International
Virtual
Observatory
Alliance

IVOA STC Model: Coordinate Metadata for the Virtual Observatory
II. Coordinate Measurement Values

Version 2.0

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Abstract

STC2 is version 2 of the Data Model for the metadata describing Space-Time, related, and other Coordinates. These metadata are to be used for specifying coordinate-related information for datasets, catalogs, and queries. It consists of five sub-models that have uni-directional dependencies.

1. **Coordinates** provides the metadata for the coordinate frames and coordinate locations. It consists of three packages:
   1.1. CoordSystems provides the basic model for constructing coordinate frames and for collecting them in coordinate systems
   1.2. Coordinates defines the general model for specifying coordinate values
   1.3. Domain sub-packages provide the concrete model design for the five astronomical domains (temporal, spatial, spectral, redshift, and polarization), generic coordinates (any other – usually dependent – coordinate variable), and pixel coordinates
2. **Transforms** models the specification of coordinate frame transformations and are defined as a mapping from one coordinate frame into another
3. **Measurement** extends the Coordinate concept to associate uncertainties and resolution measures with particular coordinate values
4. **CoordinateArea** allows the specification of the volume in coordinate space that a particular dataset occupies
5. **Region** is a specialization of CoordinateArea specifically for two-dimensional spatial coordinates

This document describes the **STC2 Coordinates** model.

Status of This Document

This is an IVOA Working Draft for review by IVOA members and other interested parties. It is a draft document and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use IVOA Working Drafts as reference materials or to cite them as other than "work in progress".

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Contents

1 Introduction

1.1 Motivation

Astronomy, being primarily being a science that crucially depends on observations, has a very basic need for complete, accurate, and unambiguous metadata regarding coordinate information, meaning all coordinates of the observable space and noting that several of these are intertwined. The Data Model described in this document aims to provide a model for such metadata, satisfying the requirements.

1.2 Requirements

The primary goal of this document is the specification of a Data Model for coordinate metadata that satisfies the following requirements; the Data Model *shall*:

1. Cover all coordinate axes of observable space: Time, Space, Electro-magnetic Spectrum, Redshift (or Doppler Velocity), Polarization, and have the ability to cover any other incidental coordinates (e.g., temperature)
2. Provide metadata that are complete
3. Provide metadata that are unambiguous
4. Provide metadata that are accurate
5. Be expressed in VO-DML
6. Allow usage of only relevant subsets of the metadata, with the proviso that they must satisfy Requirements 2, 3, and 4
7. Be extensible

1.3 Context and Scope

STC2 is version 2 of the Data Model for the metadata describing Space-Time, related, and other Coordinates. These metadata are to be used for specifying coordinate-related information for datasets, catalogs, and queries. It consists of five sub-models that have uni-directional dependencies.

1. **Coordinates** provides the metadata for the coordinate frames and coordinate locations. It consists of three packages:
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2. **Transforms** models the specification of coordinate frame transformations and are defined as a mapping from one coordinate frame into another
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5. **Region** is a specialization of CoordinateArea specifically for two-dimensional spatial coordinates

This document describes the **STC2 Measurement** model.

1.4 Model Representation

The model is represented in this document in the Uniform Modeling Language (UML):

- Classes have a orange header
- Data types have a yellow header
- Generalizations (inheritance) are indicated by red lines
- Associations are represented by green lines
- Compositions are represented by blue lines
- Elements with red headers represent parent elements imported from another package
- Elements with green headers represent associated elements imported from another package

1.5 Role in the IVOA Architecture

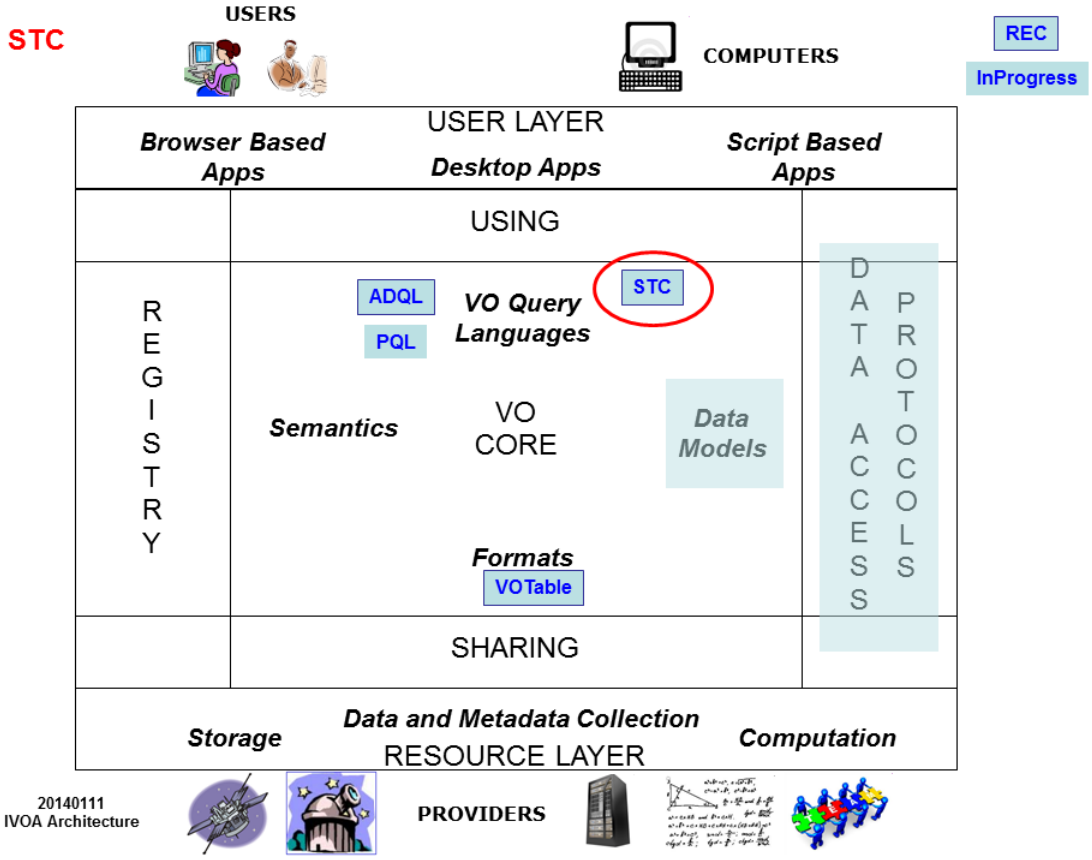


Figure 1 IVOA Standards Context

2 Index of Elements

3 Coordinate Measures

Model **stc2_measurements**

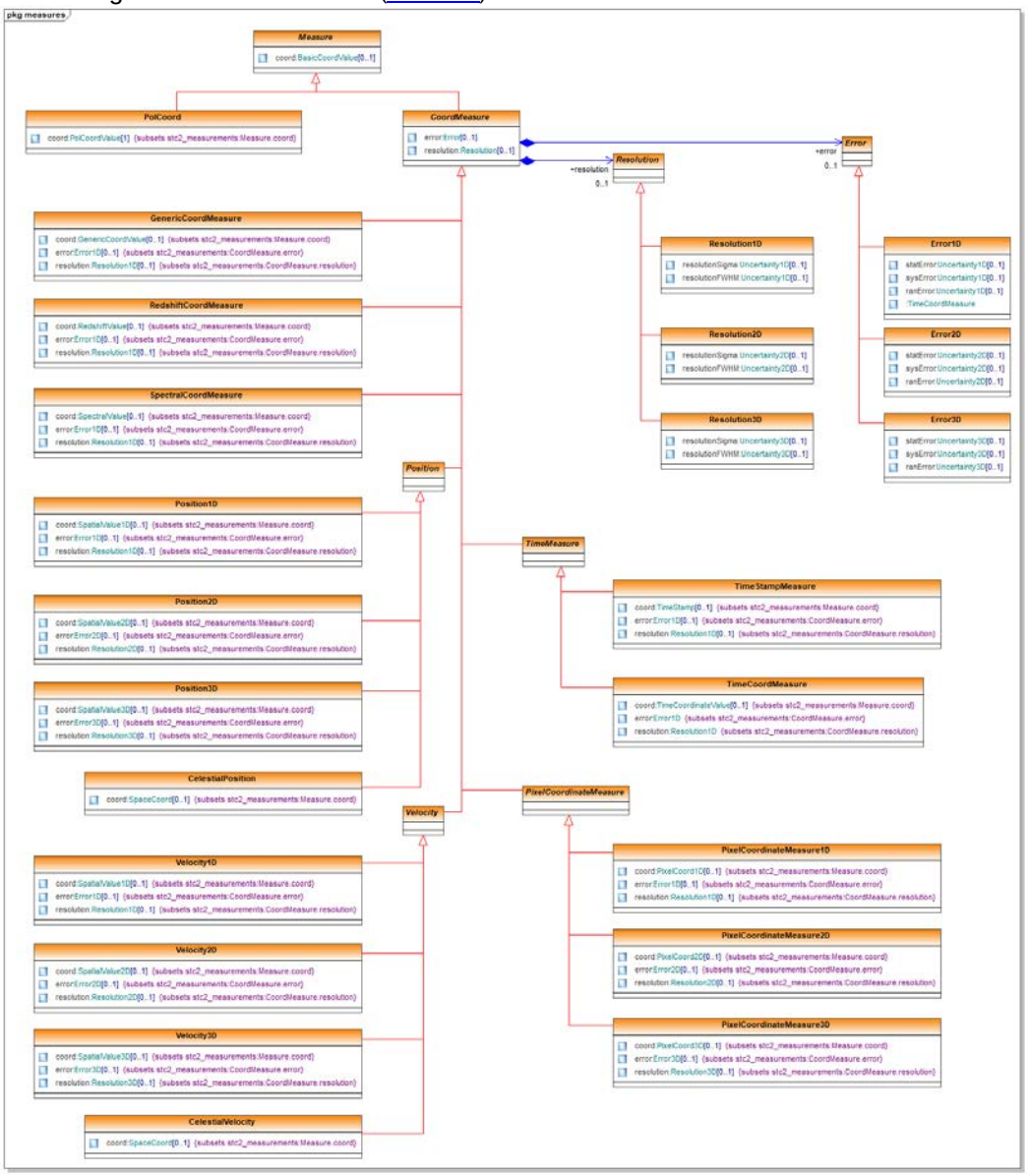
owner	Root
properties	qualified name: stc2_measurements «model»: true author: ahr title: STC2 Measures version: 2.0 uri: http://ivoa.net/vodml/stc2_meas.vo-dml
ownedMember	ivoa measures stc2_coordinates stctypes

Package **measures**

owner	stc2_measurements
properties	qualified name: stc2_measurements::measures
ownedDiagrams	CoordMeasures
ownedMember	CelestialPosition CelestialVelocity CoordMeasure Error Error1D Error2D Error3D GenericCoordMeasure Measure PixelCoordinateMeasure PixelCoordinateMeasure1D PixelCoordinateMeasure2D PixelCoordinateMeasure3D PolCoord Position Position1D Position2D Position3D RedshiftCoordMeasure Resolution Resolution1D Resolution2D Resolution3D SpectralCoordMeasure TimeCoordMeasure TimeMeasure TimeStampMeasure Velocity Velocity1D Velocity2D Velocity3D

This chapter describes the root classes and their derived domain-specific Coordinate Measure classes.

Class Diagram **CoordMeasures** (measures)



3.1 Root Classes

The abstract classes Measure, CoordMeasure, Error, and Resolution form the roots from which the domain-specific Coordinate Measures are derived. Also included here are the 1-, 2-, and 3-dimensional realizations of Error and Resolution. Polarization is derived directly from Measure, all others from CoordMeasure.

3.1.1 Class Measure

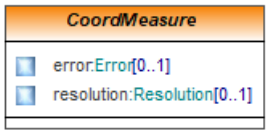
diagram	**Measure** coord:BasicCoordValue[0..1]

owner	**measures**
properties	qualified name stc2_measurements::measures::Measure abstract true
ownedMember	**coord**
specific	**CoordMeasure** **PolCoord**
shown on diagram	**CoordMeasures**
documentation	This is the abstract base class for all coordinate measure classes. Derived from this are the (enumerated) Polarization coodinate measure and CoordMeasure which is the base class for all numeric coordinate measure classes.

Property **Measure::coord**

owner	**Measure**
properties	qualified name stc2_measurements::measures::Measure::coord multiplicity 0..1 type BasicCoordValue

3.1.2 Class CoordMeasure

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::CoordMeasure abstract true
ownedMember	**error** **resolution**
general	**Measure**
specific	**GenericCoordMeasure** **PixelCoordinateMeasure** **Position** **RedshiftCoordMeasure** **SpectralCoordMeasure** **TimeMeasure** **Velocity**
shown on diagram	**CoordMeasures**
documentation	The abstract coordinate measure class contains a measured coordinate value, an error (uncertainty) associated with that coordinate and the resolution of the measurement. Individual domain versions are derived from this abstract class.

Property **CoordMeasure::error**

owner	**CoordMeasure**
properties	qualified name stc2_measurements::measures::CoordMeasure::error multiplicity 0..1 type Error aggregation composite

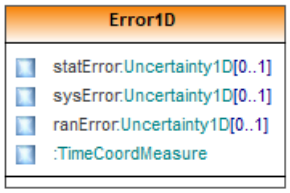
Property **CoordMeasure::resolution**

owner	**CoordMeasure**
properties	qualified name stc2_measurements::measures::CoordMeasure::resolution multiplicity 0..1 type Resolution aggregation composite

3.1.3 Class Error

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Error abstract true
specific	**Error1D** **Error2D** **Error3D**
typedElements	Class **CoordMeasure** Property **error**
shown on diagram	**CoordMeasures**
documentation	The error (uncertainty) of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension. There are 1-, 2, and 3-dimensional versions of the Error.

3.1.4 Class Error1D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Error1D abstract false
ownedMember	**ranError** **statError** **sysError**
general	**Error**
typedElements	Class **GenericCoordMeasure** Property **error** Class **PixelCoordinateMeasure1D** Property **error** Class **Position1D** Property **error** Class **RedshiftCoordMeasure** Property **error** Class **SpectralCoordMeasure** Property **error** Class **TimeCoordMeasure** Property **error** Class **TimeStampMeasure** Property **error** Class **Velocity1D** Property **error**
shown on diagram	**CoordMeasures**
documentation	The 1-D version of the error of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension.

Property **Error1D::ranError**

owner	**Error1D**
properties	qualified name stc2_measurements::measures::Error1D::ranError multiplicity 0..1 type Uncertainty1D

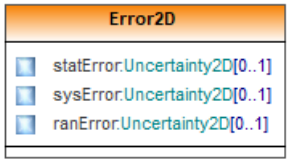
Property **Error1D::statError**

owner	**Error1D**
properties	qualified name stc2_measurements::measures::Error1D::statError multiplicity 0..1 type Uncertainty1D

Property **Error1D::sysError**

owner	**Error1D**
properties	qualified name stc2_measurements::measures::Error1D::sysError multiplicity 0..1 type Uncertainty1D

3.1.5 Class Error2D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Error2D abstract false
ownedMember	**ranError** **statError** **sysError**
general	**Error**
typedElements	Class **PixelCoordinateMeasure2D** Property **error** Class **Position2D** Property **error** Class **Velocity2D** Property **error**
shown on diagram	**CoordMeasures**
documentation	The 2-D version of the error of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension.

Property **Error2D::ranError**

owner	**Error2D**
properties	qualified name stc2_measurements::measures::Error2D::ranError multiplicity 0..1 type Uncertainty2D

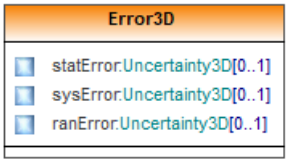
Property **Error2D::statError**

owner	**Error2D**
properties	qualified name stc2_measurements::measures::Error2D::statError multiplicity 0..1 type Uncertainty2D

Property **Error2D::sysError**

owner	**Error2D**
properties	qualified name stc2_measurements::measures::Error2D::sysError multiplicity 0..1 type Uncertainty2D

3.1.6 Class Error3D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Error3D abstract false
ownedMember	**ranError** **statError** **sysError**
general	**Error**
typedElements	Class **PixelCoordinateMeasure3D** Property **error** Class **Position3D** Property **error** Class **Velocity3D** Property **error**
shown on diagram	**CoordMeasures**
documentation	The 3-D version of the error of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension.

Property **Error3D::ranError**

owner	**Error3D**
properties	qualified name stc2_measurements::measures::Error3D::ranError multiplicity 0..1 type Uncertainty3D

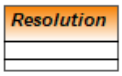
Property **Error3D::statError**

owner	**Error3D**
properties	qualified name stc2_measurements::measures::Error3D::statError multiplicity 0..1 type Uncertainty3D

Property **Error3D::sysError**

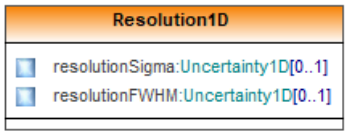
owner	**Error3D**
properties	qualified name stc2_measurements::measures::Error3D::sysError multiplicity 0..1 type Uncertainty3D

3.1.7 Class Resolution

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Resolution abstract true
specific	**Resolution1D** **Resolution2D** **Resolution3D**
typedElements	Class **CoordMeasure** Property **resolution**
shown on diagram	**CoordMeasures**

documentation	The resolution of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension. There are 1-, 2, and 3-dimensional versions of the Resolution.

3.1.8 Class Resolution1D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Resolution1D abstract false
ownedMember	**resolutionFWHM** **resolutionSigma**
general	**Resolution**
typedElements	Class **GenericCoordMeasure** Property **resolution** Class **PixelCoordinateMeasure1D** Property **resolution** Class **Position1D** Property **resolution** Class **RedshiftCoordMeasure** Property **resolution** Class **SpectralCoordMeasure** Property **resolution** Class **TimeCoordMeasure** Property **resolution** Class **TimeStampMeasure** Property **resolution** Class **Velocity1D** Property **resolution**
shown on diagram	**CoordMeasures**
documentation	The 1-D version of the resolution of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension.

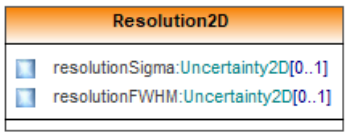
Property **Resolution1D::resolutionFWHM**

owner	**Resolution1D**
properties	qualified name stc2_measurements::measures::Resolution1D::resolutionFWHM multiplicity 0..1 type Uncertainty1D

Property **Resolution1D::resolutionSigma**

owner	**Resolution1D**
properties	qualified name stc2_measurements::measures::Resolution1D::resolutionSigma multiplicity 0..1 type Uncertainty1D

3.1.9 Class Resolution2D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Resolution2D abstract false
ownedMember	**resolutionFWHM** **resolutionSigma**
general	**Resolution**

typedElements	Class **PixelCoordinateMeasure2D** Property **resolution** Class **Position2D** Property **resolution** Class **Velocity2D** Property **resolution**
shown on diagram	**CoordMeasures**
documentation	The 2-D version of the resolution of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension.

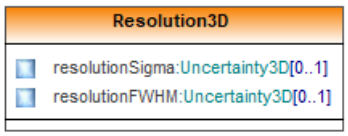
Property **Resolution2D::resolutionFWHM**

owner	**Resolution2D**
properties	qualified name stc2_measurements::measures::Resolution2D::resolutionFWHM multiplicity 0..1 type Uncertainty2D

Property **Resolution2D::resolutionSigma**

owner	**Resolution2D**
properties	qualified name stc2_measurements::measures::Resolution2D::resolutionSigma multiplicity 0..1 type Uncertainty2D

3.1.10 Class Resolution3D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Resolution3D abstract false
ownedMember	**resolutionFWHM** **resolutionSigma**
general	**Resolution**
typedElements	Class **PixelCoordinateMeasure3D** Property **resolution** Class **Position3D** Property **resolution** Class **Velocity3D** Property **resolution**
shown on diagram	**CoordMeasures**
documentation	The 3-D version of the resolution of a measured coordinate value may be expressed by an Uncertainty attribute as a sigma or a FWHM, or any other future extension.

Property **Resolution3D::resolutionFWHM**

owner	**Resolution3D**
properties	qualified name stc2_measurements::measures::Resolution3D::resolutionFWHM multiplicity 0..1 type Uncertainty3D

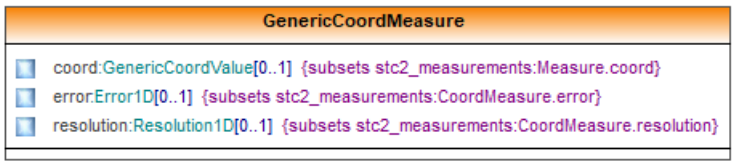
Property **Resolution3D::resolutionSigma**

owner	**Resolution3D**
properties	qualified name stc2_measurements::measures::Resolution3D::resolutionSigma multiplicity 0..1 type Uncertainty3D

3.2 Generic Coordinate Measure Domain

The Generic Domain is intended for any coordinate or dependent variables that are not part of the astronomical coordinate set. This domain contains only one single class.

3.2.1 Class GenericCoordMeasure

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::GenericCoordMeasure abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**CoordMeasure**
shown on diagram	**CoordMeasures**
documentation	The GenericCoordMeasure object provides a full description of a measured instant in the generic coordinate space, optionally adding the known error and/or resolution to the generic coordinate value.

Constraint **GenericCoordMeasure::Subset1**

owner	**GenericCoordMeasure**
properties	qualified name: stc2_measurements::measures::GenericCoordMeasure::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **GenericCoordMeasure::Subset2**

owner	**GenericCoordMeasure**
properties	qualified name: stc2_measurements::measures::GenericCoordMeasure::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **GenericCoordMeasure::Subset3**

owner	**GenericCoordMeasure**
properties	qualified name: stc2_measurements::measures::GenericCoordMeasure::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **GenericCoordMeasure::coord**

owner	**GenericCoordMeasure**
properties	qualified name: stc2_measurements::measures::GenericCoordMeasure::coord multiplicity: 0..1 type: GenericCoordValue
constraints	Subset1: subsets stc2_measurements:Measure.coord

Property **GenericCoordMeasure::error**

owner	**GenericCoordMeasure**
properties	qualified name: stc2_measurements::measures::GenericCoordMeasure::error multiplicity: 0..1 type: Error1D

	aggregation composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

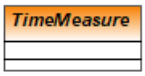
Property **GenericCoordMeasure::resolution**

owner	**GenericCoordMeasure**
properties	qualified name stc2_measurements::measures::GenericCoordMeasure::resolution multiplicity 0..1 type Resolution1D aggregation composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

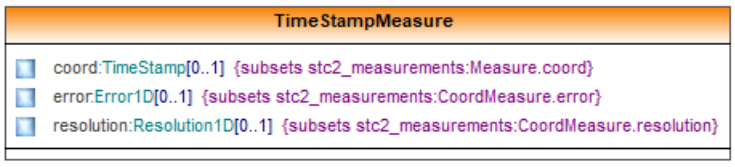
3.3 Temporal Coordinate Measure Domain

The temporal Coordinate Measure comes in two flavors: one with the shortcut TimeStamp coordinate value, the other with the full general TimeCoordinateValue.

3.3.1 Class TimeMeasure

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::TimeMeasure abstract true
general	**CoordMeasure**
specific	**TimeCoordMeasure** **TimeStampMeasure**
shown on diagram	**CoordMeasures**
documentation	The abstract TimeMeasure object provides a full description of a measured instant in the temporal coordinate space, optionally adding the known error (uncertainty) and/or resolution to the time coordinate value. Derived from it are the TimeStamp-based TimeStampMeasure and the generaliized TimeCoordMeasure which is based on the TimeCoordinateValue.

3.3.2 Class TimeStampMeasure

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::TimeStampMeasure abstract false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**TimeMeasure**
shown on diagram	**CoordMeasures**
documentation	The TimeStampMeasure object provides a full description of a measured TimeStamp instant in time, optionally adding the known error and/or resolution to the time stamp.

Constraint **TimeStampMeasure::Subset1**

owner	**TimeStampMeasure**	
properties	qualified name	stc2_measurements::measures::TimeStampMeasure::Subset1
	specification	subsets stc2_measurements:Measure.coord
	constrained elements	coord

Constraint **TimeStampMeasure::Subset2**

owner	**TimeStampMeasure**	
properties	qualified name	stc2_measurements::measures::TimeStampMeasure::Subset2
	specification	subsets stc2_measurements:CoordMeasure.error
	constrained elements	error

Constraint **TimeStampMeasure::Subset3**

owner	**TimeStampMeasure**	
properties	qualified name	stc2_measurements::measures::TimeStampMeasure::Subset3
	specification	subsets stc2_measurements:CoordMeasure.resolution
	constrained elements	resolution

Property **TimeStampMeasure::coord**

owner	**TimeStampMeasure**	
properties	qualified name	stc2_measurements::measures::TimeStampMeasure::coord
	multiplicity	0..1
	type	TimeStamp
constraints	Subset1:	subsets stc2_measurements:Measure.coord

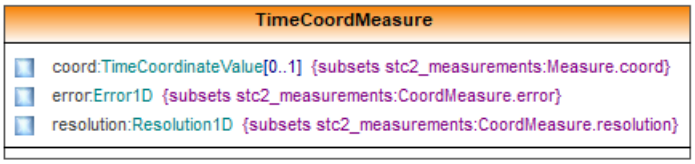
Property **TimeStampMeasure::error**

owner	**TimeStampMeasure**	
properties	qualified name	stc2_measurements::measures::TimeStampMeasure::error
	multiplicity	0..1
	type	Error1D
	aggregation	composite
constraints	Subset2:	subsets stc2_measurements:CoordMeasure.error

Property **TimeStampMeasure::resolution**

owner	**TimeStampMeasure**	
properties	qualified name	stc2_measurements::measures::TimeStampMeasure::resolution
	multiplicity	0..1
	type	Resolution1D
	aggregation	composite
constraints	Subset3:	subsets stc2_measurements:CoordMeasure.resolution

3.3.3 Class TimeCoordMeasure

diagram	
owner	**measures**

properties	qualified name stc2_measurements::measures::TimeCoordMeasure abstract false
ownedMember	**coord error resolution Subset1 Subset2 Subset3**
general	**TimeMeasure**
typedElements	Class **Error1D** Property **<unnamed>**
shown on diagram	**CoordMeasures**
documentation	The TimeCoordinateMeasure object provides a full description of a measured TimeCoordinateValue, optionally adding the known error and/or resolution to the time stamp.

Constraint **TimeCoordMeasure::Subset1**

owner	**TimeCoordMeasure**
properties	qualified name stc2_measurements::measures::TimeCoordMeasure::Subset1 specification subsets stc2_measurements:Measure.coord constrained elements coord

Constraint **TimeCoordMeasure::Subset2**

owner	**TimeCoordMeasure**
properties	qualified name stc2_measurements::measures::TimeCoordMeasure::Subset2 specification subsets stc2_measurements:CoordMeasure.error constrained elements error

Constraint **TimeCoordMeasure::Subset3**

owner	**TimeCoordMeasure**
properties	qualified name stc2_measurements::measures::TimeCoordMeasure::Subset3 specification subsets stc2_measurements:CoordMeasure.resolution constrained elements resolution

Property **TimeCoordMeasure::coord**

owner	**TimeCoordMeasure**
properties	qualified name stc2_measurements::measures::TimeCoordMeasure::coord multiplicity 0..1 type TimeCoordinateValue
constraints	Subset1: subsets stc2_measurements:Measure.coord

Property **TimeCoordMeasure::error**

owner	**TimeCoordMeasure**
properties	qualified name stc2_measurements::measures::TimeCoordMeasure::error type Error1D aggregation composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

Property **TimeCoordMeasure::resolution**

owner	**TimeCoordMeasure**
properties	qualified name stc2_measurements::measures::TimeCoordMeasure::resolution type Resolution1D aggregation composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

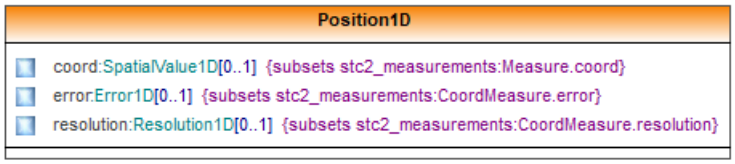
3.4 Spatial Coordinate Measure Domain

The spatial domain Coodinate Measure comes in to flavors: Position and Velocity. Both of thesehave 1-, 2-, and 3-dimensional realization, as well as one using the Celestial coordinate shortcut.

3.4.1 Class Position

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::Position abstract: true
general	**CoordMeasure**
specific	**CelestialPosition** **Position1D** **Position2D** **Position3D**
shown on diagram	**CoordMeasures**
documentation	The abstract Position object provides a full description of a measured positional instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

3.4.2 Class Position1D

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::Position1D abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**Position**
shown on diagram	**CoordMeasures**
documentation	The 1-dimensional Position object provides a full description of a measured positional instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **Position1D::Subset1**

owner	**Position1D**
properties	qualified name: stc2_measurements::measures::Position1D::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **Position1D::Subset2**

owner	**Position1D**
properties	qualified name: stc2_measurements::measures::Position1D::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **Position1D::Subset3**

owner	**Position1D**
properties	qualified name: stc2_measurements::measures::Position1D::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **Position1D::coord**

owner	**Position1D**
properties	qualified name: stc2_measurements::measures::Position1D::coord multiplicity: 0..1 type: SpatialValue1D
constraints	Subset1: subsets stc2_measurements:Measure.coord

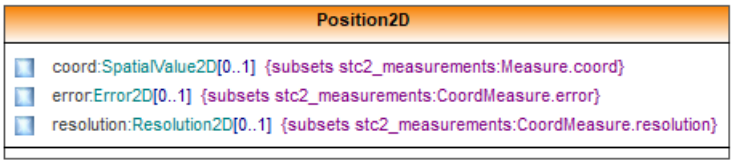
Property **Position1D::error**

owner	**Position1D**
properties	qualified name: stc2_measurements::measures::Position1D::error multiplicity: 0..1 type: Error1D aggregation: composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

Property **Position1D::resolution**

owner	**Position1D**
properties	qualified name: stc2_measurements::measures::Position1D::resolution multiplicity: 0..1 type: Resolution1D aggregation: composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

3.4.3 Class Position2D

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::Position2D abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**Position**
shown on diagram	**CoordMeasures**
documentation	The 2-dimensional Position object provides a full description of a measured positional instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **Position2D::Subset1**

owner	**Position2D**
properties	qualified name: stc2_measurements::measures::Position2D::Subset1 specification: subsets stc2_measurements:Measure.coord

	constrained elements	coord

Constraint **Position2D::Subset2**

owner	**Position2D**	
properties	qualified name	stc2_measurements::measures::Position2D::Subset2
	specification	subsets stc2_measurements:CoordMeasure.error
	constrained elements	error

Constraint **Position2D::Subset3**

owner	**Position2D**	
properties	qualified name	stc2_measurements::measures::Position2D::Subset3
	specification	subsets stc2_measurements:CoordMeasure.resolution
	constrained elements	resolution

Property **Position2D::coord**

owner	**Position2D**	
properties	qualified name	stc2_measurements::measures::Position2D::coord
	multiplicity	0..1
	type	SpatialValue2D
constraints	Subset1:	subsets stc2_measurements:Measure.coord

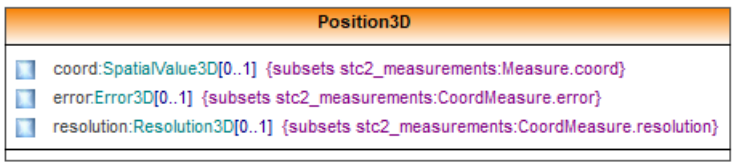
Property **Position2D::error**

owner	**Position2D**	
properties	qualified name	stc2_measurements::measures::Position2D::error
	multiplicity	0..1
	type	Error2D
	aggregation	composite
constraints	Subset2:	subsets stc2_measurements:CoordMeasure.error

Property **Position2D::resolution**

owner	**Position2D**	
properties	qualified name	stc2_measurements::measures::Position2D::resolution
	multiplicity	0..1
	type	Resolution2D
	aggregation	composite
constraints	Subset3:	subsets stc2_measurements:CoordMeasure.resolution

3.4.4 Class Position3D

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::Position3D abstract: false
ownedMember	**coord error resolution Subset1 Subset2 Subset3**
general	**Position**
shown on diagram	**CoordMeasures**

documentation	The 3-dimensional Position object provides a full description of a measured positional instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **Position3D::Subset1**

owner	**Position3D**	
properties	qualified name	stc2_measurements::measures::Position3D::Subset1
	specification	subsets stc2_measurements:Measure.coord
	constrained elements	coord

Constraint **Position3D::Subset2**

owner	**Position3D**	
properties	qualified name	stc2_measurements::measures::Position3D::Subset2
	specification	subsets stc2_measurements:CoordMeasure.error
	constrained elements	error

Constraint **Position3D::Subset3**

owner	**Position3D**	
properties	qualified name	stc2_measurements::measures::Position3D::Subset3
	specification	subsets stc2_measurements:CoordMeasure.resolution
	constrained elements	resolution

Property **Position3D::coord**

owner	**Position3D**	
properties	qualified name	stc2_measurements::measures::Position3D::coord
	multiplicity	0..1
	type	SpatialValue3D
constraints	Subset1:	subsets stc2_measurements:Measure.coord

Property **Position3D::error**

owner	**Position3D**	
properties	qualified name	stc2_measurements::measures::Position3D::error
	multiplicity	0..1
	type	Error3D
	aggregation	composite
constraints	Subset2:	subsets stc2_measurements:CoordMeasure.error

Property **Position3D::resolution**

owner	**Position3D**	
properties	qualified name	stc2_measurements::measures::Position3D::resolution
	multiplicity	0..1
	type	Resolution3D
	aggregation	composite
constraints	Subset3:	subsets stc2_measurements:CoordMeasure.resolution

3.4.5 Class CelestialPosition

diagram	
owner	**measures**

properties	qualified name stc2_measurements::measures::CelestialPosition abstract false
ownedMember	**coord** **Subset**
general	**Position**
shown on diagram	**CoordMeasures**
documentation	CelestialPosition object provides a full description of a measured instant in the celestial positional coordinate space using one of the types of SpaceCoord shortcut spatial coordinate value types, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **CelestialPosition::Subset**

owner	**CelestialPosition**
properties	qualified name stc2_measurements::measures::CelestialPosition::Subset specification subsets stc2_measurements:Measure.coord constrained elements coord

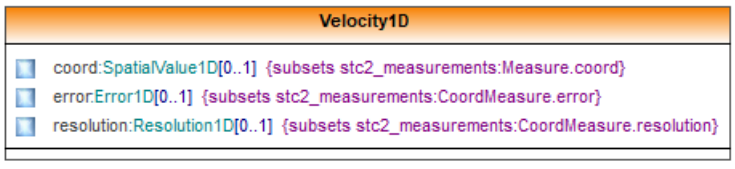
Property **CelestialPosition::coord**

owner	**CelestialPosition**
properties	qualified name stc2_measurements::measures::CelestialPosition::coord multiplicity 0..1 type SpaceCoord
constraints	Subset: subsets stc2_measurements:Measure.coord

3.4.6 Class Velocity

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Velocity abstract true
general	**CoordMeasure**
specific	**CelestialVelocity** **Velocity1D** **Velocity2D** **Velocity3D**
shown on diagram	**CoordMeasures**
documentation	The abstract Velocity object provides a full description of a measured velocity instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

3.4.7 Class Velocity1D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::Velocity1D abstract false

ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**Velocity**
shown on diagram	**CoordMeasures**
documentation	The 1-dimensional Velocity object provides a full description of a measured velocity instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **Velocity1D::Subset1**

owner	**Velocity1D**	
properties	qualified name	stc2_measurements::measures::Velocity1D::Subset1
	specification	subsets stc2_measurements:Measure.coord
	constrained elements	coord

Constraint **Velocity1D::Subset2**

owner	**Velocity1D**	
properties	qualified name	stc2_measurements::measures::Velocity1D::Subset2
	specification	subsets stc2_measurements:CoordMeasure.error
	constrained elements	error

Constraint **Velocity1D::Subset3**

owner	**Velocity1D**	
properties	qualified name	stc2_measurements::measures::Velocity1D::Subset3
	specification	subsets stc2_measurements:CoordMeasure.resolution
	constrained elements	resolution

Property **Velocity1D::coord**

owner	**Velocity1D**	
properties	qualified name	stc2_measurements::measures::Velocity1D::coord
	multiplicity	0..1
	type	SpatialValue1D
constraints	Subset1:	subsets stc2_measurements:Measure.coord

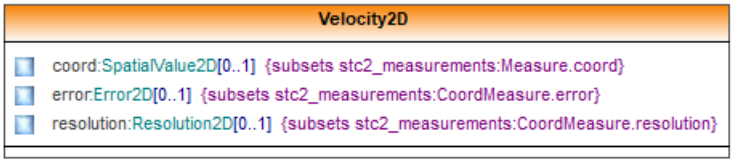
Property **Velocity1D::error**

owner	**Velocity1D**	
properties	qualified name	stc2_measurements::measures::Velocity1D::error
	multiplicity	0..1
	type	Error1D
	aggregation	composite
constraints	Subset2:	subsets stc2_measurements:CoordMeasure.error

Property **Velocity1D::resolution**

owner	**Velocity1D**	
properties	qualified name	stc2_measurements::measures::Velocity1D::resolution
	multiplicity	0..1
	type	Resolution1D
	aggregation	composite
constraints	Subset3:	subsets stc2_measurements:CoordMeasure.resolution

3.4.8 Class Velocity2D

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::Velocity2D abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**Velocity**
shown on diagram	**CoordMeasures**
documentation	The 2-dimensional Velocity object provides a full description of a measured velocity instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **Velocity2D::Subset1**

owner	**Velocity2D**
properties	qualified name: stc2_measurements::measures::Velocity2D::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **Velocity2D::Subset2**

owner	**Velocity2D**
properties	qualified name: stc2_measurements::measures::Velocity2D::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **Velocity2D::Subset3**

owner	**Velocity2D**
properties	qualified name: stc2_measurements::measures::Velocity2D::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **Velocity2D::coord**

owner	**Velocity2D**
properties	qualified name: stc2_measurements::measures::Velocity2D::coord multiplicity: 0..1 type: SpatialValue2D
constraints	Subset1: subsets stc2_measurements:Measure.coord

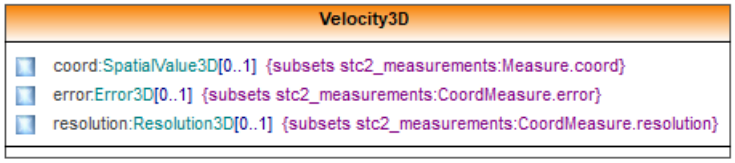
Property **Velocity2D::error**

owner	**Velocity2D**
properties	qualified name: stc2_measurements::measures::Velocity2D::error multiplicity: 0..1 type: Error2D aggregation: composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

Property **Velocity2D::resolution**

owner	**Velocity2D**
properties	qualified name: stc2_measurements::measures::Velocity2D::resolution multiplicity: 0..1 type: Resolution2D aggregation: composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

3.4.9 Class Velocity3D

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::Velocity3D abstract: false
ownedMember	**coord error resolution Subset1 Subset2 Subset3**
general	**Velocity**
shown on diagram	**CoordMeasures**
documentation	The 3-dimensional Velocity object provides a full description of a measured velocity instant in the spatial coordinate space, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **Velocity3D::Subset1**

owner	**Velocity3D**
properties	qualified name: stc2_measurements::measures::Velocity3D::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **Velocity3D::Subset2**

owner	**Velocity3D**
properties	qualified name: stc2_measurements::measures::Velocity3D::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **Velocity3D::Subset3**

owner	**Velocity3D**
properties	qualified name: stc2_measurements::measures::Velocity3D::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **Velocity3D::coord**

owner	**Velocity3D**
properties	qualified name: stc2_measurements::measures::Velocity3D::coord multiplicity: 0..1 type: SpatialValue3D
constraints	Subset1: subsets stc2_measurements:Measure.coord

Property **Velocity3D::error**

owner	**Velocity3D**
properties	qualified name: stc2_measurements::measures::Velocity3D::error multiplicity: 0..1 type: Error3D aggregation: composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

Property **Velocity3D::resolution**

owner	**Velocity3D**
properties	qualified name: stc2_measurements::measures::Velocity3D::resolution multiplicity: 0..1 type: Resolution3D aggregation: composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

3.4.10 Class CelestialVelocity

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::CelestialVelocity abstract: false
ownedMember	**coord** **Subset**
general	**Velocity**
shown on diagram	**CoordMeasures**
documentation	CelestialVelocity object provides a full description of a measured instant in the celestial velocity coordinate space using one of the types of SpaceCoord shortcut spatial coordinate value types, optionally adding the known error (uncertainty) and/or resolution to the spatial coordinate value.

Constraint **CelestialVelocity::Subset**

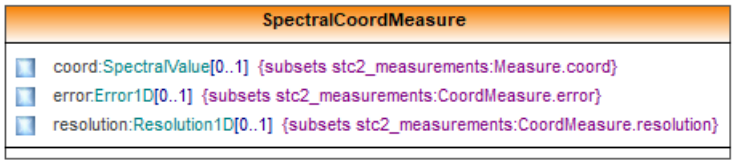
owner	**CelestialVelocity**
properties	qualified name: stc2_measurements::measures::CelestialVelocity::Subset specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Property **CelestialVelocity::coord**

owner	**CelestialVelocity**
properties	qualified name: stc2_measurements::measures::CelestialVelocity::coord multiplicity: 0..1 type: SpaceCoord
constraints	Subset: subsets stc2_measurements:Measure.coord

3.5 Spectral Coordinate Measure Domain

3.5.1 Class SpectralCoordMeasure

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**CoordMeasure**
shown on diagram	**CoordMeasures**
documentation	The SpectralCoordMeasure object provides a full description of a measured instant in spectral space, optionally adding the known error and/or resolution to the spectral coordinate value.

Constraint **SpectralCoordMeasure::Subset1**

owner	**SpectralCoordMeasure**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **SpectralCoordMeasure::Subset2**

owner	**SpectralCoordMeasure**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **SpectralCoordMeasure::Subset3**

owner	**SpectralCoordMeasure**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **SpectralCoordMeasure::coord**

owner	**SpectralCoordMeasure**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure::coord multiplicity: 0..1 type: SpectralValue
constraints	Subset1: subsets stc2_measurements:Measure.coord

Property **SpectralCoordMeasure::error**

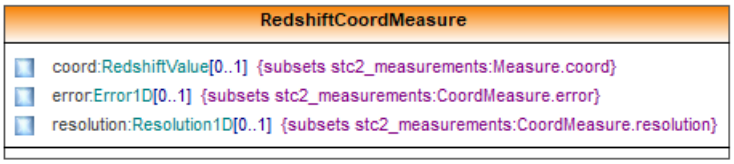
owner	**SpectralCoordMeasure**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure::error multiplicity: 0..1 type: Error1D aggregation: composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

Property **SpectralCoordMeasure::resolution**

owner	**SpectralCoordMeasure**
properties	qualified name: stc2_measurements::measures::SpectralCoordMeasure::resolution multiplicity: 0..1 type: Resolution1D aggregation: composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

3.6 Redshift Coordinate Measure Domain

3.6.1 Class RedshiftCoordMeasure

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::RedshiftCoordMeasure abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**CoordMeasure**
shown on diagram	**CoordMeasures**
documentation	The RedshiftCoordMeasure object provides a full description of a measured instant in redshift space, optionally adding the known error and/or resolution to the redshift coordinate value.

Constraint **RedshiftCoordMeasure::Subset1**

owner	**RedshiftCoordMeasure**
properties	qualified name: stc2_measurements::measures::RedshiftCoordMeasure::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **RedshiftCoordMeasure::Subset2**

owner	**RedshiftCoordMeasure**
properties	qualified name: stc2_measurements::measures::RedshiftCoordMeasure::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **RedshiftCoordMeasure::Subset3**

owner	**RedshiftCoordMeasure**
properties	qualified name: stc2_measurements::measures::RedshiftCoordMeasure::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **RedshiftCoordMeasure::coord**

owner	**RedshiftCoordMeasure**
properties	qualified name: stc2_measurements::measures::RedshiftCoordMeasure::coord multiplicity: 0..1

	type RedshiftValue
constraints	Subset1: subsets stc2_measurements:Measure.coord

Property **RedshiftCoordMeasure::error**

owner	**RedshiftCoordMeasure**
properties	qualified name stc2_measurements::measures::RedshiftCoordMeasure::error multiplicity 0..1 type Error1D aggregation composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

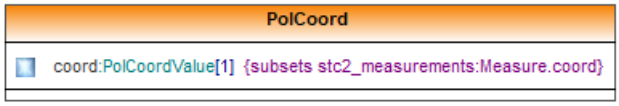
Property **RedshiftCoordMeasure::resolution**

owner	**RedshiftCoordMeasure**
properties	qualified name stc2_measurements::measures::RedshiftCoordMeasure::resolution multiplicity 0..1 type Resolution1D aggregation composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

3.7 Polarization Coordinate Domain

The Polarization Domain contains only one single class, PolCoord, which is derived directly from Measure and only contains a coordinate value, since error and resolution have no meaning for an enumerated coordinate.

3.7.1 Class PolCoord

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::PolCoord abstract false
ownedMember	**coord** **Subset**
general	**Measure**
shown on diagram	**CoordMeasures**
documentation	The Polarization coordinate object contains the coordinate value and the Polarization Type. The polarization coordinates are not measured coordinate values, as they are enumerated. Consequently, there are no errors, uncertainties, or resolutions associated with them.

Constraint **PolCoord::Subset**

owner	**PolCoord**
properties	qualified name stc2_measurements::measures::PolCoord::Subset specification subsets stc2_measurements:Measure.coord constrained elements coord

Property **PolCoord::coord**

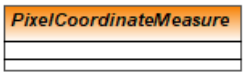
owner	**PolCoord**
properties	qualified name stc2_measurements::measures::PolCoord::coord

	multiplicity 1 type PolCoordValue
constraints	Subset: subsets stc2_measurements:Measure.coord

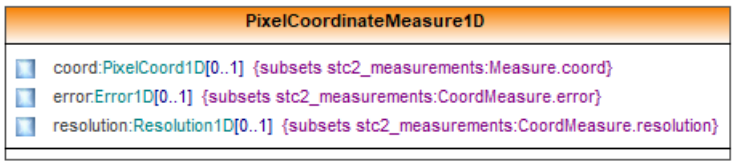
3.8 Pixel Coordinate Measure Domain

In a Pixel Space values of a dependent variable are indexed on a regular 1-, 2-, or 3-dimensional grid. Mathematically, it can be described as a continuous 1-, 2-, or 3-dimensional function, usually convolved with a point spread function (PSF), multiplied by (or sampled at) a bed-of-nails function. If the PSF is a tophat function sized to the grid elements, the pixels will appear as bins. The Pixel Space is unitless, although the pseudo unit `pixel` may be used for clarity. Although the pixel space indexing, by its nature uses integers for its coordinates, operations performed in Pixel Space, such as calculating distribution moments, require allowing the use of reals for pixel coordinates. For that reason, it is appropriate to associate error and resolution with pixel coordinates.

3.8.1 Class PixelCoordinateMeasure

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::PixelCoordinateMeasure abstract true
general	**CoordMeasure**
specific	**PixelCoordinateMeasure1D** **PixelCoordinateMeasure2D** **PixelCoordinateMeasure3D**
shown on diagram	**CoordMeasures**
documentation	The abstract PixelCoordinateMeasure object provides a full description of a measured instant in pixel space, optionally adding the known error (uncertainty) and/or resolution to the pixel coordinate value.

3.8.2 Class PixelCoordinateMeasure1D

diagram	
owner	**measures**
properties	qualified name stc2_measurements::measures::PixelCoordinateMeasure1D abstract false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**PixelCoordinateMeasure**
shown on diagram	**CoordMeasures**
documentation	The 1-dimensional PixelCoordinateMeasure object provides a full description of a measured instant in the pixel coordinate space, optionally adding the known error (uncertainty) and/or resolution to the pixel coordinate value.

Constraint **PixelCoordinateMeasure1D::Subset1**

owner	**PixelCoordinateMeasure1D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure1D::Subset1
	specification	subsets stc2_measurements:Measure.coord
	constrained elements	coord

Constraint **PixelCoordinateMeasure1D::Subset2**

owner	**PixelCoordinateMeasure1D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure1D::Subset2
	specification	subsets stc2_measurements:CoordMeasure.error
	constrained elements	error

Constraint **PixelCoordinateMeasure1D::Subset3**

owner	**PixelCoordinateMeasure1D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure1D::Subset3
	specification	subsets stc2_measurements:CoordMeasure.resolution
	constrained elements	resolution

Property **PixelCoordinateMeasure1D::coord**

owner	**PixelCoordinateMeasure1D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure1D::coord
	multiplicity	0..1
	type	PixelCoord1D
constraints	Subset1:	subsets stc2_measurements:Measure.coord

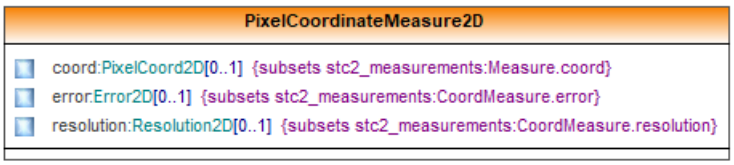
Property **PixelCoordinateMeasure1D::error**

owner	**PixelCoordinateMeasure1D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure1D::error
	multiplicity	0..1
	type	Error1D
	aggregation	composite
constraints	Subset2:	subsets stc2_measurements:CoordMeasure.error

Property **PixelCoordinateMeasure1D::resolution**

owner	**PixelCoordinateMeasure1D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure1D::resolution
	multiplicity	0..1
	type	Resolution1D
	aggregation	composite
constraints	Subset3:	subsets stc2_measurements:CoordMeasure.resolution

3.8.3 Class PixelCoordinateMeasure2D

diagram		
owner	**measures**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D
	abstract	false

ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**PixelCoordinateMeasure**
shown on diagram	**CoordMeasures**
documentation	The 2-dimensional PixelCoordinateMeasure object provides a full description of a measured instant in the pixel coordinate space, optionally adding the known error (uncertainty) and/or resolution to the pixel coordinate value.

Constraint **PixelCoordinateMeasure2D::Subset1**

owner	**PixelCoordinateMeasure2D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D::Subset1
	specification	subsets stc2_measurements:Measure.coord
	constrained elements	coord

Constraint **PixelCoordinateMeasure2D::Subset2**

owner	**PixelCoordinateMeasure2D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D::Subset2
	specification	subsets stc2_measurements:CoordMeasure.error
	constrained elements	error

Constraint **PixelCoordinateMeasure2D::Subset3**

owner	**PixelCoordinateMeasure2D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D::Subset3
	specification	subsets stc2_measurements:CoordMeasure.resolution
	constrained elements	resolution

Property **PixelCoordinateMeasure2D::coord**

owner	**PixelCoordinateMeasure2D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D::coord
	multiplicity	0..1
	type	PixelCoord2D
constraints	Subset1:	subsets stc2_measurements:Measure.coord

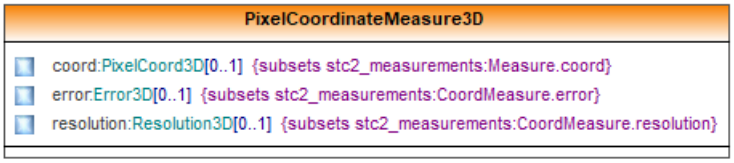
Property **PixelCoordinateMeasure2D::error**

owner	**PixelCoordinateMeasure2D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D::error
	multiplicity	0..1
	type	Error2D
	aggregation	composite
constraints	Subset2:	subsets stc2_measurements:CoordMeasure.error

Property **PixelCoordinateMeasure2D::resolution**

owner	**PixelCoordinateMeasure2D**	
properties	qualified name	stc2_measurements::measures::PixelCoordinateMeasure2D::resolution
	multiplicity	0..1
	type	Resolution2D
	aggregation	composite
constraints	Subset3:	subsets stc2_measurements:CoordMeasure.resolution

3.8.4 Class PixelCoordinateMeasure3D

diagram	
owner	**measures**
properties	qualified name: stc2_measurements::measures::PixelCoordinateMeasure3D abstract: false
ownedMember	**coord** **error** **resolution** **Subset1** **Subset2** **Subset3**
general	**PixelCoordinateMeasure**
shown on diagram	**CoordMeasures**
documentation	The 3-dimensional PixelCoordinateMeasure object provides a full description of a measured instant in the pixel coordinate space, optionally adding the known error (uncertainty) and/or resolution to the pixel coordinate value.

Constraint **PixelCoordinateMeasure3D::Subset1**

owner	**PixelCoordinateMeasure3D**
properties	qualified name: stc2_measurements::measures::PixelCoordinateMeasure3D::Subset1 specification: subsets stc2_measurements:Measure.coord constrained elements: coord

Constraint **PixelCoordinateMeasure3D::Subset2**

owner	**PixelCoordinateMeasure3D**
properties	qualified name: stc2_measurements::measures::PixelCoordinateMeasure3D::Subset2 specification: subsets stc2_measurements:CoordMeasure.error constrained elements: error

Constraint **PixelCoordinateMeasure3D::Subset3**

owner	**PixelCoordinateMeasure3D**
properties	qualified name: stc2_measurements::measures::PixelCoordinateMeasure3D::Subset3 specification: subsets stc2_measurements:CoordMeasure.resolution constrained elements: resolution

Property **PixelCoordinateMeasure3D::coord**

owner	**PixelCoordinateMeasure3D**
properties	qualified name: stc2_measurements::measures::PixelCoordinateMeasure3D::coord multiplicity: 0..1 type: PixelCoord3D
constraints	Subset1: subsets stc2_measurements:Measure.coord

Property **PixelCoordinateMeasure3D::error**

owner	**PixelCoordinateMeasure3D**
properties	qualified name: stc2_measurements::measures::PixelCoordinateMeasure3D::error multiplicity: 0..1 type: Error3D aggregation: composite
constraints	Subset2: subsets stc2_measurements:CoordMeasure.error

Property **PixelCoordinateMeasure3D::resolution**

owner	**PixelCoordinateMeasure3D**
properties	qualified name stc2_measurements::measures::PixelCoordinateMeasure3D::resolution multiplicity 0..1 type Resolution3D aggregation composite
constraints	Subset3: subsets stc2_measurements:CoordMeasure.resolution

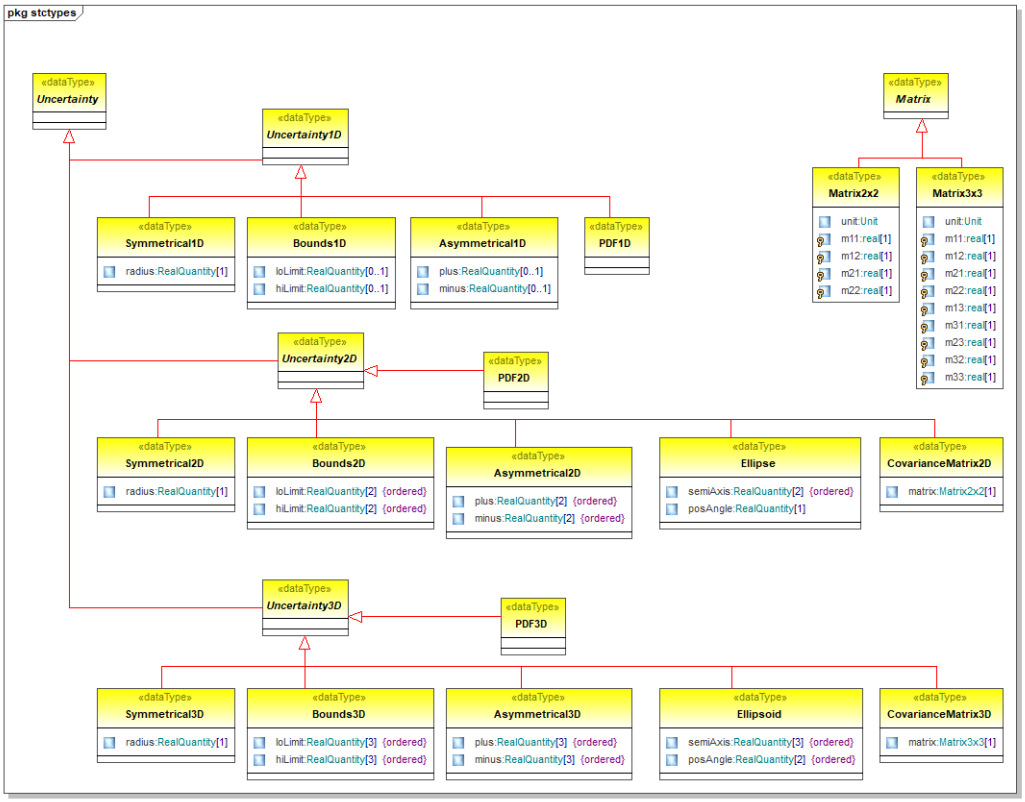
3.9 STC Types

The package stctypes provides basic data types needed for Coordinate Measurements.

Package **stctypes**

owner	**stc2_measurements**
properties	qualified name stc2_measurements::stctypes
ownedDiagrams	**stcTypes**
ownedMember	**Asymmetrical1D Asymmetrical2D Asymmetrical3D Bounds1D Bounds2D Bounds3D CovarianceMatrix2D CovarianceMatrix3D Ellipse Ellipsoid Matrix Matrix2x2 Matrix3x3 PDF1D PDF2D PDF3D Symmetrical1D Symmetrical2D Symmetrical3D Uncertainty Uncertainty1D Uncertainty2D Uncertainty3D**
source of relation	Dependency **IVOA_UML_Profile ivoa**

Class Diagram **stcTypes** (stctypes)



3.9.1 DataType Uncertainty

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Uncertainty abstract true
specific	**Uncertainty1D** **Uncertainty2D** **Uncertainty3D**
shown on diagram	**stcTypes**
documentation	Uncertainty data type, from which 1-, 2-, and 3-dimensional types are derived. It is used for errors and resolutions and is meant to be extensible. Note that Uncertainty defines the SHAPE of the function, not the meaning in terms of the level represented by its values: it may indicate 1-sigma, FWHM, 90% or 95% confidence, etc. This interpretation is left to the definition of the attribute of type Uncertainty in the Error class.

3.9.2 DataType Uncertainty1D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Uncertainty1D abstract true
general	**Uncertainty**
specific	**Asymmetrical1D** **Bounds1D** **PDF1D** **Symmetrical1D**
typedElements	Class **Error1D** Property **ranError** **statError** **sysError** Class **Resolution1D** Property **resolutionFWHM** **resolutionSigma**
shown on diagram	**stcTypes**
documentation	Abstract 1-D Uncertainty data type, from which actual instance types are derived. It is used for errors and resolutions and is meant to be extensible. Note that Uncertainty defines the SHAPE of the function, not the meaning in terms of the level represented by its values: it may indicate 1-sigma, FWHM, 90% or 95% confidence, etc. This interpretation is left to the definition of the attribute of type Uncertainty in the Error class.

3.9.3 DataType Uncertainty2D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Uncertainty2D abstract true
general	**Uncertainty**
specific	**Asymmetrical2D** **Bounds2D** **CovarianceMatrix2D** **Ellipse** **PDF2D** **Symmetrical2D**
typedElements	Class **Error2D** Property **ranError** **statError** **sysError** Class **Resolution2D** Property **resolutionFWHM** **resolutionSigma**
shown on diagram	**stcTypes**
documentation	Abstract 2-D Uncertainty data type, from which actual instance types are derived. It is used for errors and resolutions and is meant to be extensible. Note that Uncertainty defines the SHAPE of the function, not the meaning in terms of the level represented by its values: it may indicate 1-sigma, FWHM, 90% or 95% confidence, etc. This interpretation is left to the definition of the attribute of type Uncertainty in the Error class.

3.9.4 DataType Uncertainty3D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Uncertainty3D abstract true

general	**Uncertainty**
specific	**Asymmetrical3D** **Bounds3D** **CovarianceMatrix3D** **Ellipsoid** **PDF3D** **Symmetrical3D**
typedElements	Class **Error3D** Property **ranError** **statError** **sysError** Class **Resolution3D** Property **resolutionFWHM** **resolutionSigma**
shown on diagram	**stcTypes**
documentation	Abstract 3-D Uncertainty data type, from which actual instance types are derived. It is used for errors and resolutions and is meant to be extensible. Note that Uncertainty defines the SHAPE of the function, not the meaning in terms of the level represented by its values: it may indicate 1-sigma, FWHM, 90% or 95% confidence, etc. This interpretation is left to the definition of the attribute of type Uncertainty in the Error class.

3.9.5 DataType Symmetrical1D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Symmetrical1D abstract false
ownedMember	**radius**
general	**Uncertainty1D**
shown on diagram	**stcTypes**
documentation	Simple symmetrical Uncertainty.

Property **Symmetrical1D::radius**

owner	**Symmetrical1D**
properties	qualified name stc2_measurements::stctypes::Symmetrical1D::radius multiplicity 1 type RealQuantity

3.9.6 DataType Symmetrical2D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Symmetrical2D abstract false
ownedMember	**radius**
general	**Uncertainty2D**
shown on diagram	**stcTypes**
documentation	Simple circular Uncertainty.

Property **Symmetrical2D::radius**

owner	**Symmetrical2D**
properties	qualified name stc2_measurements::stctypes::Symmetrical2D::radius multiplicity 1 type RealQuantity

3.9.7 DataType Symmetrical3D

owner	**stctypes**

properties	qualified name stc2_measurements::stctypes::Symmetrical3D abstract false
ownedMember	**radius**
general	**Uncertainty3D**
shown on diagram	**stcTypes**
documentation	Simple spherical Uncertainty.

Property **Symmetrical3D::radius**

owner	**Symmetrical3D**
properties	qualified name stc2_measurements::stctypes::Symmetrical3D::radius multiplicity 1 type RealQuantity

3.9.8 DataType Asymmetrical1D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Asymmetrical1D abstract false
ownedMember	**minus** **plus**
general	**Uncertainty1D**
shown on diagram	**stcTypes**
documentation	Asymmetric Uncertainty.

Property **Asymmetrical1D::minus**

owner	**Asymmetrical1D**
properties	qualified name stc2_measurements::stctypes::Asymmetrical1D::minus multiplicity 0..1 type RealQuantity

Property **Asymmetrical1D::plus**

owner	**Asymmetrical1D**
properties	qualified name stc2_measurements::stctypes::Asymmetrical1D::plus multiplicity 0..1 type RealQuantity

3.9.9 DataType Asymmetrical2D

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Asymmetrical2D abstract false
ownedMember	**minus** **plus**
general	**Uncertainty2D**
shown on diagram	**stcTypes**
documentation	2-D asymmetric Uncertainty (offset rectangle).

Property **Asymmetrical2D::minus**

owner	**Asymmetrical2D**
properties	qualified name: stc2_measurements::stctypes::Asymmetrical2D::minus ordered: true multiplicity: 2 type: RealQuantity

Property **Asymmetrical2D::plus**

owner	**Asymmetrical2D**
properties	qualified name: stc2_measurements::stctypes::Asymmetrical2D::plus ordered: true multiplicity: 2 type: RealQuantity

3.9.10 DataType Asymmetrical3D

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::Asymmetrical3D abstract: false
ownedMember	**minus** **plus**
general	**Uncertainty3D**
shown on diagram	**stcTypes**
documentation	3-D asymmetric Uncertainty (offset rectangle).

Property **Asymmetrical3D::minus**

owner	**Asymmetrical3D**
properties	qualified name: stc2_measurements::stctypes::Asymmetrical3D::minus ordered: true multiplicity: 3 type: RealQuantity

Property **Asymmetrical3D::plus**

owner	**Asymmetrical3D**
properties	qualified name: stc2_measurements::stctypes::Asymmetrical3D::plus ordered: true multiplicity: 3 type: RealQuantity

3.9.11 DataType Bounds1D

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::Bounds1D abstract: false
ownedMember	**hiLimit** **loLimit**
general	**Uncertainty1D**
shown on diagram	**stcTypes**
documentation	Lower limit/upper limit bounds.

Property **Bounds1D::hiLimit**

owner	**Bounds1D**
properties	qualified name: stc2_measurements::stctypes::Bounds1D::hiLimit multiplicity: 0..1 type: RealQuantity

Property **Bounds1D::loLimit**

owner	**Bounds1D**
properties	qualified name: stc2_measurements::stctypes::Bounds1D::loLimit multiplicity: 0..1 type: RealQuantity

3.9.12 DataType Bounds2D

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::Bounds2D abstract: false
ownedMember	**hiLimit** **loLimit**
general	**Uncertainty2D**
shown on diagram	**stcTypes**
documentation	Rectangular lower limit/upper limit bounds.

Property **Bounds2D::hiLimit**

owner	**Bounds2D**
properties	qualified name: stc2_measurements::stctypes::Bounds2D::hiLimit ordered: true multiplicity: 2 type: RealQuantity

Property **Bounds2D::loLimit**

owner	**Bounds2D**
properties	qualified name: stc2_measurements::stctypes::Bounds2D::loLimit ordered: true multiplicity: 2 type: RealQuantity

3.9.13 DataType Bounds3D

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::Bounds3D abstract: false
ownedMember	**hiLimit** **loLimit**
general	**Uncertainty3D**
shown on diagram	**stcTypes**
documentation	Rectangular lower limit/upper limit bounds.

Property **Bounds3D::hiLimit**

owner	**Bounds3D**
properties	qualified name: stc2_measurements::stctypes::Bounds3D::hiLimit ordered: true multiplicity: 3 type: RealQuantity

Property **Bounds3D::loLimit**

owner	**Bounds3D**
properties	qualified name: stc2_measurements::stctypes::Bounds3D::loLimit ordered: true multiplicity: 3 type: RealQuantity

3.9.14 DataType Ellipse

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::Ellipse abstract: false
ownedMember	**posAngle** **semiAxis**
general	**Uncertainty2D**
shown on diagram	**stcTypes**
documentation	Elliptical Uncertainty function: semi-major and -minor axes, and position angle (CCW from true north in astronomical spherical coordinates, CCW from positive X axis otherwise).

Property **Ellipse::posAngle**

owner	**Ellipse**
properties	qualified name: stc2_measurements::stctypes::Ellipse::posAngle multiplicity: 1 type: RealQuantity

Property **Ellipse::semiAxis**

owner	**Ellipse**
properties	qualified name: stc2_measurements::stctypes::Ellipse::semiAxis ordered: true multiplicity: 2 type: RealQuantity

3.9.15 DataType Ellipsoid

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::Ellipsoid abstract: false
ownedMember	**posAngle** **semiAxis**
general	**Uncertainty3D**
shown on diagram	**stcTypes**
documentation	Ellipsoidal Uncertainty function (Cartesian coordinates only): semi axes, and position angles of first semi axis (CCW from positive X axis in X-Y plane, and angle "above" the X-Y plane).

Property **Ellipsoid::posAngle**

owner	**Ellipsoid**
properties	qualified name: stc2_measurements::stctypes::Ellipsoid::posAngle ordered: true multiplicity: 2 type: RealQuantity

Property **Ellipsoid::semiAxis**

owner	**Ellipsoid**
properties	qualified name: stc2_measurements::stctypes::Ellipsoid::semiAxis ordered: true multiplicity: 3 type: RealQuantity

3.9.16 DataType CovarianceMatrix2D

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::CovarianceMatrix2D abstract: false
ownedMember	**matrix**
general	**Uncertainty2D**
shown on diagram	**stcTypes**
documentation	2-D Covariance matrix.

Property **CovarianceMatrix2D::matrix**

owner	**CovarianceMatrix2D**
properties	qualified name: stc2_measurements::stctypes::CovarianceMatrix2D::matrix multiplicity: 1 type: Matrix2x2

3.9.17 DataType CovarianceMatrix3D

owner	**stctypes**
properties	qualified name: stc2_measurements::stctypes::CovarianceMatrix3D abstract: false
ownedMember	**matrix**
general	**Uncertainty3D**
shown on diagram	**stcTypes**
documentation	3-D Covariance matrix.

Property **CovarianceMatrix3D::matrix**

owner	**CovarianceMatrix3D**
properties	qualified name: stc2_measurements::stctypes::CovarianceMatrix3D::matrix multiplicity: 1 type: Matrix3x3

3.9.18 DataType Matrix

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Matrix abstract true
specific	**Matrix2x2** **Matrix3x3**
shown on diagram	**stcTypes**
documentation	Abstract Matrix data type.

3.9.19 DataType Matrix2x2

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Matrix2x2 abstract false
ownedMember	**m11** **m12** **m21** **m22** **unit**
general	**Matrix**
typedElements	DataType **CovarianceMatrix2D** Property **matrix**
shown on diagram	**stcTypes**
documentation	2x2 matrix data type, with a unit.

Property **Matrix2x2::m11,m12,m21,m22**

owner	**Matrix2x2**
properties	qualified name stc2_measurements::stctypes::Matrix2x2::m11 multiplicity 1 type real

Property **Matrix2x2::unit**

owner	**Matrix2x2**
properties	qualified name stc2_measurements::stctypes::Matrix2x2::unit type Unit

3.9.20 DataType Matrix3x3

owner	**stctypes**
properties	qualified name stc2_measurements::stctypes::Matrix3x3 abstract false
ownedMember	**m11** **m12** **m13** **m21** **m22** **m23** **m31** **m32** **m33** **unit**
general	**Matrix**
typedElements	DataType **CovarianceMatrix3D** Property **matrix**
shown on diagram	**stcTypes**
documentation	3x3 matrix data type, with a unit.

Property **Matrix3x3::m11,m12,m13,m21,m22,m23,m31,m32,m33**

owner	**Matrix3x3**

properties	qualified name multiplicity type	stc2_measurements::stctypes::Matrix3x3::m11 1 real

Property **Matrix3x3::unit**

owner	**Matrix3x3**	
properties	qualified name type	stc2_measurements::stctypes::Matrix3x3::unit Unit

3.9.21 DataType PDF1D

owner	**stctypes**	
properties	qualified name abstract	stc2_measurements::stctypes::PDF1D false
general	**Uncertainty1D**	
shown on diagram	**stcTypes**	
documentation	Stubbed entry for a Probability Density Function (PDF); for future specification.	

3.9.22 DataType PDF2D

owner	**stctypes**	
properties	qualified name abstract	stc2_measurements::stctypes::PDF2D false
general	**Uncertainty2D**	
shown on diagram	**stcTypes**	
documentation	Stubbed entry for a Probability Density Function (PDF); for future specification.	

3.9.23 DataType PDF3D

owner	**stctypes**	
properties	qualified name abstract	stc2_measurements::stctypes::PDF3D false
general	**Uncertainty3D**	
shown on diagram	**stcTypes**	
documentation	Stubbed entry for a Probability Density Function (PDF); for future specification.	

4 Imported Models

4.1 Coordinates

Model **stc2_coordinates**

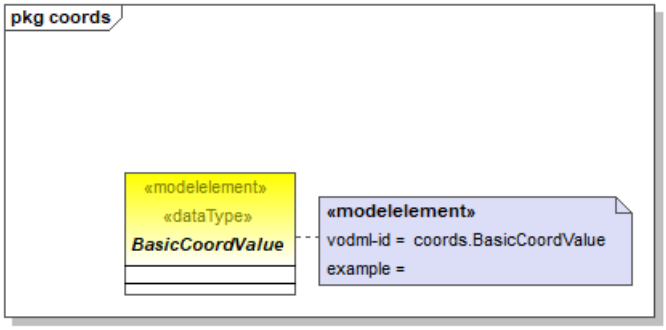
owner	**stc2_measurements**

properties	qualified name stc2_measurements::stc2_coordinates «modelimport» true url https://volute.g-vo.org/svn/trunk/projects/dm/STC/vo-dml/STC_coords-v2.0.vo-dml.xml
ownedMember	**coords** **domain**

Package **coords**

owner	**stc2_coordinates**
properties	qualified name stc2_measurements::stc2_coordinates::coords «modelelement» true vodml-id stc_coordinates.coords
ownedDiagrams	**Coords**
ownedMember	**BasicCoordValue**

Class Diagram **Coords** (coords)



DataType **BasicCoordValue**

owner	**coords**
properties	qualified name stc2_measurements::stc2_coordinates::coords::BasicCoordValue abstract false vodml-id coords.BasicCoordValue
typedElements	Class **Measure** Property **coord**
shown on diagram	**Coords**
documentation	This is the abstract base data type for coordinate values.

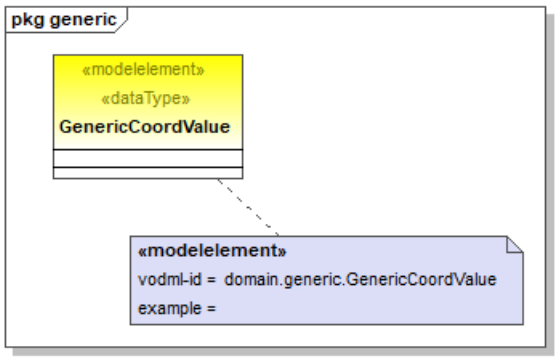
Package **domain**

owner	**stc2_coordinates**
properties	qualified name stc2_measurements::stc2_coordinates::domain «modelelement» true vodml-id stc2_coordinates:domain
ownedMember	**generic** **pixel** **polarization** **redshift** **space** **spectral** **time**

Package **generic**

owner	**domain**
properties	qualified name stc2_measurements::stc2_coordinates::domain::generic «modelelement» true vodml-id domain.generic
ownedDiagrams	**GenericDomain**
ownedMember	**GenericCoordValue**

Class Diagram **GenericDomain** (generic)



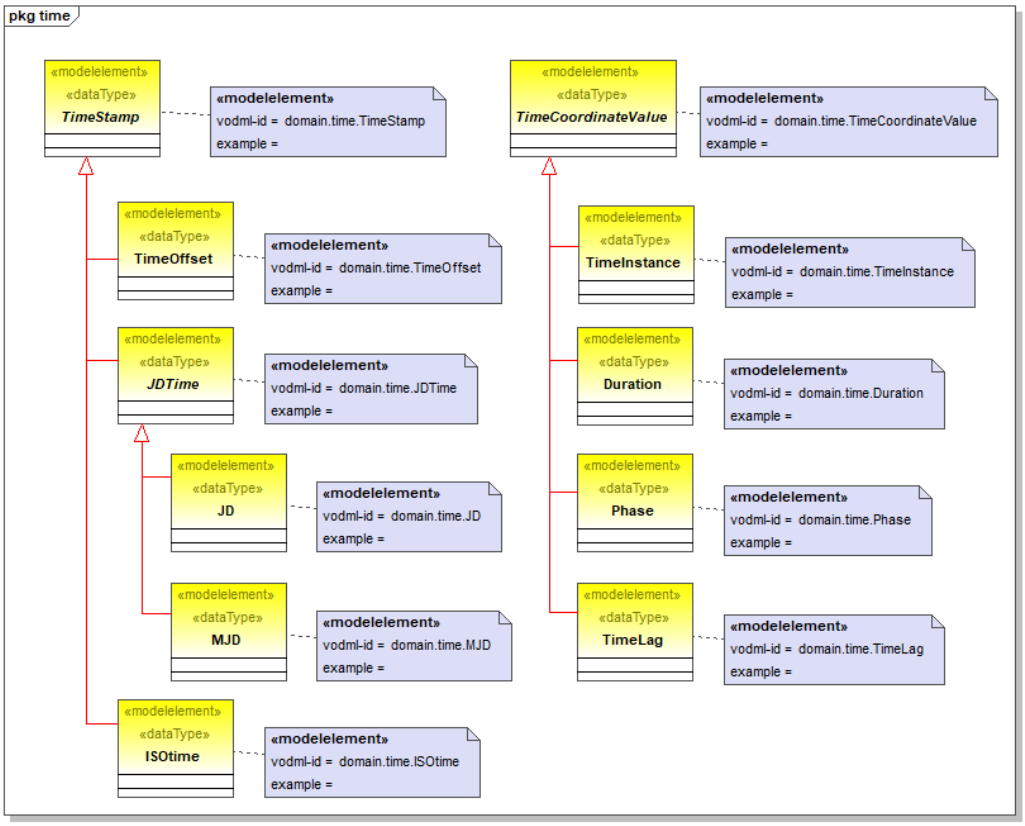
DataType **GenericCoordValue**

owner	**generic**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::generic::GenericCoordValue abstract: false vodml-id: domain.generic.GenericCoordValue
typedElements	Class **GenericCoordMeasure** Property **coord**
shown on diagram	**GenericDomain**
documentation	This data type contains the generic coordinate value and a reference to a GenericFrame through a coordinate axis and Coorindate Space object.

Package **time**

owner	**domain**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::time visibility: public «modelelement»: true vodml-id: domain.time «modelimport»: false
ownedDiagrams	**TimeDomain**
ownedMember	**Duration** **ISOtime** **JD** **JDTime** **MJD** **Phase** **TimeCoordinateValue** **TimeInstance** **TimeLag** **TimeOffset** **TimeStamp**

Class Diagram **TimeDomain** (time)



DataType **TimeStamp**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::TimeStamp abstract true vodml-id domain.time.TimeStamp
specific	**ISOtime** **JDTime** **TimeOffset**
typedElements	Class **TimeStampMeasure** Property **coord**
shown on diagram	**TimeDomain**
documentation	The abstract TimeStamp data type specifies a specific time instance and may be expressed as JD, MJD, ISO-8601, or an offset from a specific point in time (which has to be a Time Stamp). The contents of the Time Stamp references an instance of a time axis.

DataType **TimeOffset**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::TimeOffset abstract false vodml-id domain.time.TimeOffset
general	**TimeStamp**
shown on diagram	**TimeDomain**
documentation	TimeOffset specifies the offset in time of the Time Stamp relative to the Time Origin in the associated Time Frame.

DataType **JDTime**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::JDTime abstract true vodml-id domain.time.JDTime
general	**TimeStamp**
specific	**JD** **MJD**
shown on diagram	**TimeDomain**
documentation	Basic astronomical time is specified as Julian Dates (or Modified Julian Dates). The numbers are unitlless, although the implied unit is, of course, 'd'.

DataType **JD**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::JD abstract false vodml-id domain.time.JD
general	**JDTime**
shown on diagram	**TimeDomain**
documentation	JD is a Time Stamp expressed in Julian Days. Note that JD does not properly specify a time stamp, unless it is related to a time scale and a reference position. One shoulld be aware that precision can easily become an issue with JD, as the numbers tend to be large.

DataType **MJD**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::MJD abstract false vodml-id domain.time.MJD
general	**JDTime**
shown on diagram	**TimeDomain**
documentation	MJD is a Time Stamp expressed in Modified Julian Days. T(MJD)=T(JD)-2440000.5.

DataType **ISOtime**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::ISOtime abstract false vodml-id domain.time.ISOtime
general	**TimeStamp**
shown on diagram	**TimeDomain**
documentation	ISOtime is a Time Stamp expressed as an ISO-8601 string, within the restrictions imposed by the IVOA: no time zone information is allowed, the string needs to be of the form [+|-c]ccyy-mm-dd[Thh:mm:ss[.s...]].

DataType **TimeCoordinateValue**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::TimeCoordinateValue abstract true vodml-id domain.time.TimeCoordinateValue

specific	**Duration** **Phase** **TimeInstance** **TimeLag**
typedElements	Class **TimeCoordMeasure** Property **coord**
shown on diagram	**TimeDomain**
documentation	The abstract TimeCoordinateValue data type specifies a specific time coordinate value and may be a TimeInstance, Duration, Phase, or TimeLag. The contents of the TimeCoordinateValue references an instance of a time axis.

DataType **TimeInstance**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::TimeInstance abstract false vodml-id domain.time.TimeInstance
general	**TimeCoordinateValue**
shown on diagram	**TimeDomain**
documentation	TimeInstance specifies a time instance in the associated TimeFrame.

DataType **Duration**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::Duration abstract false vodml-id domain.time.Duration
general	**TimeCoordinateValue**
shown on diagram	**TimeDomain**
documentation	Duration specifies a time duration in the associated TimeFrame.

DataType **Phase**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::Phase abstract false vodml-id domain.time.Phase
general	**TimeCoordinateValue**
shown on diagram	**TimeDomain**
documentation	Phase specifies a phase instance in the associated TimeFrame.

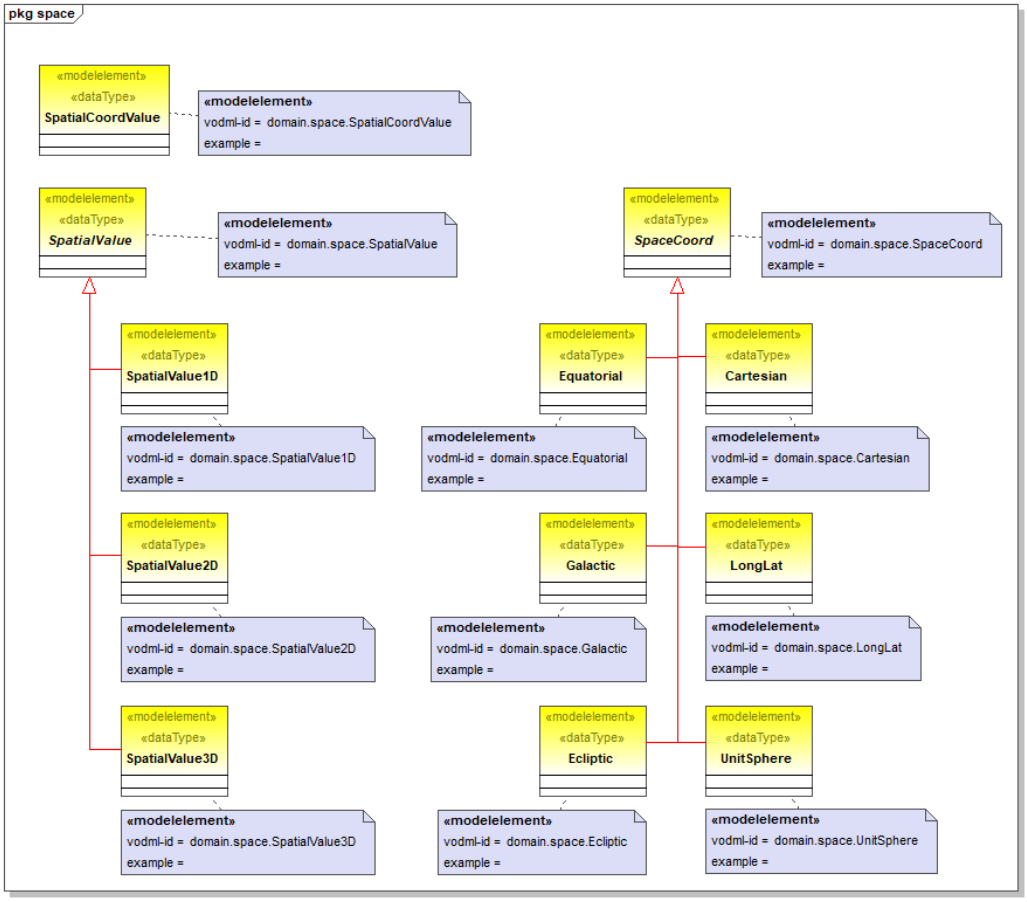
DataType **TimeLag**

owner	**time**
properties	qualified name stc2_measurements::stc2_coordinates::domain::time::TimeLag abstract false vodml-id domain.time.TimeLag
general	**TimeCoordinateValue**
shown on diagram	**TimeDomain**
documentation	TimeLag specifies a time lag in the associated TimeFrame.

Package **space**

owner	**domain**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::space «modelelement»: true vodml-id: domain.space
ownedDiagrams	**SpatialDomain**
ownedMember	**Cartesian** **Ecliptic** **Equatorial** **Galactic** **LongLat** **SpaceCoord** **SpatialCoordValue** **SpatialValue** **SpatialValue1D** **SpatialValue2D** **SpatialValue3D** **UnitSphere**

Class Diagram **SpatialDomain** (space)



DataType **SpatialCoordValue**

owner	**space**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::space::SpatialCoordValue abstract: false vodml-id: domain.space.SpatialCoordValue
shown on diagram	**SpatialDomain**

DataType **SpatialValue**

owner	**space**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::space::SpatialValue abstract: true vodml-id: domain.space.SpatialValue

specific	**SpatialValue1D** **SpatialValue2D** **SpatialValue3D**
shown on diagram	**SpatialDomain**
documentation	The abstract data type SpatialValue contains a reference to a SpatialFrame and, through the coordinate axis, to Spatial Space and allows the 1-, 2-, and 3-dimensional coordinate values to be specified as derived data types. It MAY include an epoch. Note that SpatialValue may contain either positions or velocities. The latter are restricted to true space velocities; Doppler velocities belong in the redshift domain.

DataType **SpatialValue1D**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::SpatialValue1D abstract false vodml-id domain.space.SpatialValue1D
general	**SpatialValue**
typedElements	Class **Position1D** Property **coord** Class **Velocity1D** Property **coord**
shown on diagram	**SpatialDomain**
documentation	1-dimensional spatial coordinate value.

DataType **SpatialValue2D**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::SpatialValue2D abstract false vodml-id domain.space.SpatialValue2D
general	**SpatialValue**
typedElements	Class **Position2D** Property **coord** Class **Velocity2D** Property **coord**
shown on diagram	**SpatialDomain**
documentation	2-dimensional spatial coordinate value. Each component references its own axis.

DataType **SpatialValue3D**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::SpatialValue3D abstract false vodml-id domain.space.SpatialValue3D
general	**SpatialValue**
typedElements	Class **Position3D** Property **coord** Class **Velocity3D** Property **coord**
shown on diagram	**SpatialDomain**
documentation	3-dimensional spatial coordinate value. Each component references its own axis.

DataType **SpaceCoord**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::SpaceCoord abstract true vodml-id domain.space.SpaceCoord
specific	**Cartesian** **Ecliptic** **Equatorial** **Galactic** **LongLat** **UnitSphere**
typedElements	Class **CelestialPosition** Property **coord**

	Class **CelestialVelocity** Property **coord**
shown on diagram	**SpatialDomain**
documentation	The abstract data type SpaceCoord is the base type for the shortcut spatial coordinate types Equatorial, Galactic, Ecliptic, Cartesian, LongLat, and UnitSphere. It contains a reference to a SpatialFrame. It MAY include an epoch. Note that SpatialCoord may contain either positions or velocities. The latter are restricted to true space velocities; Doppler velocities belong in the redshift domain.

DataType **Cartesian**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::Cartesian abstract false vodml-id domain.space.Cartesian
general	**SpaceCoord**
shown on diagram	**SpatialDomain**
documentation	Shortcut coordinate type for 1-, 2-, or 3-dimensional Cartesian spatial coordinates.

DataType **Ecliptic**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::Ecliptic abstract false vodml-id domain.space.Ecliptic
general	**SpaceCoord**
shown on diagram	**SpatialDomain**
documentation	Shortcut coordinate type for spherical ecliptic coordinates.

DataType **Equatorial**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::Equatorial abstract false vodml-id domain.space.Equatorial
general	**SpaceCoord**
shown on diagram	**SpatialDomain**
documentation	Shortcut coordinate type for spherical equatorial coordinates.

DataType **Galactic**

owner	**space**
properties	qualified name stc2_measurements::stc2_coordinates::domain::space::Galactic abstract false vodml-id domain.space.Galactic
general	**SpaceCoord**
shown on diagram	**SpatialDomain**
documentation	Shortcut coordinate type for spherical Galactic coordinates.

DataType **LongLat**

owner	**space**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::space::LongLat abstract: false vodml-id: domain.space.LongLat
general	**SpaceCoord**
shown on diagram	**SpatialDomain**
documentation	Shortcut coordinate type for 1-, 2-, or 3-dimensional spherical spatial coordinates.

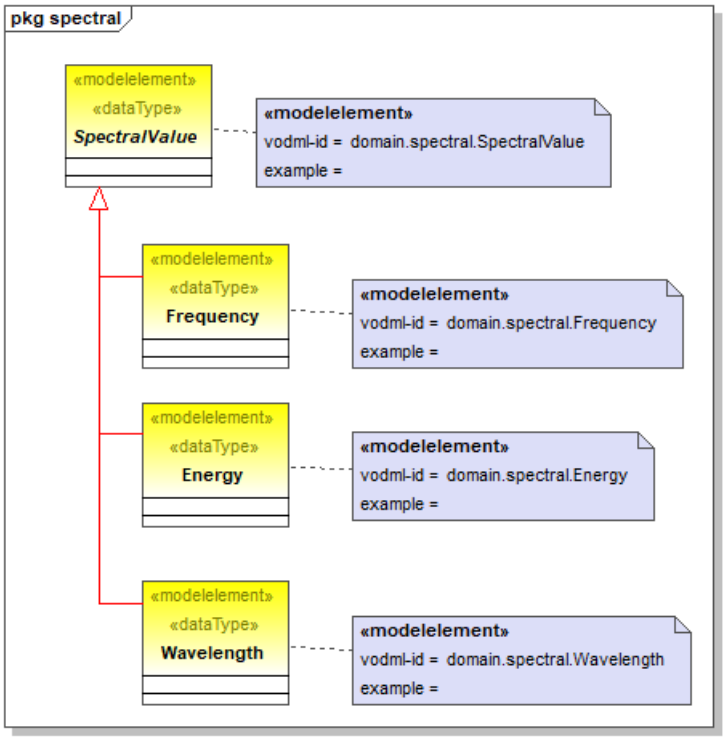
DataType **UnitSphere**

owner	**space**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::space::UnitSphere abstract: false vodml-id: domain.space.UnitSphere
general	**SpaceCoord**
shown on diagram	**SpatialDomain**
documentation	Shortcut coordinate type for 1-, 2-, or 3-dimensional spatial coordinates on a unit sphere (direction cosines).

Package **spectral**

owner	**domain**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::spectral «modelelement»: true vodml-id: domain.spectral
ownedDiagrams	**SpectralDomain**
ownedMember	**Energy** **Frequency** **SpectralValue** **Wavelength**

Class Diagram **SpectralDomain** (spectral)



DataType **SpectralValue**

owner	**spectral**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::spectral::SpectralValue abstract: true vodml-id: domain.spectral.SpectralValue
specific	**Energy** **Frequency** **Wavelength**
typedElements	Class **SpectralCoordMeasure** Property **coord**
shown on diagram	**SpectralDomain**
documentation	The abstract data type SpectralValue contains a reference to a SpectralFrame through the coordinate axis and Spectral Space and allows the equivalent data types Frequency, Energy, and Wavelength coordinate values to be specified as derived data types.

DataType **Energy**

owner	**spectral**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::spectral::Energy abstract: false vodml-id: domain.spectral.Energy
general	**SpectralValue**
shown on diagram	**SpectralDomain**
documentation	Spectral coordinate value expressed as an energy.

DataType **Frequency**

owner	**spectral**

properties	qualified name: stc2_measurements::stc2_coordinates::domain::spectral::Frequency abstract: false vodml-id: domain.spectral.Frequency
general	**SpectralValue**
shown on diagram	**SpectralDomain**
documentation	Spectral coordinate value expressed as a frequency.

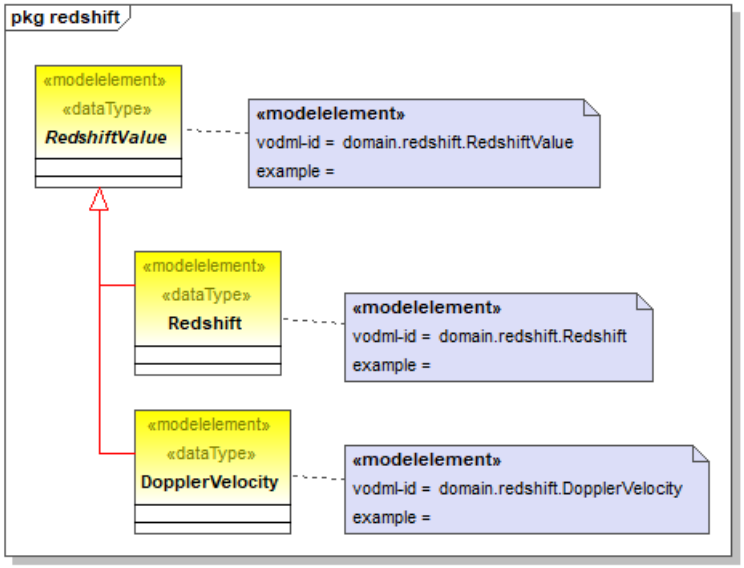
DataType **Wavelength**

owner	**spectral**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::spectral::Wavelength abstract: false vodml-id: domain.spectral.Wavelength
general	**SpectralValue**
shown on diagram	**SpectralDomain**
documentation	Spectral coordinate value expressed as a wavelength. Requires a refractive index (default: 0.0).

Package **redshift**

owner	**domain**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::redshift «modelelement»: true vodml-id: domain.redshift
ownedDiagrams	**RedshiftDomain**
ownedMember	**DopplerVelocity** **Redshift** **RedshiftValue**

Class Diagram **RedshiftDomain** (redshift)



DataType **RedshiftValue**

owner	**redshift**

properties	qualified name stc2_measurements::stc2_coordinates::domain::redshift::RedshiftValue abstract true vodml-id domain.redshift.RedshiftValue
specific	**DopplerVelocity** **Redshift**
typedElements	Class **RedshiftCoordMeasure** Property **coord**
shown on diagram	**RedshiftDomain**
documentation	The abstract data type RedshiftValue contains a reference to a RedshiftFrame through the coordinate axis and Spectral Space objects and allows the equivalent data types Redshift and DopplerVelocity coordinate values to be specified as derived data types.

DataType **Redshift**

owner	**redshift**
properties	qualified name stc2_measurements::stc2_coordinates::domain::redshift::Redshift abstract false vodml-id domain.redshift.Redshift
general	**RedshiftValue**
shown on diagram	**RedshiftDomain**
documentation	The RedshiiftValue expressed as a unitlless redshift (z)

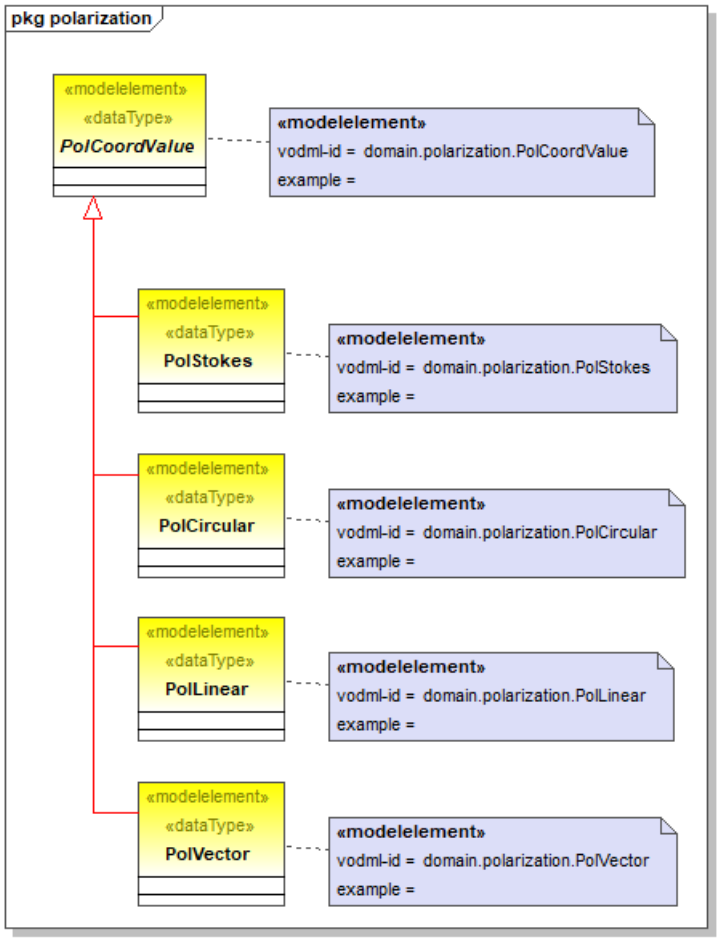
DataType **DopplerVelocity**

owner	**redshift**
properties	qualified name stc2_measurements::stc2_coordinates::domain::redshift::DopplerVelocity abstract false vodml-id domain.redshift.DopplerVelocity
general	**RedshiftValue**
shown on diagram	**RedshiftDomain**
documentation	The RedshiftValue expressed as a DopplerVelocity, requiring a DopplerDefinition (default: optical).

Package **polarization**

owner	**domain**
properties	qualified name stc2_measurements::stc2_coordinates::domain::polarization «modelelement» true vodml-id domain.polarization
ownedDiagrams	**PolarizationDomain**
ownedMember	**PolCircular** **PolCoordValue** **PolLinear** **PolStokes** **PolVector**

Class Diagram **PolarizationDomain** (polarization)



DataType **PolCoordValue**

owner	**polarization**
properties	qualified name stc2_measurements::stc2_coordinates::domain::polarization::PolCoordValue abstract true vodml-id domain.polarization.PolCoordValue
specific	**PolCircular** **PolLinear** **PolStokes** **PolVector**
typedElements	Class **PolCoord** Property **coord**
shown on diagram	**PolarizationDomain**
documentation	The abstract data type PolCoordValue contains a reference to a PolarizationFrame through a DiscreteAxis and PolarizationSpace object and allows the equivalent data types PolStokes, PolCircular, PolLinear, and PolVector coordinate values to be specified as derived data types.

DataType **PolStokes**

owner	**polarization**
properties	qualified name stc2_measurements::stc2_coordinates::domain::polarization::PolStokes abstract false vodml-id domain.polarization.PolStokes
general	**PolCoordValue**
shown on	**PolarizationDomain**

diagram	
documentation	Stokes polarization coordinate value.

DataType **PolCircular**

owner	**polarization**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::polarization::PolCircular abstract: false vodml-id: domain.polarization.PolCircular
general	**PolCoordValue**
shown on diagram	**PolarizationDomain**
documentation	Circular polarization coordinate value.

DataType **PolLinear**

owner	**polarization**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::polarization::PolLinear abstract: false vodml-id: domain.polarization.PolLinear
general	**PolCoordValue**
shown on diagram	**PolarizationDomain**
documentation	Linear polarization coordinate value.

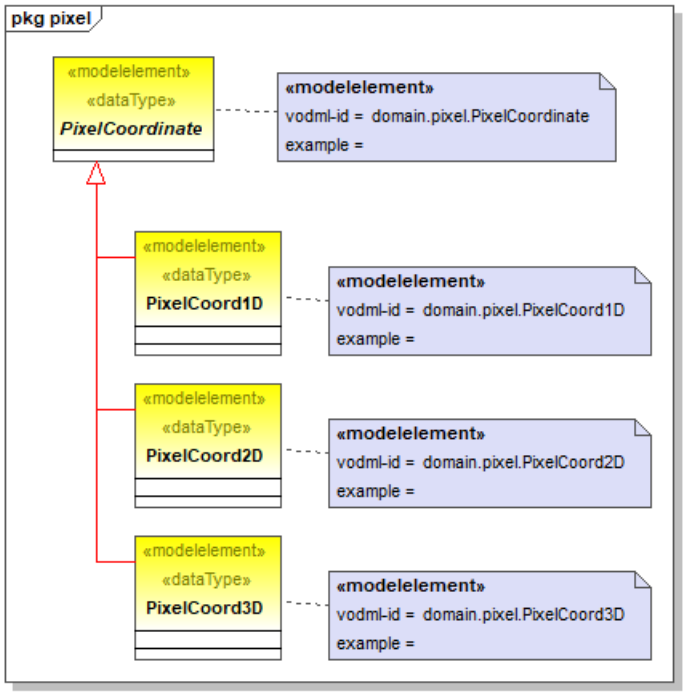
DataType **PolVector**

owner	**polarization**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::polarization::PolVector abstract: false vodml-id: domain.polarization.PolVector
general	**PolCoordValue**
shown on diagram	**PolarizationDomain**
documentation	Vector polarization coordinate value.

Package **pixel**

owner	**domain**
properties	qualified name: stc2_measurements::stc2_coordinates::domain::pixel «modelelement»: true vodml-id: domain.pixel
ownedDiagrams	**PixelDomain**
ownedMember	**PixelCoord1D** **PixelCoord2D** **PixelCoord3D** **PixelCoordinate**

Class Diagram **PixelDomain** (pixel)



DataType **PixelCoordinate**

owner	**pixel**
properties	qualified name stc2_measurements::stc2_coordinates::domain::pixel::PixelCoordinate abstract true vodml-id domain.pixel.PixelCoordinate
specific	**PixelCoord1D** **PixelCoord2D** **PixelCoord3D**
shown on diagram	**PixelDomain**
documentation	A PixelCoordinate is a real-valued coordinate in 1-, 2-, or 3-dimensional pixel space, with each component referenced to its pixel frame through its associated Pixel Axis. This data type specifies an arbitrary location in the Pixel Frame, rather than identifying a specific pixel.

DataType **PixelCoord1D**

owner	**pixel**
properties	qualified name stc2_measurements::stc2_coordinates::domain::pixel::PixelCoord1D abstract false vodml-id domain.pixel.PixelCoord1D
general	**PixelCoordinate**
typedElements	Class **PixelCoordinateMeasure1D** Property **coord**
shown on diagram	**PixelDomain**
documentation	The 1-dimensional Pixel Coordinate value.

DataType **PixelCoord2D**

owner	**pixel**
properties	qualified name stc2_measurements::stc2_coordinates::domain::pixel::PixelCoord2D abstract false

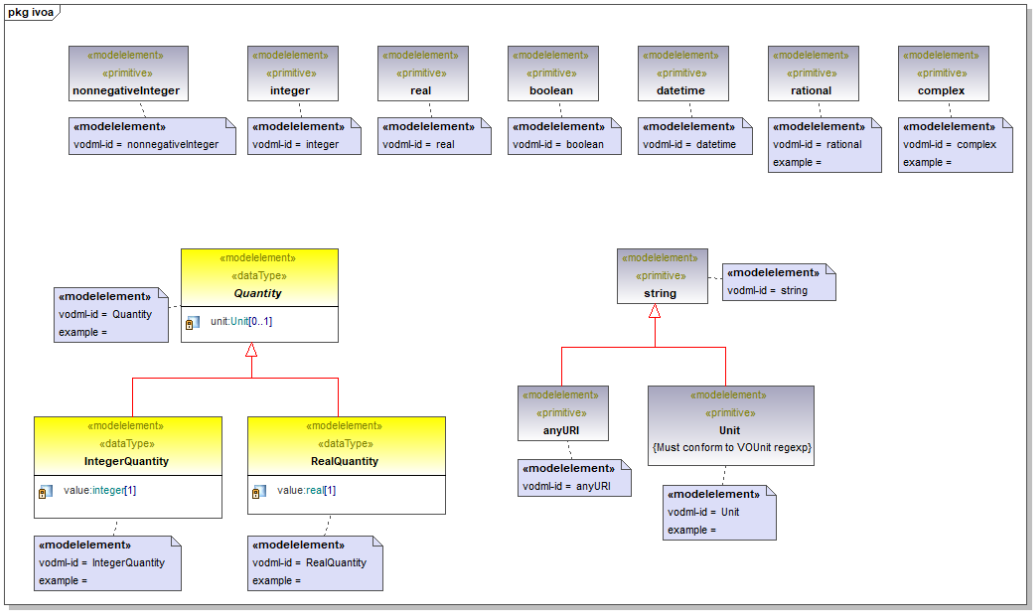
	vodml-id domain.pixel.PixelCoord2D
general	**PixelCoordinate**
typedElements	Class **PixelCoordinateMeasure2D** Property **coord**
shown on diagram	**PixelDomain**
documentation	The 2-dimensional Pixel Coordinate value.

DataType **PixelCoord3D**

owner	**pixel**
properties	qualified name stc2_measurements::stc2_coordinates::domain::pixel::PixelCoord3D abstract false vodml-id domain.pixel.PixelCoord3D
general	**PixelCoordinate**
typedElements	Class **PixelCoordinateMeasure3D** Property **coord**
shown on diagram	**PixelDomain**
documentation	The 3-dimensional Pixel Coordinate value.

4.2 ivoa Model and IVOA UML Profile

Class Diagram **ivoa** (ivoa)



Model **ivoa**

owner	**stc2_measurements**
properties	qualified name stc2_measurements::ivoa «modelimport» true url http://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/ivoa/vo-dml/IVOA-v1.0.vo-dml.xml documentationURL http://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/ivoa/vo-dml/IVOA.html
ownedDiagrams	**ivoa**

ownedMember	**anyURI boolean complex datetime integer IntegerQuantity nonnegativeInteger Quantity rational real RealQuantity string Unit**
source of relation	Dependency **IVOA_UML_Profile** ProfileApplication **IVOA_UML_Profile**
target of relation	Dependency **stctypes**

DataType **Quantity**

owner	**ivoa**
properties	qualified name stc2_measurements::ivoa::Quantity abstract true vodml-id Quantity
ownedMember	**unit**
specific	**IntegerQuantity RealQuantity**
shown on diagram	**ivoa**
documentation	Meant to represent the value of a numerical physical quantity. May be integer, what units can apply there?

Property **Quantity::unit**

owner	**Quantity**
properties	qualified name stc2_measurements::ivoa::Quantity::unit multiplicity 0..1 type Unit

DataType **IntegerQuantity**

owner	**ivoa**
properties	qualified name stc2_measurements::ivoa::IntegerQuantity abstract false vodml-id IntegerQuantity
ownedMember	**value**
general	**Quantity**
shown on diagram	**ivoa**

Property **IntegerQuantity::value**

owner	**IntegerQuantity**
properties	qualified name stc2_measurements::ivoa::IntegerQuantity::value multiplicity 1 type integer

DataType **RealQuantity**

owner	**ivoa**
properties	qualified name stc2_measurements::ivoa::RealQuantity abstract false vodml-id RealQuantity
ownedMember	**value**
general	**Quantity**
typedElements	DataType **Asymmetrical1D** Property **minus plus** DataType **Asymmetrical2D** Property **minus plus** DataType **Asymmetrical3D** Property **minus plus** DataType **Bounds1D** Property **hiLimit loLimit** DataType **Bounds2D** Property **hiLimit loLimit**

	DataType **Bounds3D** Property **hiLimit** **loLimit** DataType **Ellipse** Property **posAngle** **semiAxis** DataType **Ellipsoid** Property **posAngle** **semiAxis** DataType **Symmetrical1D** Property **radius** DataType **Symmetrical2D** Property **radius** DataType **Symmetrical3D** Property **radius**
shown on diagram	**ivoa**

Property **RealQuantity::value**

owner	**RealQuantity**	
properties	qualified name	stc2_measurements::ivoa::RealQuantity::value
	multiplicity	1
	type	real

Constraint **Unit::regexp**

owner	**Unit**	
properties	qualified name	stc2_measurements::ivoa::Unit::regexp
	specification	Must conform to VOUnit regexp
	constrained elements	Unit

Class Diagram **IVOA_UML_Profile** (IVOA_UML_Profile)