

# *Utypes in VOTable*

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# Metadata in VOTable

- VOTable is *not* a data model , but has the role of conveying data together with the metadata that describes it as accurately as possible;
  - semantic description of the <FIELD>s by:
    - <DESCRIPTION> textual
    - **ucd** attribute broad semantics
    - **utype** attribute detailed semantics, relates to data model.
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# *Referencing Models in VOTable*

The constraints:

- we want to keep in VOTable accurate metadata
  - keep VOTable flexible (*it is impossible to add into a VOTable document all the various XML codes related to all data models developed by the VO*)
- ⇒ VOTable document therefore *refers* to data models without *including* them
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# *The VOTable-STC Connection*

- In Version 1.0 VOTable introduced an element **<COOSYS>** to specify the coordinate system used in the tabular data, but
    - lacks accuracy, not a complete definition
    - lacks interoperability
  - use **STC** data model
  - Similar questions for other data, e.g. photometry, provenance, characterisation, ...
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# *Utypes in VOTable*

- in VOTable schema: **utype** is a non-mandatory attribute of any **RESOURCE TABLE FIELD PARAM GROUP**
    - originally created for DAL needs
    - is an acceptable attribute wherever the **ucd** accepted
    - contrary to the **ucd**, gives a fully detailed meaning of the field, parameter or group
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# *Utype: its usage in VOTable*

- can supply an exact description of the column contents
  - immediate application for referencing quantities (*parameters* and/or *fields*) which exact meaning is crucial
    - systems of coordinates: celestial, terrestrial, solar, ... (connection with **STC**)
    - time definitions (connection with **STC**)
    - observation details (characterisation)
    - photometric systems & filters...
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# *Utypes: syntax*

*prefix:element.element.element...*

- prefix **declared** in the xlmns (*versioning*)
  - dot-separated list of the elements in the hierarchy of the data model
  - it is hoped that the same syntax is accepted across all IVOA components
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# Example from STC model

- `stc:AstroCoords.Position2D.Value2.C1`

`stc` = prefix which refers to the data model; a definition of the exact data model used specified with *xmlns* convention

```
<AstroCoords>
  <Position2D>
    <Value2>
      <C1>180</C1>
      <C2>-60</C2>
    </Value2>
  </Position2D>
</AstroCoords>
```



## *Example in VOTable*

A right ascension parameter could be written in VOTable as:

```
<PARAM name="RA" datatype="double" unit="deg"  
  utype="stc:AstroCoords.Position2D.Value2.C1"  
  value="180" />
```



```
<?xml version="1.0"?>
<VOTABLE version="1.2" xmlns:xsi="
http://www.w3.org/2001/XMLSchema-instance"
xmlns:stc="http://www.ivoa.net/xml/STC/stc-v1.30.xsd"
xmlns="http://www.ivoa.net/xml/VOTable/v1.2">
  <RESOURCE name="myObservations">
    <TABLE name="results">
      <DESCRIPTION>Observation log</DESCRIPTION>
      <PARAM name="Telescope" datatype="float"
        ucd="phys.size;instr.tel"
        unit="m" value="3.6"/>
      <GROUP ID="Cool" utype="stc:AstroCoords" >
        <PARAM name="cooframe" datatype="char"
          arraysize="*" ucd="pos.frame"
          utype="stc:AstroCoords.coord_sys_id"
          value="UTC-ICRS-TOPO" />
        <FIELDref ref="ObsStart" />
        <FIELDref ref="RAJ2000" />
        <FIELDref ref="DEJ2000" />
      </GROUP>
    </TABLE>
  </RESOURCE>
</VOTABLE>
```

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```
<FIELD name="RAJ2000" ucd="pos.eq.ra;meta.main"
  ref="Cool" ID="RAJ2000"
  utype="stc:AstroCoords.Position2D.Value2.C1"
  datatype="float" precision="4" unit="deg" />
<FIELD name="DEJ2000" ucd="pos.eq.dec;meta.main"
  ref="Cool" ID="DEJ2000"
  utype="stc:AstroCoords.Position2D.Value2.C2"
  datatype="float" precision="4" unit="deg" />
<FIELD name="ObsStart" ucd="time.start;obs"
  datatype="char" arraysize="19" unit="s"
  ID="ObsStart" ref="Cool"
  utype="stc:AstroCoords.Time.TimeInstant.ISOTime" />
<FIELD name="ExpTime"
  ucd="time.duration;obs.exposure"
  datatype="float" width="6" precision="1" unit="s"/>
```

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# Generalisation (1)

- Value in attribute:

<Elem1>

<Elem2>

<Elem3 attr1="v1">

utype="Elem1.Elem2.Elem3.attr1"

value="v1"

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## Generalisation (2)

- Empty elements (enumeration):

```
<AstroCoordSystem>  
  <SpaceFrame>  
    <CoordRefFrame>  
      <ICRS/>
```

```
utype="AstroCoordSystem.SpaceFrame.CoordRefFrame"  
value="ICRS"
```

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# *Utypes: Questions*

- Can a uniform convention be adopted ?
  - Concatenation of data models => use ; as separator ?
  - One ambiguity could exist in the case an attribute and sub-element having the same name exist (*also confuses XML tools*).
  - Any problem about this scheme ?
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