

VO access to Gaia DR1: TAP, Cone Search, COOSYS and HiPS

Thomas Boch, *on behalf of the CDS team*

Trieste Interop, Apps2



□ Gaia DR1

- Released September 14th 2016
- Content
 - **gaia_source**: position and flux (G band)
for *1 billion sources*
 - **TGAS**: position, flux, proper motions and parallax
for *2 million sources*
 - light curves for RR Lyrae and Cepheid
 - QSOs

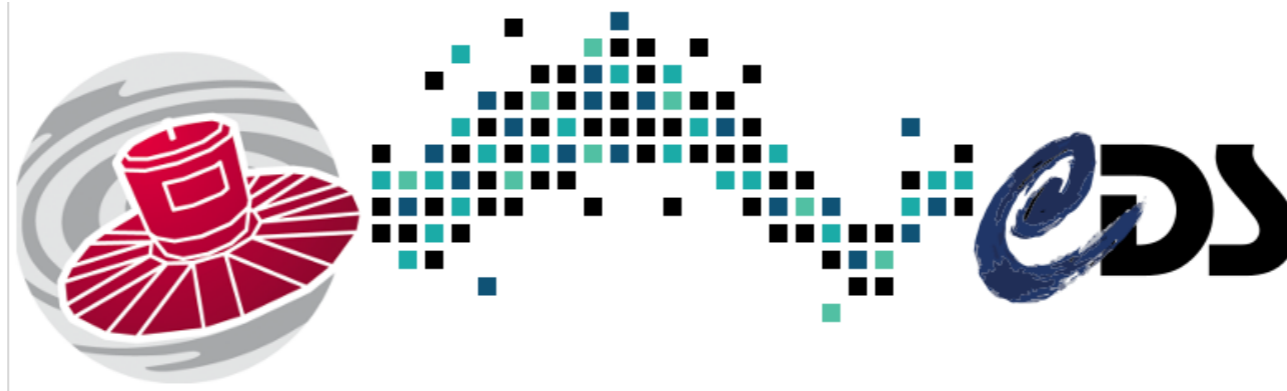
□ Who distributes the data?

<i>Official archive</i>	Gaia archive at ESAC	VOTable	TAP		SAMP
<i>Partner data centers</i>	AIP	VOTable			SAMP
	ARI	VOTable	TAP	CS	SAMP
	ASDC	VOTable			
	CDS	VOTable	TAP	CS	SAMP
<i>External data centers</i>	IRSA	VOTable	TAP	CS	
	GAVO	VOTable	TAP		

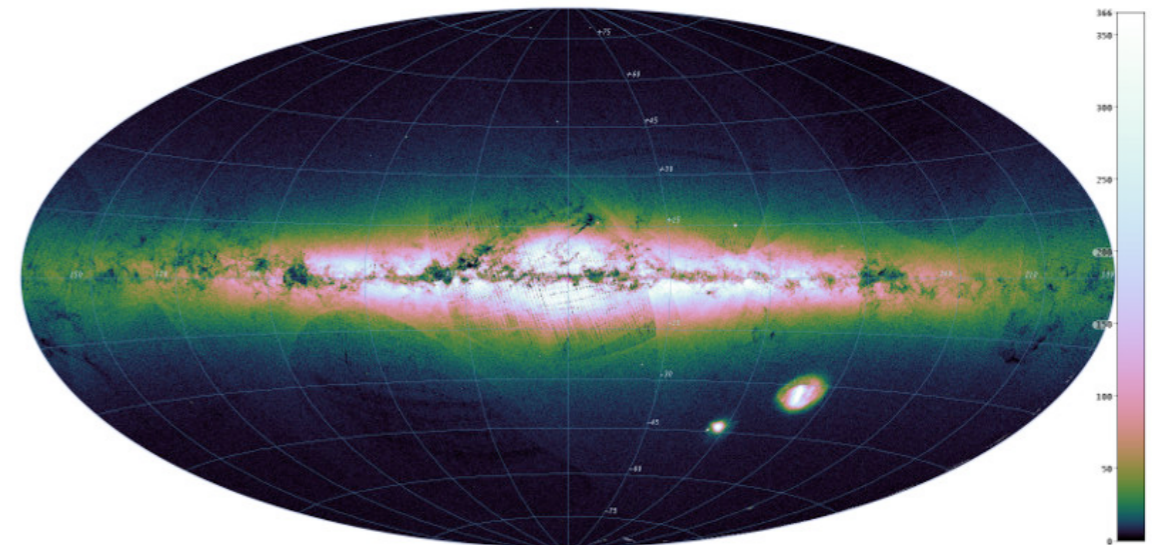
□ Who distributes the data?

<i>Official archive</i>	Gaia archive at ESAC	VOTable	TAP		SAMP
<i>Partner data centers</i>	AIP	VOTable			SAMP
	ARI	VOTable	TAP	CS	SAMP
	ASDC	VOTable			
	CDS	VOTable	TAP	CS	SAMP
<i>External data centers</i>	IRSA	VOTable	TAP	CS	
	GAVO	VOTable	TAP		

□ Gaia DR1 at CDS



- VizieR
- TAP VizieR
- Cross-match service
- Aladin
- HiPS catalogue



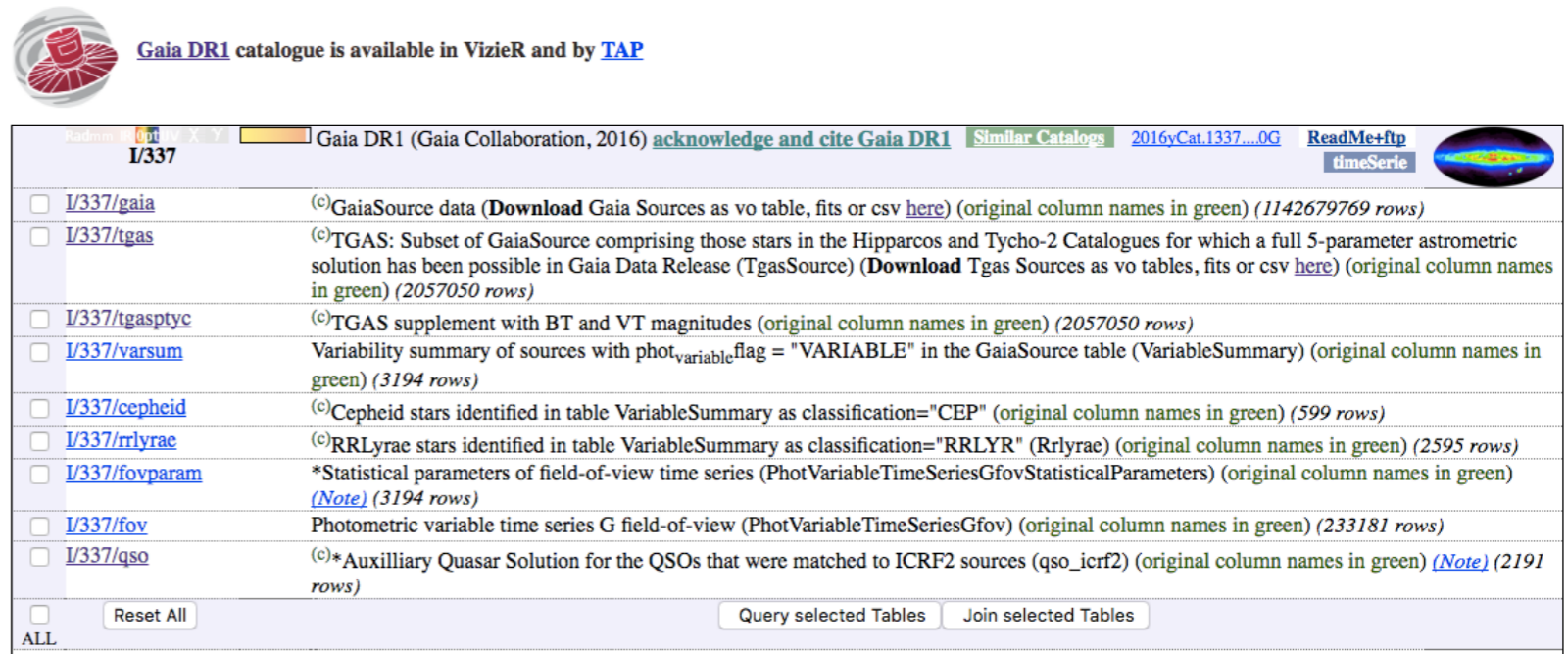
<http://cds.unistra.fr/gaia>

□ Gaia DR1 at CDS: VizieR

- VizieR web interface
- Query by position
+ constraints on fields
- Cone Search interface
- Light curves visualization

□ Gaia DR1 at CDS: VizieR

- VizieR web interface
- Query by position + constraints on fields
- Cone Search interface
- Light curves visualization



Gaia DR1 catalogue is available in VizieR and by [TAP](#)

Gaia DR1 (Gaia Collaboration, 2016) [acknowledge and cite Gaia DR1](#) [Similar Catalogs](#) [2016vCat.1337...0G](#) [ReadMe+ftp](#) [timeSerie](#)

<input type="checkbox"/>	I/337/gaia	(c)GaiaSource data (Download Gaia Sources as vo table, fits or csv here) (original column names in green) (1142679769 rows)
<input type="checkbox"/>	I/337/tgas	(c)TGAS: Subset of GaiaSource comprising those stars in the Hipparcos and Tycho-2 Catalogues for which a full 5-parameter astrometric solution has been possible in Gaia Data Release (TgasSource) (Download Tgas Sources as vo tables, fits or csv here) (original column names in green) (2057050 rows)
<input type="checkbox"/>	I/337/tgasptyc	(c)TGAS supplement with BT and VT magnitudes (original column names in green) (2057050 rows)
<input type="checkbox"/>	I/337/varsum	Variability summary of sources with phot_variable_flag = "VARIABLE" in the GaiaSource table (VariableSummary) (original column names in green) (3194 rows)
<input type="checkbox"/>	I/337/cepheid	(c)Cepheid stars identified in table VariableSummary as classification="CEP" (original column names in green) (599 rows)
<input type="checkbox"/>	I/337/rlyrae	(c)RRLYrae stars identified in table VariableSummary as classification="RRLYR" (Rrlyrae) (original column names in green) (2595 rows)
<input type="checkbox"/>	I/337/fovparam	*Statistical parameters of field-of-view time series (PhotVariableTimeSeriesGfovStatisticalParameters) (original column names in green) (Note) (3194 rows)
<input type="checkbox"/>	I/337/fov	Photometric variable time series G field-of-view (PhotVariableTimeSeriesGfov) (original column names in green) (233181 rows)
<input type="checkbox"/>	I/337/qso	(c)*Auxilliary Quasar Solution for the QSOs that were matched to ICRF2 sources (qso_icrf2) (original column names in green) (Note) (2191 rows)

ALL

□ Gaia DR1 at CDS: VizieR

- VizieR web interface
- Query by position + constraints on fields
- Cone Search interface
- Light curves visualization

The screenshot shows the 'Simple Target' interface in VizieR. It features two tabs: 'Simple Target' (active) and 'List Of Targets'. The main search area is titled 'Target Name (resolved by [Sesame](#)) or Position:'. It contains a 'Clear' button, a text input field with 'M45', a dropdown menu set to 'J2000', and a 'Target dimension:' section with a text input field containing '20' and a dropdown menu set to 'arcmin'. Below this, there are two radio buttons: 'Radius' (selected) and 'Box size'. A table below the search area shows two rows of constraints, each with a checked checkbox, an unchecked radio button, a field name, a value, and a unit link.

Checked	Radio	Field	Value	Unit
<input checked="" type="checkbox"/>	<input type="radio"/>	Plx	5..10	mas
<input checked="" type="checkbox"/>	<input type="radio"/>	e_Plx	<0.4	mas

□ Gaia DR1 at CDS: VizieR

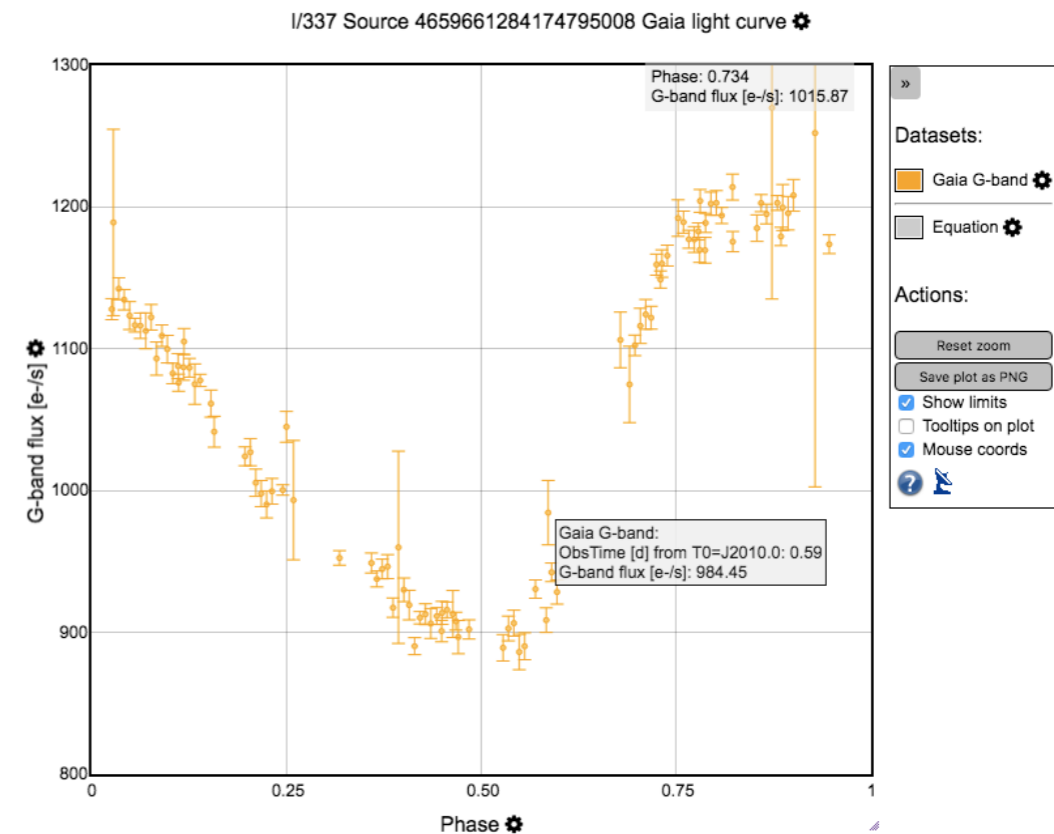
- VizieR web interface
- Query by position
+ constraints on fields
- Cone Search interface
- Light curves visualization

<u>Full</u>	<u>HIP</u>	<u>TYC2</u>	<u>Source</u>	<u>RA ICRS</u> deg	<u>e</u> mas	<u>DE ICRS</u> deg	<u>e</u> mas	<u>Plx</u> mas	<u>e</u> mas	<u>pmRA</u> mas/yr	<u>pmD</u> mas/yr
<u>1</u>	17692		65017627244152064	056.8374571684	0.312	+23.8031539045	0.223	7.17	0.38	19.078	-45.46
<u>2</u>		1800-1567-1	65207705316826752	056.8518153901	0.250	+23.9144901927	0.220	7.65	0.30	18.854	-43.75
<u>3</u>		1800-1579-1	65212103363335296	056.7676517819	0.318	+23.9950255841	0.180	7.13	0.32	22.722	-44.92
<u>4</u>		1799-79-1	65221483571888128	056.4652392295	0.247	+24.0386890228	0.222	7.41	0.25	19.719	-44.88
<u>5</u>		1800-1974-1	65230829420741632	056.5573526278	0.276	+24.1965619563	0.172	7.56	0.27	17.724	-12.32
<u>6</u>		1800-1908-1	65231482255770112	056.6137540453	0.367	+24.2548128138	0.167	7.74	0.32	19.956	-44.29
<u>7</u>		1800-1607-1	66715273197982848	056.8306946920	0.312	+24.1389324034	0.164	7.64	0.30	17.879	-43.46

□ Gaia DR1 at CDS: VizieR

- VizieR web interface
- Query by position + constraints on fields
- Cone Search interface
- Light curves visualization

<u>Full</u>	<u>HIP</u>	<u>TYC2</u>	<u>Source</u>	<u>RA ICRS</u> deg	<u>e</u> mas	<u>DE ICRS</u> deg	<u>e</u> mas	<u>Plx</u> mas	<u>e</u> mas	<u>pmRA</u> mas/yr	<u>pmD</u> mas/yr
<u>1</u>	<u>17692</u>		65017627244152064	056.8374571684	0.312	+23.8031539045	0.223	7.17	0.38	19.078	-45.46
<u>2</u>		<u>1800-1567-1</u>	65207705316826752	056.8518153901	0.250	+23.9144901927	0.220	7.65	0.30	18.854	-43.75
<u>3</u>		<u>1800-1579-1</u>	65212103363335296	056.7676517819	0.318	+23.9950255841	0.180	7.13	0.32	22.722	-44.92
<u>4</u>		<u>1799-79-1</u>	65221483571888128	056.4652392295	0.247	+24.0386890228	0.222	7.41	0.25	19.719	-44.88
<u>5</u>		<u>1800-1974-1</u>	65230829420741632	056.5573526278	0.276	+24.1965619563	0.172	7.56	0.27	17.724	-12.32
<u>6</u>		<u>1800-1908-1</u>	65231482255770112	056.6137540453	0.367	+24.2548128138	0.167	7.74	0.32	19.956	-44.29
<u>7</u>		<u>1800-1607-1</u>	66715273197982848	056.8306946920	0.312	+24.1389324034	0.164	7.64	0.30	17.879	-43.46



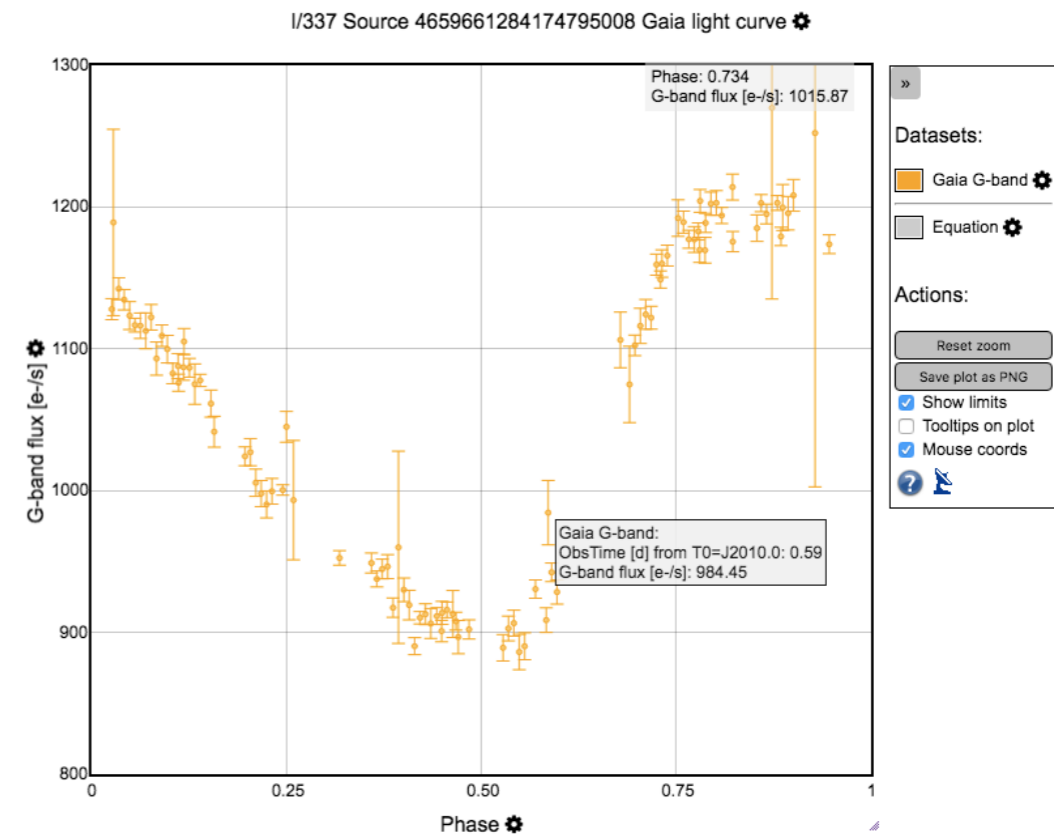
□ Gaia DR1 at CDS: VizieR

- VizieR web interface
- Query by position + constraints on fields

Full	HIP	TYC2	Source	RA ICRS deg	e mas	DE ICRS deg	e mas	Plx mas	e mas	pmRA mas/yr	pmD mas/yr
1	17692		65017627244152064	056.8374571684	0.312	+23.8031539045	0.223	7.17	0.38	19.078	-45.46
2		1800-1567-1	65207705316826752	056.8518153901	0.250	+23.9144901927	0.220	7.65	0.30	18.854	-43.75
3		1800-1579-1	65212103363335296	056.7676517819	0.318	+23.9950255841	0.180	7.13	0.32	22.722	-44.92
4		1799-79-1	65221483571888128	056.4652392295	0.247	+24.0386890228	0.222	7.41	0.25	19.719	-44.88
5		1800-1974-1	65230829420741632	056.5573526278	0.276	+24.1965619563	0.172	7.56	0.27	17.724	-12.32
6		1800-1908-1	65231482255770112	056.6137540453	0.367	+24.2548128138	0.167	7.74	0.32	19.956	-44.29
7		1800-1607-1	66715273197982848	056.8306946920	0.312	+24.1389324034	0.164	7.64	0.30	17.879	-43.46

- Cone Search interface
- Light curves visualization

3+ million queries
last month



□ Gaia DR1 at CDS: VizieR TAP

- Gaia DR1 tables available in TAP VizieR
- Users can query Gaia tables and complement/join them with any available VizieR table (notably *Hipparcos*, *Tycho*, large surveys like *2MASS*, *SDSS*, etc)
- Web interface:
<http://tapvizier.u-strasbg.fr/adql/>
- TAP endpoint:
<http://tapvizier.u-strasbg.fr/TAPVizieR/tap/>

□ Gaia DR1 at CDS: VizieR TAP

- Gaia DR1 tables available in TAP VizieR
- Users can query Gaia tables and complement/join them with any available VizieR table (notably *Hipparcos*, *Tycho*, large surveys like *2MASS*, *SDSS*, etc)
- Web interface: <http://tapvizier.u-strasbg.fr/adql/>
- TAP endpoint: <http://tapvizier.u-strasbg.fr/TAPVizieR/tap/>

The screenshot shows the VizieR TAP interface. At the top, there is a search bar with 'I/337' entered and a 'Go' button. Below the search bar, there is a message: 'Search by catalog, author's name, word(s) from title, position (resolved by Sesame), ... e.g : Veron, 2Mass, redshift, M31... Note : The vizieR capability takes advantage of METAdata'. The interface is divided into several sections. The first section is a navigation bar with tabs: 'all', 'by wavelength', 'by mission', 'by astronomy', and a close button 'x'. Below this is a 'Show 10 entries' section with a search bar. The main content area is a table with columns 'catalogues', 'description', and 'tables'. The 'I/337' catalogue is selected, and its description is shown: 'Gaia DR1 (Gaia Collaboration, 2016) wavelength : optical ; astronomy : Positional_Data ; Parallaxes ; Proper_Motions ;'. The 'tables' column lists several tables with their row counts and descriptions: 'I/337/gaia (1142679769 rows) (positions) GaiaSource data (Download } Gaia Sources as vo table, fits or csv \W{xplain}{http://1016243957.rsc.cdn77.org/Gaia/gaia_source /}{here}) (\originalcolumnnames)', 'I/337/tgas (2057050 rows) (positions) TGAS: Subset of GaiaSource (\originalcolumnnames)', 'I/337/tgasptyc (2057050 rows) (positions) TGAS supplement with BT and VT magnitudes (\originalcolumnnames)', 'I/337/varsum (3194 rows) Variability summary of sources with phot_variable_flag = "VARIABLE" in the GaiaSource table (VariableSummary) (\originalcolumnnames)', 'I/337/cepheid (599 rows) (positions) Cepheid stars identified in table VariableSummary as classification="CEP" (\originalcolumnnames)', and 'I/337/rrlyrae (2595 rows) (positions) RR Lyrae stars identified in table VariableSummary as classification="RRLYR" (Rrlyrae) (\originalcolumnnames)'. Below the table is a section for 'Columns and constraints', 'Sky area', and 'Unit change of coordinates'. There is a 'Max records' section with 'all' and 'limit 100' options, and an 'Update query' button. A SQL query is shown in a text area: '1 SELECT floor(ra/5.000000)*5.000000 as ra_floor, 2 floor(dec/5.000000)*5.000000 as dec_floor, 3 count(*) as nb 4 FROM "I/337/tgas" 5 GROUP BY 1,2'. Below the query is a 'Query name' field with 'I/337/tgas', an 'Output format' dropdown set to 'votable', and buttons for 'Run', 'Quickview', 'Reset', and 'Test'. A green checkmark indicates 'Your query is correct !'. At the bottom, there is a 'List of your TAP queries' section with 'Refresh', 'Abort', 'Destroy', and 'Properties' buttons. Below this is a table with columns 'name', 'phase', 'start', 'destruction', and 'results'. The table shows three entries: 'I/337/tgas' with 'COMPLETED' phase, 'I/337/tgas' with 'COMPLETED' phase, and 'I/337/tgas' with 'EXECUTING' phase. Each entry has a 'download view' link or a 'status' link. The bottom of the interface shows 'Showing 1 to 3 of 3 entries' and navigation buttons: 'First', 'Previous', 'Next', 'Last'.

□ Gaia DR1 at CDS: VizieR TAP

- Gaia DR1 tables available in TAP VizieR
- Users can query Gaia tables and complement/join them with any available VizieR table (notably *Hipparcos*, *Tycho*, large surveys like *2MASS*, *SDSS*, etc)
- Web interface: <http://tapvizier.u-strasbg.fr/adql/>
- TAP endpoint: <http://tapvizier.u-strasbg.fr/TAPVizieR/tap/>

The screenshot displays the 'Table Access Protocol (TAP) Query' interface. The 'Metadata' section is active, showing a search for 'gaia'. The left sidebar lists various tables, with 'I/337/gaia' selected. The main panel shows a table of columns with their data types, indexed status, units, and descriptions. Below the metadata, the 'Service Capabilities' section shows 'Query Language: ADQL-2.0', 'Max Rows: 1000000000 (default)', and 'Uploads: 10krow/'. The 'ADQL Text' section shows a query: 'SELECT TOP 1000 * FROM "I/337/tgas"'. The 'Run Query' button is visible at the bottom.

Name	DataType	Indexed	Unit	Desc
astrometric_n_obs_ac	SMALLINT	<input type="checkbox"/>		Tota
phot_g_mean_flux	DOUBLE	<input checked="" type="checkbox"/>	e-/s	G-b;
solution_id	BIGINT	<input type="checkbox"/>		Solut
source_id	BIGINT	<input checked="" type="checkbox"/>		Sour
ecl_lat	DOUBLE	<input type="checkbox"/>	deg	Eclip
scan_direction_mean_k4	DOUBLE	<input type="checkbox"/>	deg	Mea
dec_pmdec_corr	REAL	<input type="checkbox"/>		? Coi
ra_error	REAL	<input checked="" type="checkbox"/>	mas	Stani
phot_g_mean_mag	REAL	<input checked="" type="checkbox"/>	mag	G-b;
astrometric_n_obs_al	SMALLINT	<input type="checkbox"/>		Tota
pmra_error	REAL	<input type="checkbox"/>	mas/yr	? Sta
scan_direction_mean_k3	DOUBLE	<input type="checkbox"/>	deg	Mea
parallax_pmra_corr	REAL	<input type="checkbox"/>		? Coi

□ Gaia DR1 at CDS: xmatch service

- Fast positional cross-identification of Gaia sources with any VizieR table with position (or user-uploaded table)
- Web interface:
<http://cdsxmatch.u-strasbg.fr/xmatch>
- HTTP API
 - *astroquery*
 - *Topcat*

□ Gaia DR1 at CDS: xmatch service

- Fast positional cross-identification of Gaia sources with any VizieR table with position (or user-uploaded table)
- Web interface: <http://cdsxmatch.u-strasbg.fr/xmatch>
- HTTP API
 - *astroquery*
 - *Topcat*

CDS X-Match Service

Choose tables to cross-match

GAIA DR1 TGAS 2MASS

Gaia DR1 (Gaia Collaboration, 2016) 2,057,050 rows

2MASS All-Sky Catalog of Point Sources (Cutri+ 2003) 470,992,970 rows

Begin the X-Match

Visualize and manage your cross-match jobs

Table 1	Table 2	Options	Begin	Status
GAIA DR1 TGAS	2MASS	fixed radius	21/10/2016 at 22:55	completed

For the selected job(s): Delete

□ Gaia DR1 at CDS: xmatch service

- Fast positional cross-identification of Gaia sources with any VizieR table with position (or user-uploaded table)
- Web interface: <http://cdsxmatch.u-strasbg.fr/xmatch>
- HTTP API
 - *astroquery*
 - *Topcat*

The screenshot shows the 'CDS Upload X-Match' web interface. It is divided into three main sections: 'Remote Table', 'Local Table', and 'Match Parameters'.
- **Remote Table:** 'VizieR Table ID/Alias' is set to 'GAIA DR1'. Other fields include 'Name: I/337/gaia', 'Alias: GAIA DR1', 'Description: GaiaSource data ({\bf Download } Gaia Source', 'Row Count: 1 142 679 769', and 'Coverage: 0.9999797 (order 6)'.
- **Local Table:** 'Input Table' is '2: III_235B_catalog'. 'RA column' is '_RAJ2000' (degrees, J2000) and 'Dec column' is '_DEJ2000' (degrees, J2000).
- **Match Parameters:** 'Radius' is '4.0' (arcsec), 'Find mode' is 'Best', 'Rename columns' is 'Duplicates', 'Suffix' is '_x', and 'Block size' is '50000'.
At the bottom, there are 'Go' and 'Stop' buttons.

□ Gaia DR1 at CDS: xmatch service

- Fast positional cross-identification of Gaia sources with any VizieR table with position (or user-uploaded table)
- Web interface: <http://cdsxmatch.u-strasbg.fr/xmatch>
- HTTP API
 - *astroquery*
 - *Topcat*

Stats:

130M positions submitted
from 200+ different IPs

The screenshot shows the 'CDS Upload X-Match' web interface. It is divided into three main sections: 'Remote Table', 'Local Table', and 'Match Parameters'.
- **Remote Table:** 'VizieR Table ID/Alias' is set to 'GAIA DR1'. Other fields include 'Name: I/337/gaia', 'Alias: GAIA DR1', 'Description: GaiaSource data ({\bf Download } Gaia Source', 'Row Count: 1 142 679 769', and 'Coverage: 0.9999797 (order 6)'.
- **Local Table:** 'Input Table' is '2: III_235B_catalog'. 'RA column' is '_RAJ2000' (degrees, J2000) and 'Dec column' is '_DEJ2000' (degrees, J2000).
- **Match Parameters:** 'Radius' is '4.0' (arcsec), 'Find mode' is 'Best', 'Rename columns' is 'Duplicates', 'Suffix' is '_x', and 'Block size' is '50000'.
At the bottom, there are 'Go' and 'Stop' buttons.

□ Gaia DR1 at CDS: Aladin

- Dedicated form to access Gaia data in Aladin Desktop

- Visualization of proper motions

□ Gaia DR1 at CDS: Aladin

- Dedicated form to access Gaia data in Aladin Desktop

The screenshot shows the 'Server selector' dialog box in Aladin Desktop. The dialog is titled 'Server selector' and has a 'Gaia DR1 (Gaia Collaboration, 2016)' section. The fields are as follows:

Field	Value
Target (ICRS, name)	<input type="text"/>
Radius	14'
Table	I/337/tgasptyc - TGAS supplemented wit...
Plx [mas](ex: > 50)	<input type="text"/>
Gmag (ex: 10..11)	<input type="text"/>
pmRA [mas/yr] (ex: <-...)	<input type="text"/>
pmDE [mas/yr] (ex: > 3...)	<input type="text"/>
Output columns	* - Default columns
Output max	999999

At the bottom of the dialog, there are buttons for 'Reset', 'Clear', 'SUBMIT', and 'Close', along with a help icon.

- Visualization of proper motions

□ Gaia DR1 at CDS: Aladin

- Dedicated form to access Gaia data in Aladin Desktop

- Visualization of proper motions

Server selector

Others HiPS File all-VO Watch FoV... Tools...

Image servers

Aladin images SkyView UKIDSS Sloan DSS... VLA... Archives... Others...

Catalog servers

All VizieR Surveys Missions SIMBAD NED SkyBot Gaia Others...

○ Gaia DR1 (Gaia Collaboration, 2016) ?

Target (ICRS, name) Grab coord

Radius 14'

Table I/337/tgasptyc - TGAS supplemented wit...

Plx [mas](ex: > 50)

Gmag (ex: 10..11)

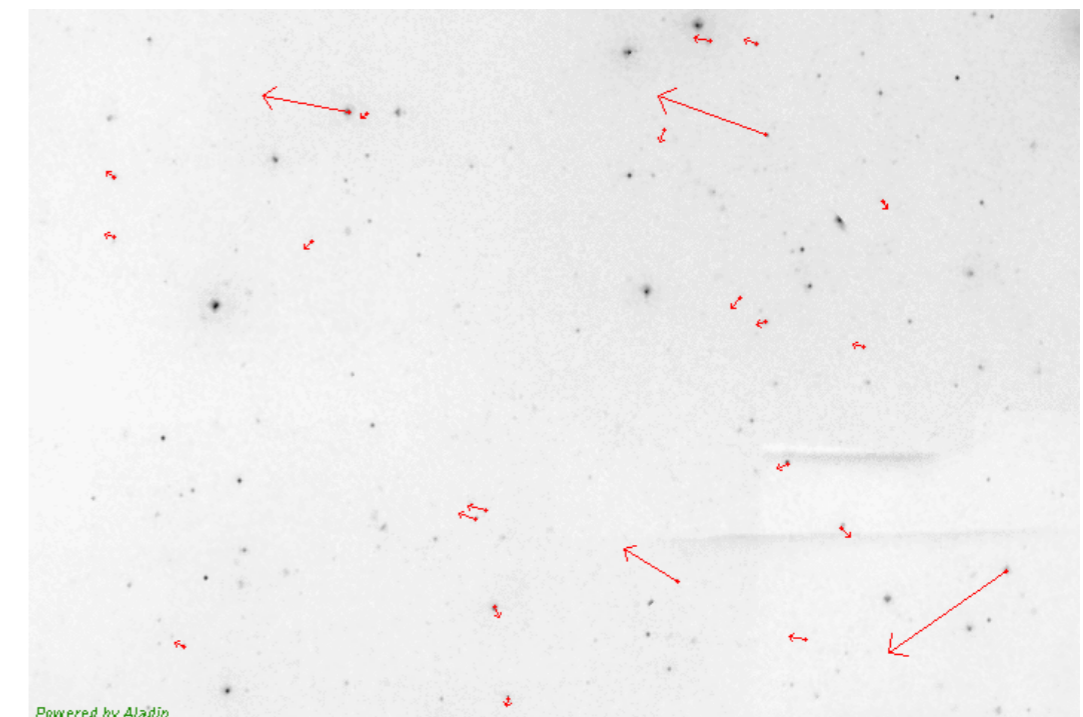
pmRA [mas/yr] (ex: <-...)

pmDE [mas/yr] (ex: > 3...)

Output columns * - Default columns

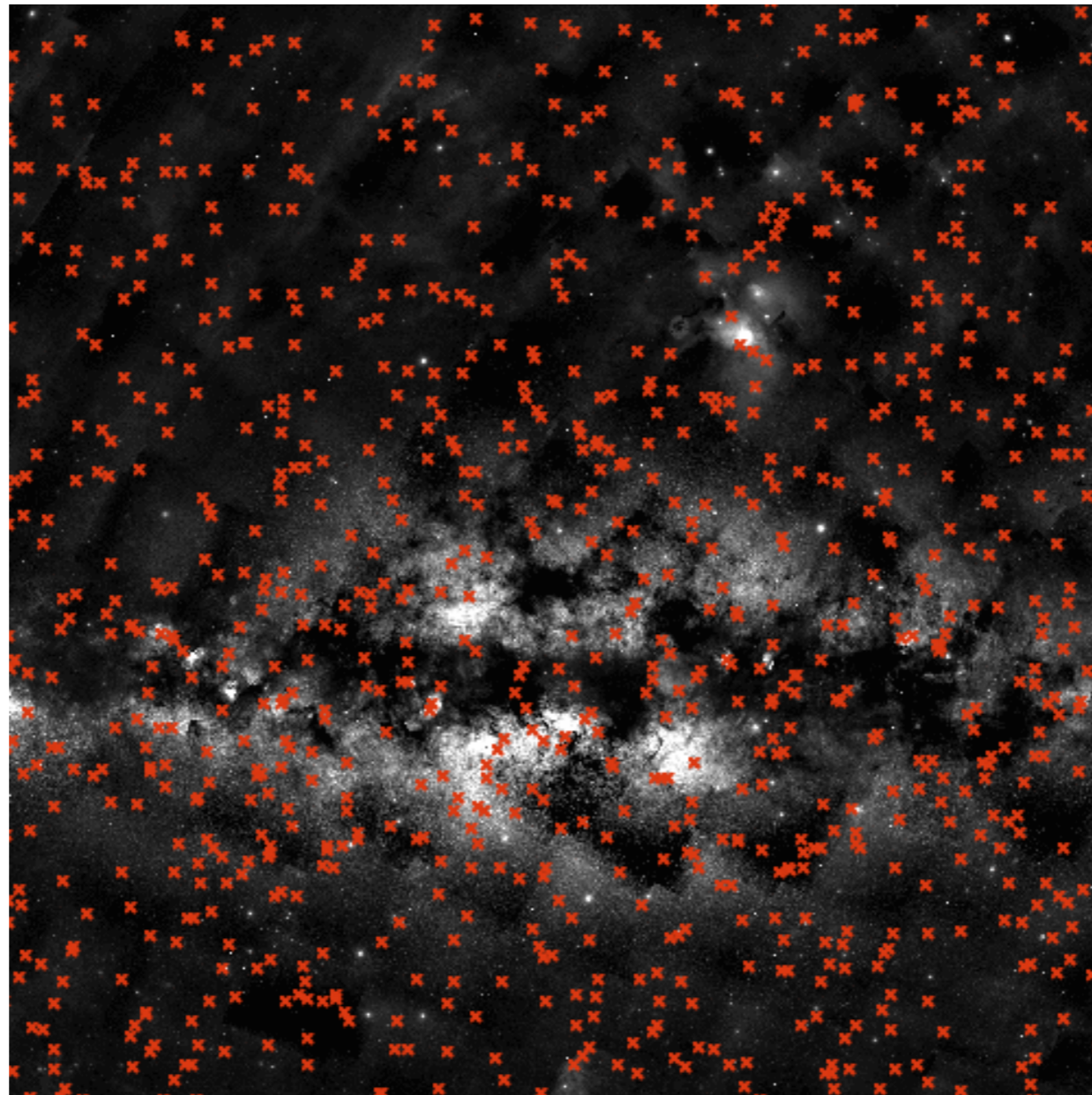
Output max 999999

Reset Clear SUBMIT Close ?



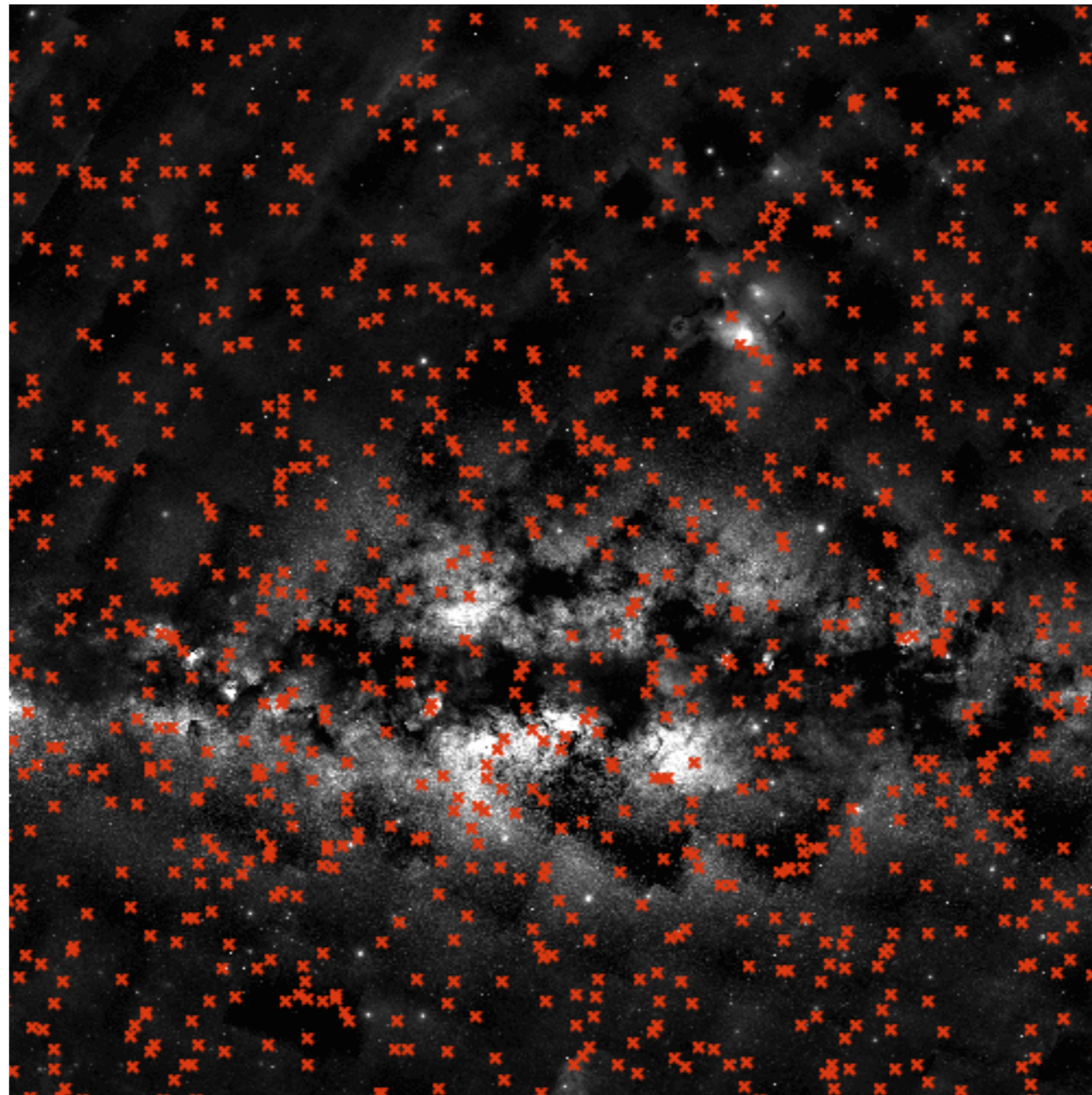
□ Gaia DR1 at CDS: HiPS catalogue

- HiPS progressive catalogue built from Gaia data
<http://cds.unistra.fr/Gaia/DR1/AL-visualisation.gml>



□ Gaia DR1 at CDS: HiPS catalogue

- HiPS progressive catalogue built from Gaia data
<http://cds.unistra.fr/Gaia/DR1/AL-visualisation.gml>





VO access to Gaia data:
the good, the bad, the ugly

□ VO access to Gaia: the good

- Data available through numerous services
- Services do work fine
- Same column names in all TAP services
 - user-friendly
 - allows for easy re-launch of the same query on different services

□ VO access to Gaia: the ugly

- Poor metadata describing output FIELDS
 - no UCD
 - no unit
- non-standard non-parseable units

□ VO access to Gaia: the ugly

- Poor metadata describing output FIELDS

- no UCD

- no unit

- non-standard non-parseable units

`unit="Angle[deg]"`

`unit="Time[Julian Years]"`

□ VO access to Gaia: the ugly

- Poor metadata describing output FIELDS

- no UCD

- no unit

`unit="Angle[deg]"`

- non-standard non-parseable units

`unit="Time[Julian Years]"`

- Unit parser/validator:

<http://www.astro.gla.ac.uk/users/norman/ivoa/unity/>

- UCD tools:

<http://cds.unistra.fr/UCD/tools.htx>

□ VO access to Gaia: the bad

- (Lack of) definition of coordinate system in VOTable output
- examples
 - no description at all
 - inaccurate description
 - accurate description

□ No description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  ▼<TABLE>
    <FIELD name="ra" datatype="double" unit="deg" />
    <FIELD name="dec" datatype="double" unit="deg" />
    <FIELD name="solution_id" datatype="long" />
    <FIELD name="source_id" datatype="long" />
    <FIELD name="random_index" datatype="long" />
    <FIELD name="ref_epoch" datatype="double" unit="Julian Years" />
    <FIELD name="ra_error" datatype="double" unit="mas" />
    <FIELD name="dec_error" datatype="double" unit="mas" />
    <FIELD name="parallax" datatype="double" unit="mas" />
    <FIELD name="parallax_error" datatype="double" unit="mas" />
    <FIELD name="pmra" datatype="double" unit="mas/year" />
    <FIELD name="pmra_error" datatype="double" unit="mas/year" />
    <FIELD name="pmdec" datatype="double" unit="mas/year" />
    <FIELD name="pmdec_error" datatype="double" unit="mas/year" />
```

□ No description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  ▼<TABLE>
    <FIELD name="ra" datatype="double" unit="deg" />
    <FIELD name="dec" datatype="double" unit="deg" />
    <FIELD name="solution_id" datatype="long" />
    <FIELD name="source_id" datatype="long" />
    <FIELD name="random_index" datatype="long" />
    <FIELD name="ref_epoch" datatype="double" unit="Julian Years" />
    <FIELD name="ra_error" datatype="double" unit="mas" />
    <FIELD name="dec_error" datatype="double" unit="mas" />
    <FIELD name="parallax" datatype="double" unit="mas" />
    <FIELD name="parallax_error" datatype="double" unit="mas" />
    <FIELD name="pmra" datatype="double" unit="mas/year" />
    <FIELD name="pmra_error" datatype="double" unit="mas/year" />
    <FIELD name="pmdec" datatype="double" unit="mas/year" />
    <FIELD name="pmdec_error" datatype="double" unit="mas/year" />
```

□ No description

Coordinate system?

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  ▼<TABLE>
    <FIELD name="ra" datatype="double" unit="deg" />
    <FIELD name="dec" datatype="double" unit="deg" />
    <FIELD name="solution_id" datatype="long" />
    <FIELD name="source_id" datatype="long" />
    <FIELD name="random_index" datatype="long" />
    <FIELD name="ref_epoch" datatype="double" unit="Julian Years" />
    <FIELD name="ra_error" datatype="double" unit="mas" />
    <FIELD name="dec_error" datatype="double" unit="mas" />
    <FIELD name="parallax" datatype="double" unit="mas" />
    <FIELD name="parallax_error" datatype="double" unit="mas" />
    <FIELD name="pmra" datatype="double" unit="mas/year" />
    <FIELD name="pmra_error" datatype="double" unit="mas/year" />
    <FIELD name="pmdec" datatype="double" unit="mas/year" />
    <FIELD name="pmdec_error" datatype="double" unit="mas/year" />
```


□ No description

Coordinate system?

Epoch?

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  ▼<TABLE>
    <FIELD name="ra" datatype="double" unit="deg" />
    <FIELD name="dec" datatype="double" unit="deg" />
    <FIELD name="solution_id" datatype="long" />
    <FIELD name="source_id" datatype="long" />
    <FIELD name="random_index" datatype="long" />
    <FIELD name="ref_epoch" datatype="double" unit="Julian Years" />
    <FIELD name="ra_error" datatype="double" unit="mas" />
    <FIELD name="dec_error" datatype="double" unit="mas" />
    <FIELD name="parallax" datatype="double" unit="mas" />
    <FIELD name="parallax_error" datatype="double" unit="mas" />
    <FIELD name="pmra" datatype="double" unit="mas/year" />
    <FIELD name="pmra_error" datatype="double" unit="mas/year" />
    <FIELD name="pmdec" datatype="double" unit="mas/year" />
    <FIELD name="pmdec_error" datatype="double" unit="mas/year" />
```

□ Inaccurate description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK"/>
  <COOSYS ID="coosys_FK5_2015.0" system="eq_FK5" equinox="2000.0" epoch="2015.0"/>
  ▼<TABLE>
    ▼<FIELD ID="ra" name="ra" datatype="double" arraysize="1" ucd="pos.eq.ra;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      ▼<DESCRIPTION>
        Right ascension (ICRS) at epoch Epoch (ra)
      </DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="dec" name="dec" datatype="double" arraysize="1" ucd="pos.eq.dec;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      <DESCRIPTION>Declination (ICRS) at epoch Epoch (dec)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="solution_id" name="solution_id" datatype="long" arraysize="1" ucd="meta.id;meta.version">
      <DESCRIPTION>Solution ID (solution_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="source_id" name="source_id" datatype="long" arraysize="1" ucd="meta.id;meta.main">
      <DESCRIPTION>Source ID (source_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="random_index" name="random_index" datatype="int" arraysize="1" ucd="meta.code">
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="ref_epoch" name="ref_epoch" datatype="double" arraysize="1" ucd="meta.ref;time.epoch" unit="s">
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
```

□ Inaccurate description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  <COOSYS ID="coosys_FK5_2015.0" system="eq_FK5" equinox="2000.0" epoch="2015.0" />
▼<TABLE>
  ▼<FIELD ID="ra" name="ra" datatype="double" arraysize="1" ucd="pos.eq.ra;meta.main" unit="deg"
    ref="coosys_FK5_2015.0">
    ▼<DESCRIPTION>
      Right ascension (ICRS) at epoch Epoch (ra)
    </DESCRIPTION>
  </FIELD>
  ▼<FIELD ID="dec" name="dec" datatype="double" arraysize="1" ucd="pos.eq.dec;meta.main" unit="deg"
    ref="coosys_FK5_2015.0">
    <DESCRIPTION>Declination (ICRS) at epoch Epoch (dec)</DESCRIPTION>
  </FIELD>
  ▼<FIELD ID="solution_id" name="solution_id" datatype="long" arraysize="1" ucd="meta.id;meta.version">
    <DESCRIPTION>Solution ID (solution_id)</DESCRIPTION>
  </FIELD>
  ▼<FIELD ID="source_id" name="source_id" datatype="long" arraysize="1" ucd="meta.id;meta.main">
    <DESCRIPTION>Source ID (source_id)</DESCRIPTION>
  </FIELD>
  ▼<FIELD ID="random_index" name="random_index" datatype="int" arraysize="1" ucd="meta.code">
    ▶<DESCRIPTION>...</DESCRIPTION>
  </FIELD>
  ▼<FIELD ID="ref_epoch" name="ref_epoch" datatype="double" arraysize="1" ucd="meta.ref;time.epoch" unit="s">
    ▶<DESCRIPTION>...</DESCRIPTION>
  </FIELD>
```

□ Inaccurate description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  <COOSYS ID="coosys_FK5_2015.0" system="eq_FK5" equinox="2000.0" epoch="2015.0" />
  ▼<TABLE>
    ▼<FIELD ID="ra" name="ra" datatype="double" arraysize="1" ucd="pos.eq.ra;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      ▼<DESCRIPTION>
        Right ascension (ICRS) at epoch Epoch (ra)
      </DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="dec" name="dec" datatype="double" arraysize="1" ucd="pos.eq.dec;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      <DESCRIPTION>Declination (ICRS) at epoch Epoch (dec)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="solution_id" name="solution_id" datatype="long" arraysize="1" ucd="meta.id;meta.version">
      <DESCRIPTION>Solution ID (solution_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="source_id" name="source_id" datatype="long" arraysize="1" ucd="meta.id;meta.main">
      <DESCRIPTION>Source ID (source_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="random_index" name="random_index" datatype="int" arraysize="1" ucd="meta.code">
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="ref_epoch" name="ref_epoch" datatype="double" arraysize="1" ucd="meta.ref;time.epoch" unit="
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
```

□ Inaccurate description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  <COOSYS ID="coosys_FK5_2015.0" system="eq_FK5" equinox="2000.0" epoch="2015.0" />
  ▼<TABLE>
    ▼<FIELD ID="ra" name="ra" datatype="double" arraysize="1" ucd="pos.eq.ra;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      ▼<DESCRIPTION>
        Right ascension (ICRS) at epoch Epoch (ra)
      </DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="dec" name="dec" datatype="double" arraysize="1" ucd="pos.eq.dec;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      <DESCRIPTION>Declination (ICRS) at epoch Epoch (dec)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="solution_id" name="solution_id" datatype="long" arraysize="1" ucd="meta.id;meta.version">
      <DESCRIPTION>Solution ID (solution_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="source_id" name="source_id" datatype="long" arraysize="1" ucd="meta.id;meta.main">
      <DESCRIPTION>Source ID (source_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="random_index" name="random_index" datatype="int" arraysize="1" ucd="meta.code">
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="ref_epoch" name="ref_epoch" datatype="double" arraysize="1" ucd="meta.ref;time.epoch" unit="
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
```

□ Inaccurate description

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  <COOSYS ID="coosys_FK5_2015.0" system="eq_FK5" equinox="2000.0" epoch="2015.0" />
  ▼<TABLE>
    ▼<FIELD ID="ra" name="ra" datatype="double" arraysize="1" ucd="pos.eq.ra;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      ▼<DESCRIPTION>
        Right ascension (ICRS) at epoch Epoch (ra)
      </DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="dec" name="dec" datatype="double" arraysize="1" ucd="pos.eq.dec;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      <DESCRIPTION>Declination (ICRS) at epoch Epoch (dec)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="solution_id" name="solution_id" datatype="long" arraysize="1" ucd="meta.id;meta.version">
      <DESCRIPTION>Solution ID (solution_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="source_id" name="source_id" datatype="long" arraysize="1" ucd="meta.id;meta.main">
      <DESCRIPTION>Source ID (source_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="random_index" name="random_index" datatype="int" arraysize="1" ucd="meta.code">
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="ref_epoch" name="ref_epoch" datatype="double" arraysize="1" ucd="meta.ref;time.epoch" unit="
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
```

□ Inaccurate description

But Gaia positions are in ICRS!

```
▼<RESOURCE type="results">
  <INFO name="QUERY_STATUS" value="OK" />
  <COOSYS ID="coosys_FK5_2015.0" system="eq_FK5" equinox="2000.0" epoch="2015.0" />
  ▼<TABLE>
    ▼<FIELD ID="ra" name="ra" datatype="double" arraysize="1" ucd="pos.eq.ra;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      ▼<DESCRIPTION>
        Right ascension (ICRS) at epoch Epoch (ra)
      </DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="dec" name="dec" datatype="double" arraysize="1" ucd="pos.eq.dec;meta.main" unit="deg"
      ref="coosys_FK5_2015.0">
      <DESCRIPTION>Declination (ICRS) at epoch Epoch (dec)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="solution_id" name="solution_id" datatype="long" arraysize="1" ucd="meta.id;meta.version">
      <DESCRIPTION>Solution ID (solution_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="source_id" name="source_id" datatype="long" arraysize="1" ucd="meta.id;meta.main">
      <DESCRIPTION>Source ID (source_id)</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="random_index" name="random_index" datatype="int" arraysize="1" ucd="meta.code">
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
    ▼<FIELD ID="ref_epoch" name="ref_epoch" datatype="double" arraysize="1" ucd="meta.ref;time.epoch" unit="
      ▶<DESCRIPTION>...</DESCRIPTION>
    </FIELD>
```

□ Accurate description

```
▼<GROUP utype="stc:CatalogEntryLocation">
  <PARAM arraysize="*" datatype="char" name="CoordFlavor" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor" value="SPHERICAL"/>
  <PARAM arraysize="*" datatype="char" name="coord_naxes" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor.coord_naxes" value="3"/>
  <PARAM arraysize="*" datatype="char" name="CoordRefFrame" utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame" value="ICRS"/>
  <PARAM arraysize="*" datatype="char" name="ReferencePosition" utype="stc:AstroCoordSystem.SpaceFrame.ReferencePosition"
value="BARYCENTER"/>
  <PARAM arraysize="*" datatype="char" name="TimeScale" utype="stc:AstroCoordSystem.TimeFrame.TimeScale" value="TCB"/>
  <PARAM arraysize="*" datatype="char" name="C3" utype="stc:AstroCoords.Velocity3D.Value3.C3" value="0.0"/>
  <PARAM arraysize="*" datatype="char" name="URI" utype="stc:DataModel.URI" value="http://www.ivoa.net/xml/STC/stc-v1.30.xsd"/>
  <FIELDref ref="raj2000" utype="stc:AstroCoords.Position3D.Value3.C1"/>
  <FIELDref ref="dej2000" utype="stc:AstroCoords.Position3D.Value3.C2"/>
  <FIELDref ref="parallax" utype="stc:AstroCoords.Position3D.Value3.C3"/>
  <FIELDref ref="ref_epoch" utype="stc:AstroCoords.Time.TimeInstant"/>
  <FIELDref ref="pmra" utype="stc:AstroCoords.Velocity3D.Value3.C1"/>
  <FIELDref ref="pmdec" utype="stc:AstroCoords.Velocity3D.Value3.C2"/>
</GROUP>
▼<FIELD ID="source_id" datatype="long" name="source_id" ucd="meta.id;meta.main">
  <DESCRIPTION>Unique source identifier</DESCRIPTION>
  <VALUES null="-1"/>
</FIELD>
▼<FIELD ID="raj2000" datatype="double" name="raj2000" ucd="pos.eq.ra;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Right Ascension in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
▼<FIELD ID="dej2000" datatype="double" name="dej2000" ucd="pos.eq.dec;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Declination in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
```


□ Accurate description

```
▼<GROUP utype="stc:CatalogEntryLocation">
  <PARAM arraysize="*" datatype="char" name="CoordFlavor" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor" value="SPHERICAL"/>
  <PARAM arraysize="*" datatype="char" name="coord_naxes" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor.coord_naxes" value="3"/>
  <PARAM arraysize="*" datatype="char" name="CoordRefFrame" utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame" value="ICRS"/>
  <PARAM arraysize="*" datatype="char" name="ReferencePosition" utype="stc:AstroCoordSystem.SpaceFrame.ReferencePosition"
  value="BARYCENTER"/>
  <PARAM arraysize="*" datatype="char" name="TimeScale" utype="stc:AstroCoordSystem.TimeFrame.TimeScale" value="TCB"/>
  <PARAM arraysize="*" datatype="char" name="C3" utype="stc:AstroCoords.Velocity3D.Value3.C3" value="0.0"/>
  <PARAM arraysize="*" datatype="char" name="URI" utype="stc:DataModel.URI" value="http://www.ivoa.net/xml/STC/stc-v1.30.xsd"/>
  <FIELDref ref="raj2000" utype="stc:AstroCoords.Position3D.Value3.C1"/>
  <FIELDref ref="dej2000" utype="stc:AstroCoords.Position3D.Value3.C2"/>
  <FIELDref ref="parallax" utype="stc:AstroCoords.Position3D.Value3.C3"/>
  <FIELDref ref="ref_epoch" utype="stc:AstroCoords.Time.TimeInstant"/>
  <FIELDref ref="pmra" utype="stc:AstroCoords.Velocity3D.Value3.C1"/>
  <FIELDref ref="pmdec" utype="stc:AstroCoords.Velocity3D.Value3.C2"/>
</GROUP>
▼<FIELD ID="source_id" datatype="long" name="source_id" ucd="meta.id;meta.main">
  <DESCRIPTION>Unique source identifier</DESCRIPTION>
  <VALUES null="-1"/>
</FIELD>
▼<FIELD ID="raj2000" datatype="double" name="raj2000" ucd="pos.eq.ra;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Right Ascension in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
▼<FIELD ID="dej2000" datatype="double" name="dej2000" ucd="pos.eq.dec;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Declination in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
```

□ Accurate description

```
▼<GROUP utype="stc:CatalogEntryLocation">
  <PARAM arraysize="*" datatype="char" name="CoordFlavor" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor" value="SPHERICAL"/>
  <PARAM arraysize="*" datatype="char" name="coord_naxes" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor.coord_naxes" value="3"/>
  <PARAM arraysize="*" datatype="char" name="CoordRefFrame" utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame" value="ICRS"/>
  <PARAM arraysize="*" datatype="char" name="ReferencePosition" utype="stc:AstroCoordSystem.SpaceFrame.ReferencePosition" value="BARYCENTER"/>
  <PARAM arraysize="*" datatype="char" name="TimeScale" utype="stc:AstroCoordSystem.TimeFrame.TimeScale" value="TCB"/>
  <PARAM arraysize="*" datatype="char" name="C3" utype="stc:AstroCoords.Velocity3D.Value3.C3" value="0.0"/>
  <PARAM arraysize="*" datatype="char" name="URI" utype="stc:DataModel.URI" value="http://www.ivoa.net/xml/STC/stc-v1.30.xsd"/>
  <FIELDref ref="raj2000" utype="stc:AstroCoords.Position3D.Value3.C1"/>
  <FIELDref ref="dej2000" utype="stc:AstroCoords.Position3D.Value3.C2"/>
  <FIELDref ref="parallax" utype="stc:AstroCoords.Position3D.Value3.C3"/>
  <FIELDref ref="ref_epoch" utype="stc:AstroCoords.Time.TimeInstant"/>
  <FIELDref ref="pmra" utype="stc:AstroCoords.Velocity3D.Value3.C1"/>
  <FIELDref ref="pmdec" utype="stc:AstroCoords.Velocity3D.Value3.C2"/>
</GROUP>
▼<FIELD ID="source_id" datatype="long" name="source_id" ucd="meta.id;meta.main">
  <DESCRIPTION>Unique source identifier</DESCRIPTION>
  <VALUES null="-1"/>
</FIELD>
▼<FIELD ID="raj2000" datatype="double" name="raj2000" ucd="pos.eq.ra;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Right Ascension in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
▼<FIELD ID="dej2000" datatype="double" name="dej2000" ucd="pos.eq.dec;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Declination in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
```

□ Accurate description

```
▼<GROUP utype="stc:CatalogEntryLocation">
  <PARAM arraysize="*" datatype="char" name="CoordFlavor" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor" value="SPHERICAL"/>
  <PARAM arraysize="*" datatype="char" name="coord_naxes" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor.coord_naxes" value="3"/>
  <PARAM arraysize="*" datatype="char" name="CoordRefFrame" utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame" value="ICRS"/>
  <PARAM arraysize="*" datatype="char" name="ReferencePosition" utype="stc:AstroCoordSystem.SpaceFrame.ReferencePosition" value="BARYCENTER"/>
  <PARAM arraysize="*" datatype="char" name="TimeScale" utype="stc:AstroCoordSystem.TimeFrame.TimeScale" value="TCB"/>
  <PARAM arraysize="*" datatype="char" name="C3" utype="stc:AstroCoords.Velocity3D.Value3.C3" value="0.0"/>
  <PARAM arraysize="*" datatype="char" name="URI" utype="stc:DataModel.URI" value="http://www.ivoa.net/xml/STC/stc-v1.30.xsd"/>
  <FIELDref ref="raj2000" utype="stc:AstroCoords.Position3D.Value3.C1"/>
  <FIELDref ref="dej2000" utype="stc:AstroCoords.Position3D.Value3.C2"/>
  <FIELDref ref="parallax" utype="stc:AstroCoords.Position3D.Value3.C3"/>
  <FIELDref ref="ref_epoch" utype="stc:AstroCoords.Time.TimeInstant"/>
  <FIELDref ref="pmra" utype="stc:AstroCoords.Velocity3D.Value3.C1"/>
  <FIELDref ref="pmdec" utype="stc:AstroCoords.Velocity3D.Value3.C2"/>
</GROUP>
▼<FIELD ID="source_id" datatype="long" name="source_id" ucd="meta.id;meta.main">
  <DESCRIPTION>Unique source identifier</DESCRIPTION>
  <VALUES null="-1"/>
</FIELD>
▼<FIELD ID="raj2000" datatype="double" name="raj2000" ucd="pos.eq.ra;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Right Ascension in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
▼<FIELD ID="dej2000" datatype="double" name="dej2000" ucd="pos.eq.dec;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Declination in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
```

□ Accurate description

Based on *Referencing STC in VOTable* note v2.0

```
▼<GROUP utype="stc:CatalogEntryLocation">
  <PARAM arraysize="*" datatype="char" name="CoordFlavor" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor" value="SPHERICAL"/>
  <PARAM arraysize="*" datatype="char" name="coord_naxes" utype="stc:AstroCoordSystem.SpaceFrame.CoordFlavor.coord_naxes" value="3"/>
  <PARAM arraysize="*" datatype="char" name="CoordRefFrame" utype="stc:AstroCoordSystem.SpaceFrame.CoordRefFrame" value="ICRS"/>
  <PARAM arraysize="*" datatype="char" name="ReferencePosition" utype="stc:AstroCoordSystem.SpaceFrame.ReferencePosition" value="BARYCENTER"/>
  <PARAM arraysize="*" datatype="char" name="TimeScale" utype="stc:AstroCoordSystem.TimeFrame.TimeScale" value="TCB"/>
  <PARAM arraysize="*" datatype="char" name="C3" utype="stc:AstroCoords.Velocity3D.Value3.C3" value="0.0"/>
  <PARAM arraysize="*" datatype="char" name="URI" utype="stc:DataModel.URI" value="http://www.ivoa.net/xml/STC/stc-v1.30.xsd"/>
  <FIELDref ref="raj2000" utype="stc:AstroCoords.Position3D.Value3.C1"/>
  <FIELDref ref="dej2000" utype="stc:AstroCoords.Position3D.Value3.C2"/>
  <FIELDref ref="parallax" utype="stc:AstroCoords.Position3D.Value3.C3"/>
  <FIELDref ref="ref_epoch" utype="stc:AstroCoords.Time.TimeInstant"/>
  <FIELDref ref="pmra" utype="stc:AstroCoords.Velocity3D.Value3.C1"/>
  <FIELDref ref="pmdec" utype="stc:AstroCoords.Velocity3D.Value3.C2"/>
</GROUP>
▼<FIELD ID="source_id" datatype="long" name="source_id" ucd="meta.id;meta.main">
  <DESCRIPTION>Unique source identifier</DESCRIPTION>
  <VALUES null="-1"/>
</FIELD>
▼<FIELD ID="raj2000" datatype="double" name="raj2000" ucd="pos.eq.ra;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Right Ascension in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
▼<FIELD ID="dej2000" datatype="double" name="dej2000" ucd="pos.eq.dec;meta.main" unit="deg">
  <DESCRIPTION>Barycentric Declination in ICRS at ref_epoch</DESCRIPTION>
</FIELD>
```

□ How to improve description of coordinates?

- In Banff (nov 2014):
 - only 1 service provider (out of 20 tested) was describing coordinates according to the *Referencing STC in VOTable* note
 - only 1 client was parsing the description as expected
 - suggestion to un-deprecate COOSYS as a temporary solution to increase number of services and clients supporting coordinates description/parsing
- COOSYS not enough, can't describe everything (*eg: different epoch for each source*)
- How shall we go on?