



# Footprint Overlay Specification using current VO Standards: VOTABLE, SIA and STC Version 1.00

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<http://www.ivoa.net/Documents/Notes/Footprint/Footprint-20070709.pdf>

**Latest version:**

<http://www.ivoa.net/Documents/latest/Footprint.html>

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## Introduction / Goal

Most observing tools, archive browsers and proposal preparation tools provide means to graphically overlay instrumental footprint information onto some celestial background image with a given world coordinate system (WCS 2002). The exact description of detector characteristics and the observation context can be truly complex. Therefore, it is extremely helpful to provide a quicklook capability which mimics a human observer glancing at the sky and drawing a pattern of the aerial coverage as one would see it when peeking through various oculars.

Notwithstanding the merits of other efforts in this topical area (JHU Footprint 2007) the Footprint Overlay Specification is special in that it can be directly plugged into query results of image and spectrum data services using extensions to a DAL query response (DAL Extensions 2005, SIA 2004, VOTable 1.1+ 2004, SSA-IF 2007). Furthermore, it provides a container to embed application specific attributes to exploit specific features of a given legacy client software (e.g. Hubble Space Telescope - Astronomer's Proposal Tool, HST - APT). Care has been taken to make clear separation between the geometry and the application specific attributes. Therefore, it is possible to reuse the respective IVOA data models [STC 2007, Char 2007] and still add, for instance, a representation layer for rendering.

This convention provides means to define the geometry of an instrumental footprint such that it can be projected onto a sky coordinate grid and rendered by a visual archive browser (Aladin, new ESO browser, ...). It is also a step towards the creation of spatial search engines. The instrumental footprint may be that of an actual or planned or simulated observation. A footprint may consist of one or several STC shapes. A given footprint can be associated with a set of observations. A rule set is available to assign rendering attributes in a flexible manner. The document is exhaustive regarding the elements describing the footprint geometry but it is deliberately open to customization for application specific features related to the presentation layer. In particular, it is not the purpose of this document to replace graphic formats such as Scalable Vector Graphics (SVG 2003). It does, however, give means to link existing visualization capabilities of legacy tools to selected footprint elements.

The geometry of a footprint is expressed as a set of STC shapes. It's vertices are given relative to a J2000 equatorial reference coordinate which also serves as the center of rotation. The center position and position angle is factored out in to a catalog section so that a given instrumental footprint definition can be applied to a set of observations taken at different sky locations and varying roll angle.

A set of footprints can be stored in a single VOTable document. A typical usage scenario is the visualization of an SIA or SSA query response table whereby the footprints are attached in additional RESOURCE elements (DAL Extensions 2005). The convention also supports self-contained, complex footprints as required in the context of proposal preparation.

## Small reference guide: the proposed Footprint description standard.

IVOA Data Models such as STC and Characterization are referred via the utype attributes. While these utype values are correctly inferred from these Models current structure, the utype syntax may change a little bit , in the future. Although we didn't do it formally in some cases we had to define pseudo-utypes belonging to two different namespaces: "dal" for general purposes features, and app for rendering information, when no attribute or class was available from the existing data models. The whole structure for the geometry of a given Footprint is embedded in a RESOURCE with utype dal:footprint.geom, while for the rendering it is embedded in another RESOURCE with utype app:footprint.render. The only constraint forced by this specification is the combination "VOTable Tag" / utype, and some encapsulation order for RESOURCES, TABLES, and PARAM or FIELDS. That means that names are free, IDs should be given only when needed and are also free and UCDs are recommended but not REQUIRED.

### Geometry description

#### Footprint "manifold"

The standard "manifold" (sphere or projection of the sphere homothetic to the instrument plane) is described by its STC Spatial Coordinate Frame with a SPHERICAL or CARTESIAN flavor to explicitly define the euclidian geometry where the contours of the instruments will be described. The coordinate system could be one of the standard ones defined by the STC library. In that case it is sufficient to give its ID as a "value" in a single PARAM with utype stc:AstroCoordSystem.id. In practice we decided to restrict the coordinate systems to those defined for the VOEvent IVOA standard (VOEvent 2006) : *TT-ICRS-TOPO*, *UTC-ICRS-TOPO*, *TT-FK5-TOPO* , *UTC-FK5-TOPO*, *TT-ICRS-GEO*, *UTC-ICRS-GEO*, *TT-FK5-GEO*, *UTC-FK5-GEO*, *TDB-ICRS-BARY*, *TDB-FK5-BARY*.

In addition a parameter with utype stc:AstroCoordSystem.SpaceFrame.FK5.Equinox may be necessary in the case of FK5 frames.

In case we want to redefine a customized system we define the following PARAMS:

- A PARAM with the flavor utype stc:AstroCoordSystem.CoordFrame.CARTESIAN or stc:AstroCoordSystem.CoordFrame.SPHERICAL. This PARAM MUST be implemented.
- Two PARAMS with utype stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C1 and stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C2 in order to define the Projection center which will serve as the origin of the Offsets coordinates. They MUST be implemented ( their position in the VOTABLE can be variable according to the kind of document: independent Footprint description or attached to a dataset catalog, in whatever format). In the latter case there will be as much different "centers" as datasets in the catalog, see below in section 3. It is reasonable to think that these Coordinates are given by default in TT\_ICRS\_TOPO. If it is not the case it will be possible to add a third PARAM giving the coordinate system in which the Reference Position is given, and optionally the equinox and to encapsulate the three PARAM in a GROUP with utype stc:AstroCoordSystem.CoordFrame.CoordRefPos\_
- One PARAM with utype stc:AstroCoordSystem.CoordFrame.cart2DRefFrame.Transform2.PosAngle it gives the orientation of the Offsets axes with respect to the axes coordinates of the native coordinate system. We MAY give this PARAM. By default it will be considered zero.
- One PARAM with utype stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.projection giving the PROJECTION used to go from the sky to the FOV plane. Admitted projections are a subset of those

defined in WCS (TAN, SIN, AIT). We MUST implement it when the flavor is CARTESIAN. It is a NONSENSE if the flavor is SPHERICAL.

PARAM to define for a Coordinate System		
STC	Customized system	
	Spherical	Cartesian
One of this value : <i>TT-ICRS-TOPO, UTC-ICRS-TOPO,</i> <i>TT-FK5-TOPO, UTC-FK5-TOPO,</i> <i>TT-ICRS-GEO, UTC-ICRS-GEO,</i> <i>TT-FK5-GEO, UTC-FK5-GEO, TDB-</i> <i>ICRS-BARY, TDB-FK5-BARY</i>	Define an origin Define an angle	Define an origin Define an angle Define a projection

### Defining the Instrument contours.

Each footprint is described in a specific RESOURCE containing one or more TABLE. This RESOURCE has the utype char:spatialAxis.coverage.support

Each Table describes a Region of the Footprint plane considered as part of the footprint geometry. (For example It can be a chip in a CCD mosaic). We MUST define a PARAM with utype dal:footprint.geom.segment.shape giving the Region type.

Supported Region types at the moment are: Polygons, Boxes, Circles Pickles. Many other could be defined in the future, as long as they are built using building blocks consistent with stc.

In the Box case the TABLE MUST contain:

- two PARAMS to define the Center Position of the Box with utype stc:AstroCoordArea.Box.Center.C1 and stc:AstroCoordArea.Box.Center.C2
- and two PARAMS to define the Size of the Box with utype stc:AstroCoordArea.Region.Box.Size.

In the Polygon case the TABLE MUST contain:.

- two FIELDS with utype stc:AstroCoordArea.Polygon.Vertex.Position.C1 and stc:AstroCoordArea.Polygon.Vertex.Position.C2 which contain the two coordinates of the successive vertices.

In the circle case we MUST implement:

- Two PARAMS to define the center of the Circular region with utype stc:AstroCoordArea.Circle.Center.C1 and stc:AstroCoordArea.Circle.Center.C2
- one PARAM to define the radius with utype stc:AstroCoordArea.Circle.radius

In the "Pickle" case we built a structure defined by a sector center and two circles with this same center. So we REQUIRE:

- Two PARAMS to define the common center of the Circular regions and of the sector with utypes:stc:AstroCoordArea.Sector.Center.C1 and stc:AstroCoordArea.Sector.Center.C2
- two PARAMS with the limit angles for the sector, with utypes: stc:AstroCoordArea.Sector.PosAngle1 and stc:AstroCoordArea.Sector.PosAngle2
- and two PARAMS for the Radius of the two circles with utype: stc:AstroCoordArea.Circle.radius

Other Kind of Regions described as STC Regions could be added in the future.

## Attaching the footprint description to the Catalog Dataset

This is done by a specific FIELD in the catalog dataset with utype dal:footprint.geom.id. This FIELD contains the ID string of the RESOURCE describing the whole FOV.

In the Dataset Catalog case the PARAMS describing the Reference Position of the footprint plane are defined by two FIELDS in the Dataset with the utypes: stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C[12]

We MUST implement that if the Dataset catalog is an ad hoc catalog (a Mission log for example).

In the case of SIA Query response, the Reference Position can be the standard SIA reference Position given by the two FIELDS with ucd POS\_EQ\_RA POS\_EQ\_DEC In this SIA case the two FIELDS with utypes stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C[12] can be given if the FOV plane Reference Position is supposed to be different from the SIA reference Position. The MAY FIELD with utype stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.Transform2.PosAngle MUST be given in the Dataset Catalog version and not in the footprint description RESOURCE because in that case we assume that the orientation of the FOV plane is driven by the Dataset orientation.

In the case of SSA Query response, the Reference Position is given by the FIELD with utype: Char.SpatialAxis.Coverage.Location.Value.

To reference explicitly these (this) FIELD(S) in the Coordinate System section of the footprint RESOURCE we use PARAMS with a ref attribute to these FIELDS and a wildcard value.

## 3.Rendering description

Additional general information for the footprint description is available via a RESOURCE of utype app:footprint.render This RESOURCE contains one or more RESOURCES of utype app:footprint.render.rule. These resources are just containers of rules. Each rule describes a filter and the parameters to set if the filter passes. The app:footprint.render.filter.sia select lines from the SIA result and the app:footprint.render.filter.geom select geometry object from their ID. Rule can be nested to form AND boolean operations. Rule at the same level of the xml tree form OR operation. If 2 rules collide (for example one rule wants a footprint to be blue and another one want it to be yellow) the result is undefined. Specific geometric features not really belonging to footprints, such as axis lines, arrows, roll range indicators may be described in this section, although they will make use of STC structures.

### 3.1 Global rendering information

We create a RESOURCE of utype "app:footprint.render.rule". A PARAM with utype app:footprint.render.filter.geom and a wildcard value defines the set of rules as applicable to the whole Footprint manifold.

For purposes such as observation planning, it can be useful for a tool to allow the footprint to be manipulated (moved and rolled) by the user. Rollability and Movability status are given with two MAY PARAMS of utypes dal:footprint.roll and dal:footprint.move. In case it is Rollable, the Rolling center may be different from the Reference Position of the Footprint plane. In case they are not given these parameters must be considered false.

Two MAY PARAMS with utype dal:footprint.RollingCenter.C[12] will give the offsets of this RollingCenter in the Footprint plane. By default these offsets are considered null.

## 3.2 Defining instrument overlays and Rendering information for each Instrument

We create another RESOURCE of utype "app:footprint.render.rule". A PARAM with utype app:footprint.render.filter.geom referring to the ID of the instrument description RESOURCE filter the RULES defined there for the specific instrument. A MAY PARAM of utype app:footprint.render.color defines the color which will be used for this instrument contour in the display.

A PARAM with utype app:footprint.render.overlay.string.content contains a String which could label the chip. A PARAM with utype app:footprint.render.overlay.string.color defines the color of this label. Two PARAMs with utype stc:AstroCoord.Position2D.Value2.C[12] give the position of the head of the string. Rollable and Movable status can also be specified at the instrument level.

## 3.3 Defining Rendering information for set of Observations

A RESOURCE with "app:footprint.render.rule" can define Rendering rules for a specific subset of observations in the catalog dataset or SIA case in the following way.

The filter is defined by a PARAM of utype "app:footprint.render.filter.sia" , referring to a specific FIELD ID from the query result section and selecting a subset of the query response rows by its value attribute.

After that PARAMS defining colors or overlays apply only to this specific subset. The subset can be reduced to one single observation.

## 4. A small tutorial

What do we want to do? Build a VOTABLE document with a small ad hoc dataset catalog and a simple Footprint made of one single Polygon .

We create and initialize the VOTABLE document:

```
<?xml version="1.0"?>
<VOTABLE xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.ivoa.net/xml/VOTable/v1.1">
<DESCRIPTION>Example catalogue and FoV description</DESCRIPTION>
```

We create the resource containing the Dataset Catalog

```
<RESOURCE>
```

We define the Coordinate system for the datasets (by a reference to a predefined System from the STC library). This is not the reference frame for a specific field of view as defined in Section 2.

```
<PARAM name="CoordSys" utype="AstroCoordSystem.id" value="TT-ICRS-TOPO" />
<DESCRIPTION>Dataset List</DESCRIPTION>
```

We initialize the TABLE where the Dataset catalog will be stored and start to define the FIELDS

```
<TABLE>
```

We define the three fields containing the center of the Footprint and its orientation, these values are dependant for any data set

```

<!-- the three following FIELDS borrow their utype from AstroCoordSystem
for the FOV -->
<FIELD ID="RA" name="Right-ascension" ucd="pos.eq.ra;meta.main" ref="J2000"
datatype="char" arraysize="11" unit="h:m:s"
utype="stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C1"/>
<FIELD ID="DEC" name="Declination" ucd="pos.eq.dec;meta.main" ref="J2000"
datatype="char" arraysize="11" unit="d:m:s"
utype="stc:AstroCoordSys.CoordFrame.CoordRefPos.Position2D.Value2.C2"/>
<FIELD ID="PA" name="Position Angle" ucd="pos.posAng" datatype="float"
unit="deg"
utype="stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.Transform2.PositionAngle"
>

```

These Fields contains information on the datasets not related to the Footprint description

```

<FIELD ID="DATASET_ID" ucd="meta.id" datatype="char" arraysize="28" />
<FIELD ID="INSTRUMENT" ucd="meta.id;instr" datatype="char" arraysize="13" />

```

The following field hooks each Dataset record to its associate Footprint using the ID string contained in it.

```

<!-- The utype of this FIELD means that it contains the id attribute of the -->
<!-- the Field of View -->
<FIELD name="FootprintRef" datatype="char" arraysize="20"
utype="char:SpatialAxis.coverage.support.id" />

```

this is the data section for two Datasets.

```

<DATA>
  <TABLEDATA>
    <TR>
      <TD>20:48:16.76</TD>
      <TD>-40:10:35.2</TD>
      <TD>10.5</TD>
      <TD>FORS1.2004-07-23T07:36:08.899</TD>
      <TD>FORS1</TD>
      <TD>geomFors1</TD>
    </TR>
    <TR>
      <TD>20:48:16.10</TD>
      <TD>-40:11:08.8</TD>
      <TD>0.0</TD>
      <TD>FORS1.2004-07-30T08:18:53.053</TD>
      <TD>FORS1</TD>

```

```

        <TD>geomFors1</TD>
    </TR>
</TABLEDATA>
</DATA>
</TABLE>
</RESOURCE>

```

We have finished with the catalog dataset itself, now we initialize the container for the Footprint description using a RESOURCE with the utype dal:footprint.geom

```
<RESOURCE utype="dal:footprint.geom" name="Instrument footprint">
```

The specific RESOURCE for the FORS1 description gets the utype  
“char:SpatialAxis.coverage.support”

```

    <RESOURCE ID="geomFors1" name="Fake Instrument Field of View"
utype="char:SpatialAxis.coverage.support" >
    <DESCRIPTION>Fictitious FoV made up of a simple polygon </DESCRIPTION>

```

We describe the FOV coordinate system by giving Projection and Flavor which do not vary with the dataset and referencing the variable Reference Position and Position angle FIELDS.

```

<!--These PARAMs givethe Field of View Coordinate system -->
<PARAM utype="stc:AstroCoordSystem.CoordFrame.CARTESIAN" datatype="char"
arraysize="*" value="*" />
<PARAM utype="stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.projection"
datatype="char" arraysize="*" value="TAN" />
<PARAM utype="stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C1"
ref="RA" />
<PARAM utype="stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C2"
ref="DEC" />
<PARAM utype="stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.Transform2.PosAngle"
ref="PA" />

```

The following table describes the Footprint contours for observations as a Polygon

```

<TABLE ID="geomFors1_chip" name="FORS1" utype="dal:footprint.geom.segment">
    <!-- The Region nature is coded in this param -->

```

Here we define the Region type as a Polygon

```

    <PARAM datatype="char" arraysize="*" name="coordinates" value="Polygon"
        utype="dal:footprint.geom.segment.shape"/>
    <!-- In the case of a Polygon we give the X and Y positions of the successives
vertices of the polygon -->
    <!-- The AstroCoord sys definition allows to define a polygon with sides parallel -->
    <!-- to the "tilted" axes of the system -->

    <FIELD datatype="float" name="XPtPosition" unit="arcsec"

```

```

        utype="stc:AstroCoordArea.Polygon.Vertex.Position.C1"/>
<FIELD datatype="float" name="YPtPosition" unit="arcsec"
        utype="stc:AstroCoordArea.Polygon.Vertex.Position.C2"/>

```

We enter now the data section:

```

<DATA>
  <TABLEDATA>
    <TR>
      <TD>-204.0</TD>
      <TD>204.0</TD>
    </TR>
    <TR>
      <TD>204.0</TD>
      <TD>204.0</TD>
    </TR>
    <TR>
      <TD>204.0</TD>
      <TD>-204.0</TD>
    </TR>
    <TR>
      <TD>-204.0</TD>
      <TD>-204.0</TD>
    </TR>
  </TABLEDATA>
</DATA>
</TABLE>
</RESOURCE>
</RESOURCE>

```

Then we define the rendering rules for the Footprint. We open a new RESOURCE with utype "app:footprint.render".

```
<RESOURCE utype="app:footprint.render">
```

We define a RULE for all the datasets in the catalog where FORS1 is the instrument. The filter is a "sia" one to refer to the catalog section.

```

<!-- Display all the FORS1 footprints in blue, -->

<RESOURCE utype="app:footprint.render.rule">
  <PARAM      utype="app:footprint.render.filter.sia"      ref="Instrument"
  value="FORS1"/>
  <PARAM utype="app:footprint.render.color" datatype="char" arraysize="*"
  value="blue"/>
</RESOURCE>

```

We now define a rule to write a label for the FORS footprint in yellow. The filter is a geom one to refer to the geometry section.

```
<RESOURCE utype="app:footprint.render.rule">
```

```

<PARAM utype="app:footprint.render.filter.geom" ref="geomFors1" value="*" />
<RESOURCE utype="app:footprint.render.overlay.string">
<PARAM datatype="char" name="rule2"
utype="app:footprint.render.overlay.string.color" value="yellow" />
<PARAM datatype="char" name="rule2"
utype="app:footprint.render.overlay.string.content" value="My FORS1 CCD" />
<PARAM datatype="float" name="rule2"
utype="stc:AstroCoord.Position2D.Value2.C1" value="-500" unit="arcsec" />
<PARAM datatype="float" name="rule2"
utype="stc:AstroCoord.Position2D.Value2.C2" value="-500" unit="arcsec" />
</RESOURCE>
</RESOURCE>

```

After closing the RESOURCE and VOTABLE we can save the file and load it in an Image VO tool such as Aladin.

## Appendix A

This appendix gives the full list of utypes used for this footprint description

### Utypes for footprint geometry:

	used for	Description	datatype	arraysize	Possible values	Default value	Unit
dal:footprint.geom	RESOURCE	contains the geometry description					
dal:footprint.geom.segment.shape	PARAM	gives the Region type for a footprint description	char	*	one of Polygon, Box, Circle Pickle		
dal:footprint.geom.id	FIELD	used in the Dataset Catalog to link on the ID of the matching footprint RESOURCE	char	*			
char:SpatialAxis.coverage.support	RESOURCE	contains the footprint description TABLES					
stc:AstroCoordSystem.id	PARAM	defines a generic CoordSystem for use as the footprint coord system	char	*	one of coordsystem ID among those defined in VOEvent		
stc:AstroCoordSystem.CoordFrame.CARTESIAN	PARAM	indicates a CARTESIAN flavor for the footprint coord system	char	*	""	""	
stc:AstroCoordSystem.CoordFrame.SPHERICAL	PARAM	indicates a SPHERICAL flavor for the footprint coord system	char	*	""	""	
stc:AstroCoordSystem.CoordFrame.CoordRefPos	GROUP	Contains the Coordinate System Reference Position					
stc:AstroCoordSystem.SpaceFrame.FK5.Equinox	PARAM	Contains the Equinox in case of FK5 coordinate system	float	1	1950.0, 1975.0	2000.0	
stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C1	PARAM	RA of center of the footprint coordinate system, also used for the FIELDS of the SIA result containing the RA position of each observation	float	1	<0..360>		arcsec or deg
stc:AstroCoordSystem.CoordFrame.CoordRefPos.Position2D.Value2.C2	PARAM	DE of center of the footprint coordinate system, also used for the FIELDS of the SIA result containing the DE position of each observation	float	1	<-90..90>		arcsec or deg

stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.Transform2.PosAngle	PARAM	Define the rotation angle of the footprint coord system wrt the native coordinate system. Must also be used for the FIELD of the SIA result containing the rotation angle of each observation	float	1	<0..360>	0	deg
stc:AstroCoordSystem.CoordFrame.Cart2DRefFrame.projection	PARAM	Define the projection type for the footprint coord system	char	*	one of TAN, SIN, AIT		
stc:AstroCoordArea.Box.Center.C1 / stc:AstroCoordArea.Box.Center.C2	PARAM	define the box center position in the footprint coord system	float	1	any		arcsec or deg
stc:AstroCoordArea.Box.Size	PARAM	defines the box size	float	2	"any any"		arcsec or deg
stc:AstroCoordArea.Circle.Center.C1 / stc:AstroCoordArea.Circle.Center.C2	PARAM	define the circle center position in the footprint coord system	float	1	any		arcsec or deg
Stc:AstroCoordArea.Circle.Radius	PARAM	define the circle radius	float	1	any		arcsec or deg
stc:AstroCoordArea.Polygon.Vertex.Position.C1 / stc:AstroCoordArea.Polygon.Vertex.Position.C2	FIELD	defines polygon vertex in the footprint coord system in the TABLEs	float	1	any		arcsec or deg
stc:AstroCoordArea.Sector.Center.C1 / stc:AstroCoordArea.Sector.Center.C2	PARAM	define the sector AND circle center position in the footprint coord system	float	1	any		arcsec or deg
stc:AstroCoordArea.Sector.PosAngle1 / stc:AstroCoordArea.Sector.PosAngle2	PARAM	define the sector two angles	float	1	any		arcsec or deg

## Utypes for rendering:

utype	used for	Description	datatype	arraysize	Possible values	Default value	Unit
app:footprint.render	RESOURCE	contains the rendering description					
app:footprint.render.rule	RESOURCE	contains rendering rules					
app:footprint.render.filter.sia	PARAM	used to select lines from the SIA result where the FIELD with ID=MY_SIA_FIELD_ID is equal to xxx	char	*	"MY_SIA_FIELD_ID=xxx"		
app:footprint.render.filter.geom	PARAM	used to select geometry object which have an ID equal to xxx	char	*	"ID=xxx"		
app:footprint.roll	PARAM	Defines whether the footprint can be rolled	bool	1	true / false	false	
app:footprint.move	PARAM	Defines whether the footprint can be moved	bool	1	true / false	false	
app:footprint.RollingCenter.C1 / app:footprint.RollingCenter.C2	PARAM	defines the rolling center in the footprint coord system	float	1	any	0.0/0.0	arcsec or deg
app:footprint.render.color	PARAM	defines the footprint color	char	*	black, blue, cyan, darkGray, gray, green, lightGray, magenta, orange, pink, red, white, yellow		
app:footprint.render.overlay.string	RESOURCE	Contains rendering information on the overlay string					
app:footprint.render.overlay.string.content	PARAM	contains the string text	char	*	any		

app:footprint.render.overlay.string.color	PARAM	define overlaid string font color	char	*	black, blue, cyan, darkGray, gray, green, lightGray, magenta, orange, pink, red, white, yellow		
stc:AstroCoord.Position2D.Value2.C1 / stc:AstroCoord.Position2D.Value2.C2	PARAM	defines the overlaid string position in the footprint coord system	float	1	any	0.0/0.0	arcsec or deg

## Appendix B

This appendix gives description of the ESO WFI and NICMOS instruments attached to an SIA query response giving metadata for a couple of observations obtained with these two instruments. See:

<http://wiki.eurovotech.org/twiki/bin/viewfile/VOTech/UserTools?rev=1;filename=eso-0.3.footprint.xml>

## Appendix C

This appendix gives the complete description of the Footprint of the HST telescope with some of instruments.

It is not attached to any Dataset catalog. See:

<http://wiki.eurovotech.org/twiki/bin/viewfile/VOTech/UserTools?rev=1;filename=APT`HST.xml>

## Appendix D

This appendix gives the description of the footprint of a Wide Field survey as a polygon in Spherical coordinates.. See:

<http://wiki.eurovotech.org/twiki/bin/viewfile/VOTech/UserTools?rev=1;filename=WideField.xml>

## Appendix E

This appendix is a modification of the description given in Appendix D using a customized coordinate system with AITOFF projection. See:

<http://wiki.eurovotech.org/twiki/bin/viewfile/VOTech/UserTools?rev=1;filename=WideFieldAITOF.xml>

## References:

- [Char 2007] Data Model for Astronomical DataSet Characterisation V1.11,  
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