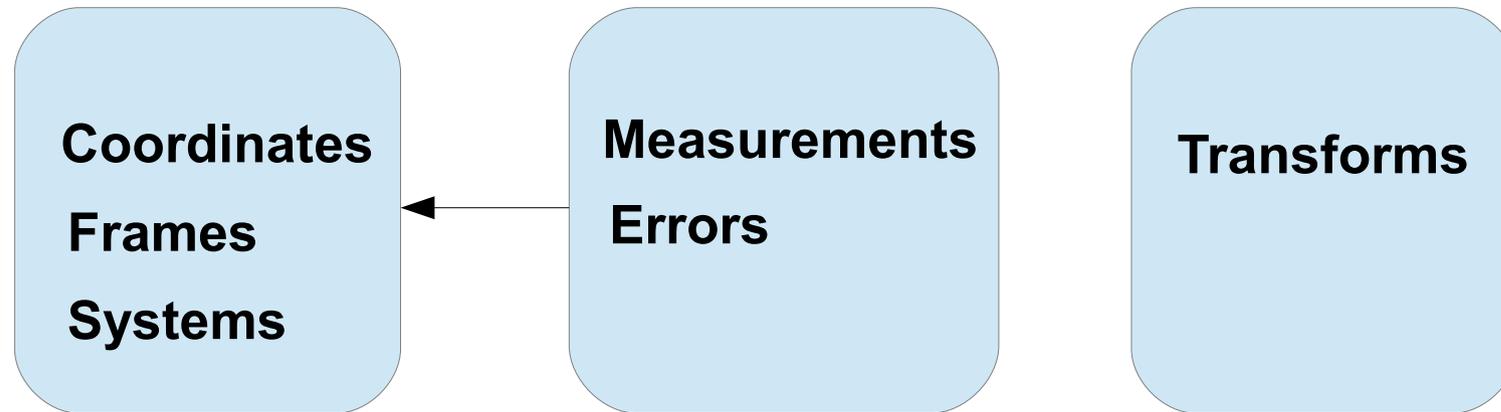


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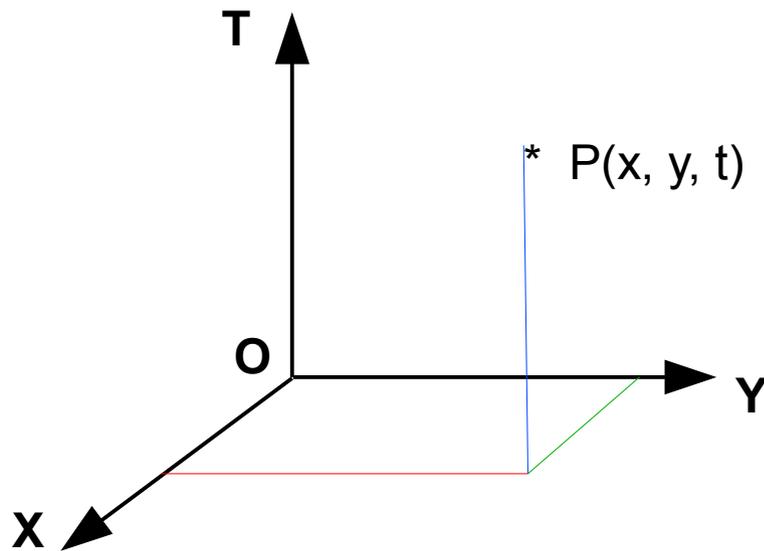
Astronomical Coordinates and Systems

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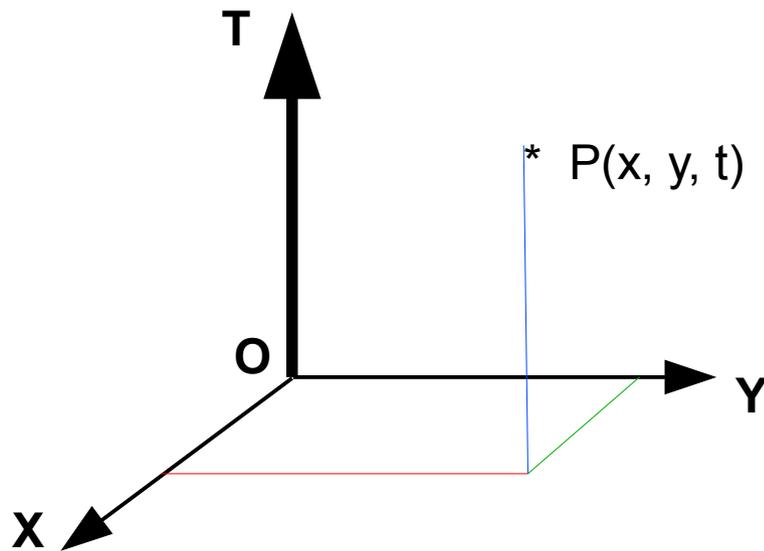
Coordinates and Systems



- Defines the coordinate domain space
- Used to build Types where the space is relevant (Measurement, Region)



Coordinates and Systems

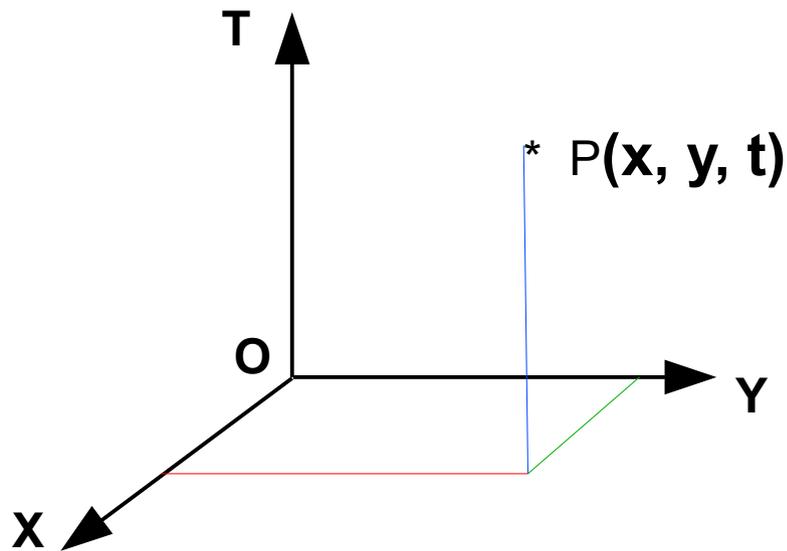


- Axis

- Defines the coordinate domain space
- Used to build Types where the space is relevant (Measurement, Region)



Coordinates and Systems

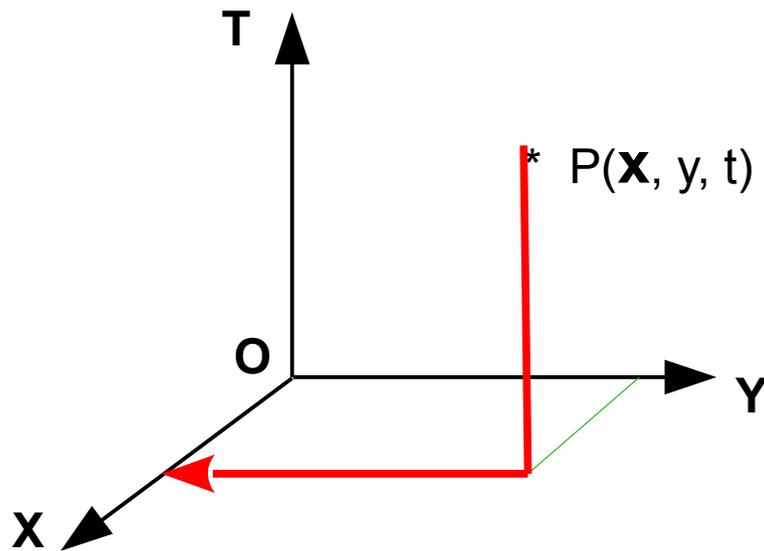


- Axis
- Composite Coordinate
-

- Defines the coordinate domain space
- Used to build Types where the space is relevant (Measurement, Region)



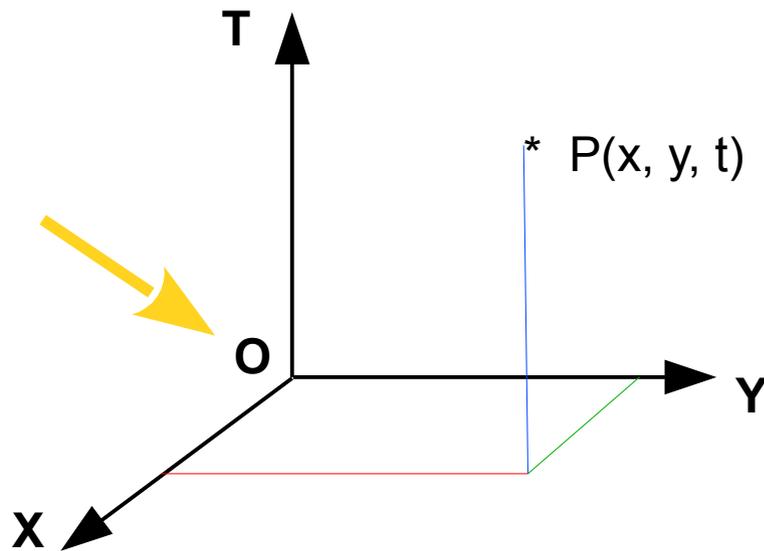
Coordinates and Systems



- Axis
- Composite Coordinate
- Coordinate along axis

- Defines the coordinate domain space
- Used to build Types where the space is relevant (Measurement, Region)

Coordinates and Systems

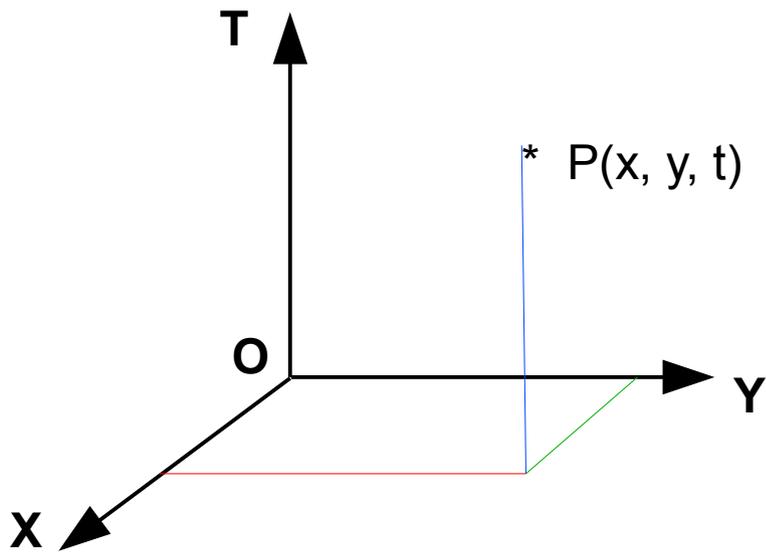


- Axis
- Composite Coordinate
- Coordinate along axis
- Frame(s)
 - origin
 - orientation

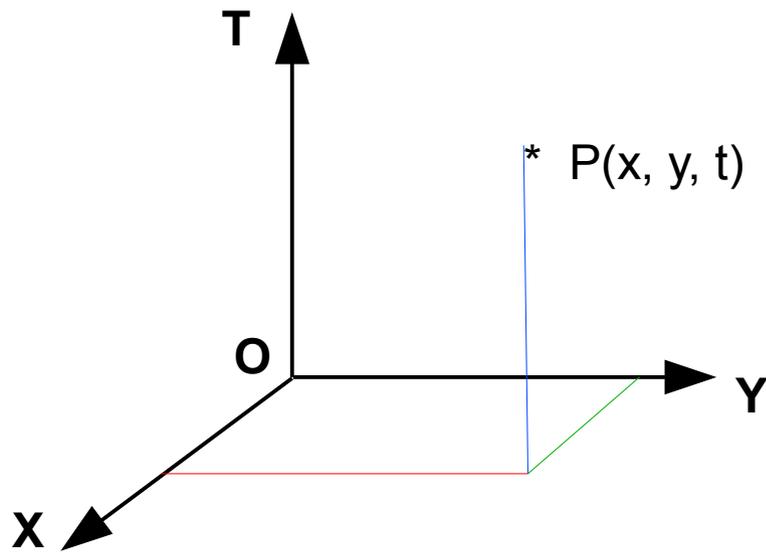
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Axis



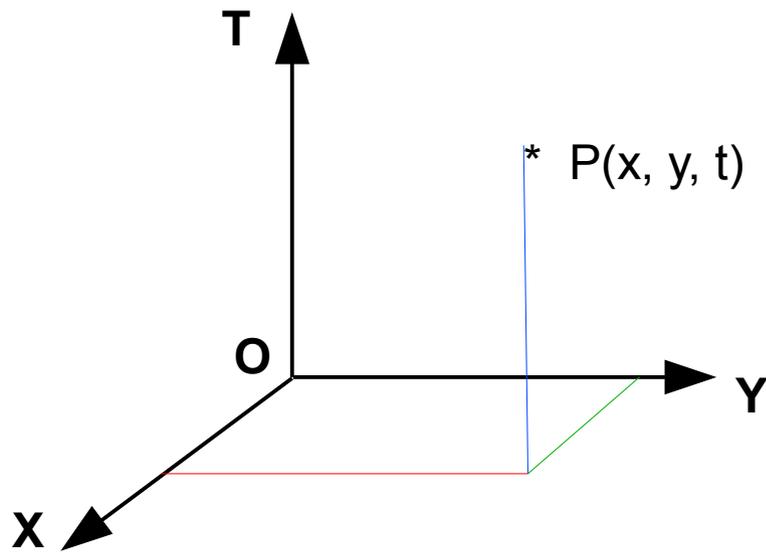
Axis



- Continuous
 - Possibly restricted range (TLMIN:TLMAX)



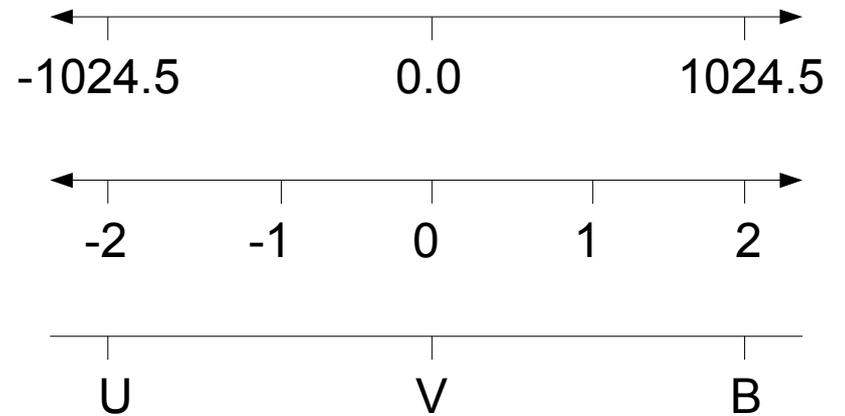
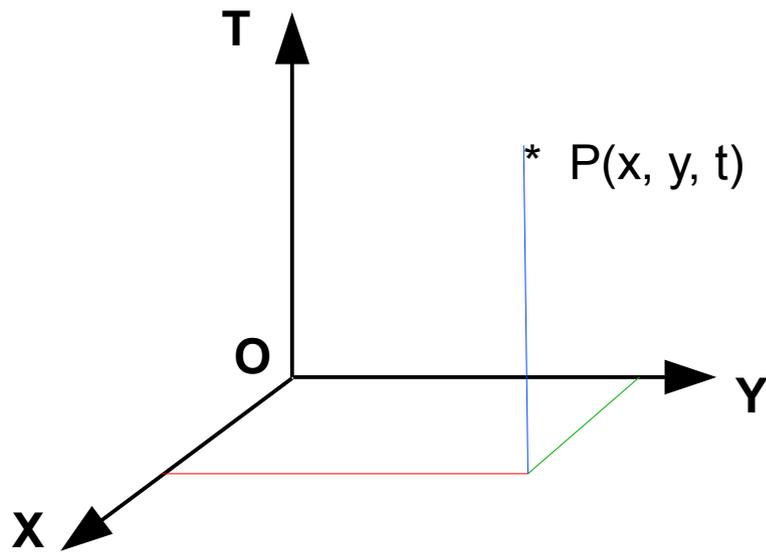
Axis



- Continuous
- Binned



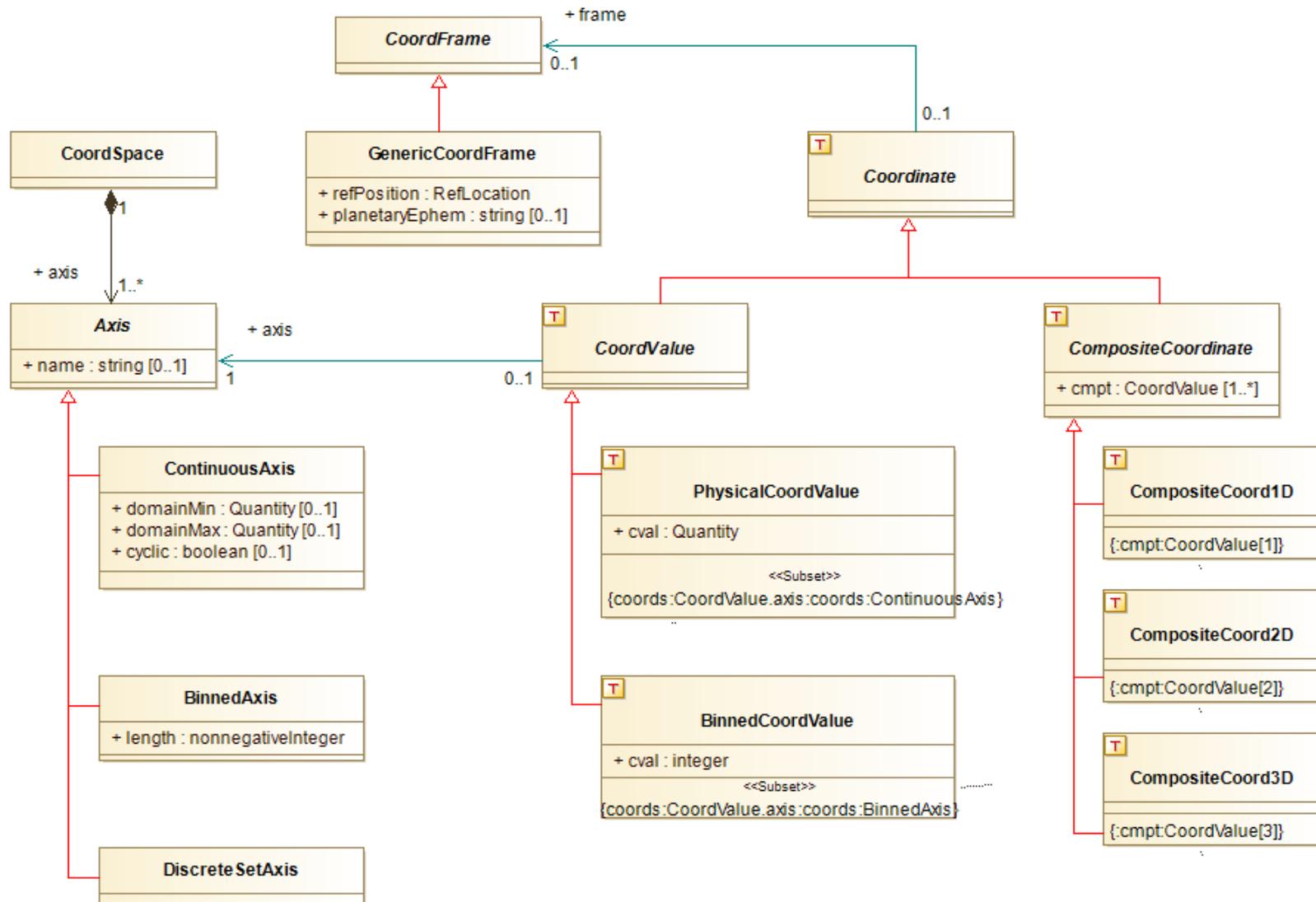
Axis



- Continuous
- Binned
- Discrete



Coords – UML (Base)



Coords – Domain Extensions

- Space

- SpaceFrame: RefPosition, RefFrame, equinox
- Shortcuts: common with standard coordinate space
 - EquatorialCoord(ra, dec, r)
 - GalacticCoord(l, b, r)
 - EclipticCoord(elong, elat, r)
 - CartesianCoord(x, y, z)
 - LongLatCoord(long, lat, r)



Coords – Domain Extensions

- Time
 - TimeFrame: TimeScale
 - Shortcuts: common with standard coordinate space
 - JD
 - MJD
 - ISOTime
 -
 - TimeOffset; adds zero point (time0)



Coords – Domain Extensions

- Pixel
 - PixelSpace: restricted to BinnedAxis types
 - PixelIndex: specialization of BinnedCoordinate
- Polarization
 - Various Polarization coordinates with enumerated values (Discrete)



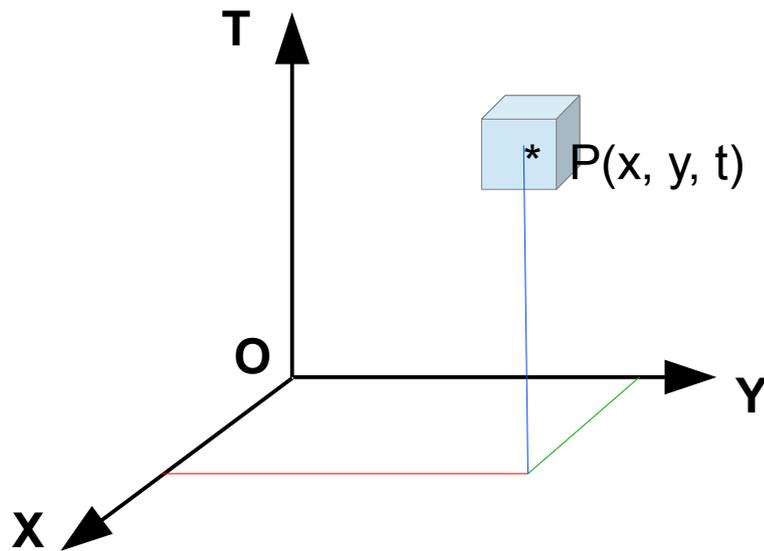
Measurements

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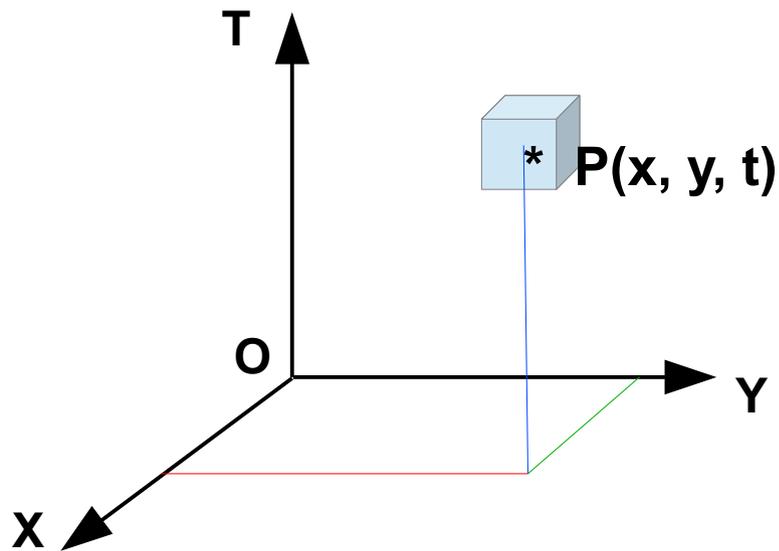


Measurement



- Measured/Determined value
 - Includes errors
- Most data we use in products and archives

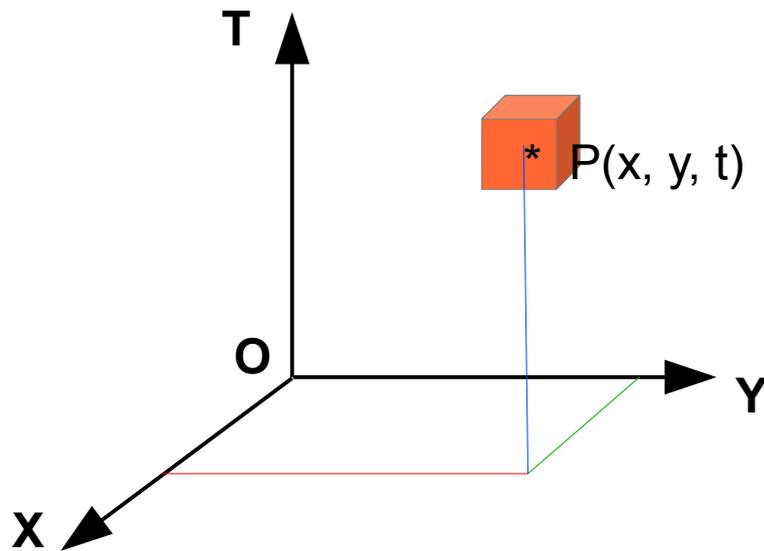
Measurement



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Measurement

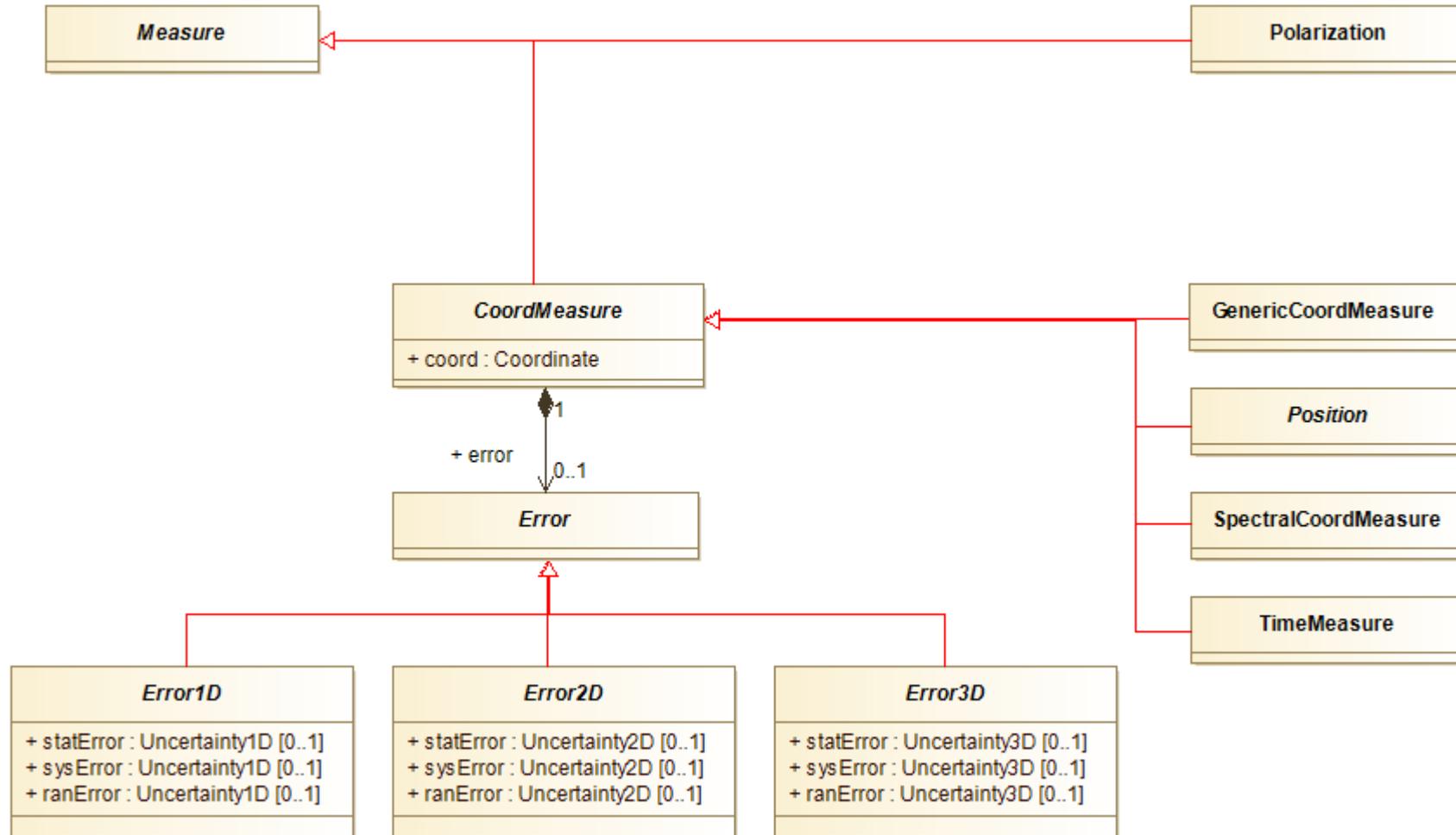


- Coordinate
- One or more associated errors

- Measured/Determined value
 - Includes errors
- Most data we use in products and archives



Measurement – UML (Base)



Meas – Domain Specializations

- Position – 1D, 2D, 3D position
 - Coord either general or shortcut
- SpectralCoordMeasure
 - Restrict coordinate content to spectral domain
- TimeMeasure
 - Coord either general or shortcut
- Polarization (no errors)
 - Coord restricted to PolarizationCoord type
- GeneralCoordMeasure – everything else



Transforms

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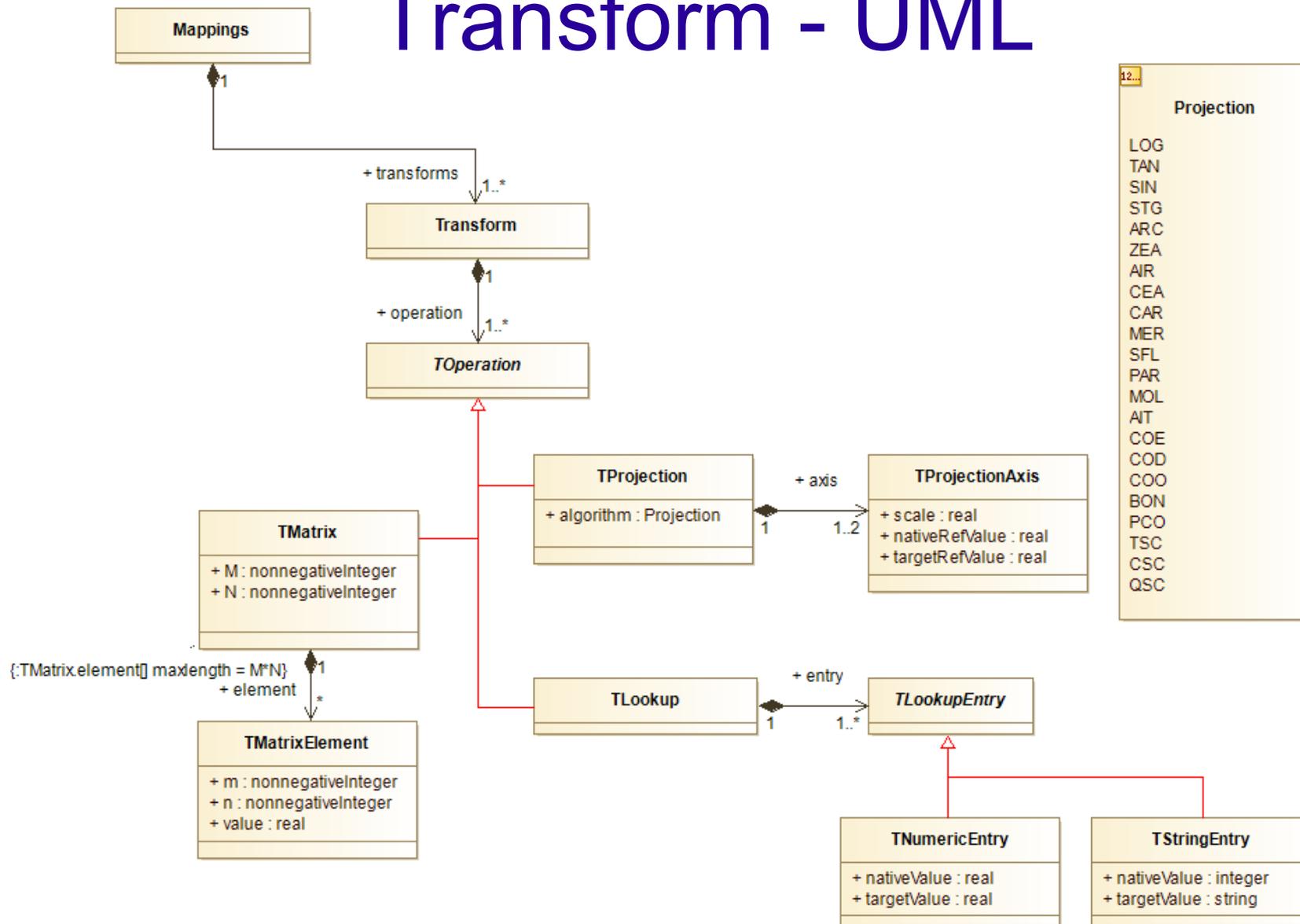


Transform

- Describes relation between objects
 - As a series of operations
 - Which require certain metadata (parameters)
- Relation to FITS WCS and wcslib
 - Model describes the interface
 - FITS WCS papers contain all the details, equations, algorithms, etc
 - wcslib(s) are existing implementation thereof
- Used by models to describe virtual data
 - Image: physical axes



Transform - UML



Going Forward

- Models are now stable and mature
 - Satisfy Cube model requirements
 - Additional changes driven by usage feedback
- **PRIORITY: Document current working versions**
 - Distribute to WG
 - Gain consensus on content
 - Move forward in REC process



Going Forward

- Topics

- Packaging: remain under STC umbrella, or formally separate component models
- Reference Frame: enum → vocabulary to better support SSIG usage
- What is the 'r' in EquatorialCoord?
- Identify and factor in 'missing' elements

