

# Gaia Services at ARI

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22<sup>nd</sup> November 2016

## 1 First glance

## 2 Data discovery

- Catalogue groups
- Catalogue description
- Column description
- Statistics, Histogram and Skymaps

## 3 Data access

- Single Source
- Cone Search
- TAP
- Services limits

## 4 Alive services

<http://gaia.ari.uni-heidelberg.de/>



## ARI's Gaia Services

- Home
- Data & Statistics
- Single Source Search
- Cone Search
- TAP
- FAQ
- News

### Welcome!

The Gaia team at ARI proudly presents you its online services to access the Gaia catalogue. On this website you will find information and a simple web form for each of the provided services.

Below you will find a short description of all the available services. It should help you to understand their purposes and guide you toward the best service(s) for your needs.

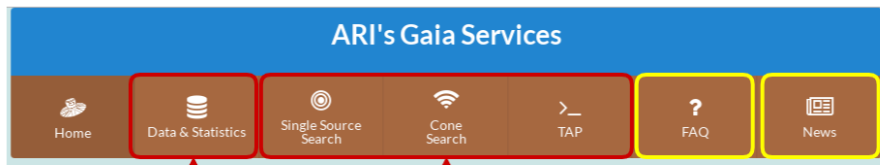
Most of them are based on IVOA standards and thus are compatible with famous VO clients like  TOPCAT and  Aladin.

**Acknowledgement and citation of Gaia DR1**  
If you use public Gaia DR1 data in your paper, please take note of our guide on how to [acknowledge and cite Gaia DR1](#).

**Gaia DR1 download**  
You can download any Gaia DR1 table from the [ESAC's CDN service](#).

# I - First glance

`http://gaia.ari.uni-heidelberg.de/`



**II - Data discovery**

**III - Data access**



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### Available TAP tables

Q Search columns with human words... Reset


- ▶ **gaiadr1** (8 tables) -
- ▶ **extcat** (4 tables) - *Some well-known catalogs imported into this TAP service for crossmatch purpose.*
- ▶ **rehearsal** (2 tables) - *The most recent Gaia rehearsal data. The used data model (v18.3.0) is the closest as possible to the data m...*
- ▶ **gog** (1 tables) -

Catalogues organized in 4 categories (or directories):

- **gaiadr1**: First release of the Gaia catalogue
- **extcat**: For external catalogues
- rehearsal
- gog

# IIb - Catalogue description

- name
- size (number of rows/sources + number of available columns/information)
- description

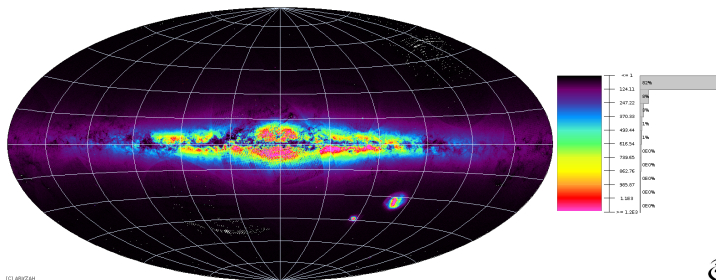
▼  **tgas\_source** (2,057,111 rows x 59 columns)

 [Expand density map](#)

This table is a 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 1. This is possible because the early Hipparcos epoch positions break some degeneracies due to the limited Gaia time coverage. This table contains a substantial fraction of the around 2.5 million stars in the Hipparcos and Tycho-2 catalogue. Many stars have been excluded due to several reasons, such as saturation, cross-match errors or bad astrometric solution.

# IIb - Catalogue description

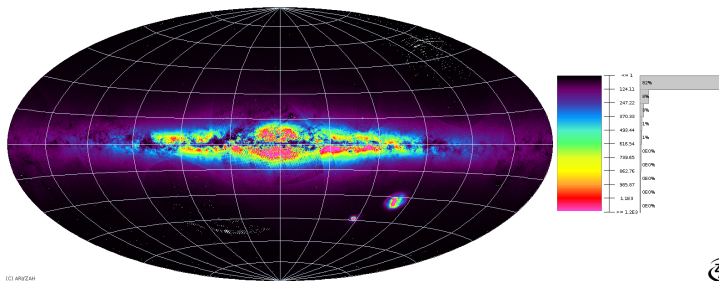
- name
- size (number of rows/sources + number of available columns/information)
- description
- density map (as image, but also as a source file displayable interactively by Aladin)





# IIb - Catalogue description

- name
- size (number of rows/sources + number of available columns/information)
- description
- density map (as image, but also as a source file displayable interactively by Aladin)
- list of all columns available



# Ilc - Column description

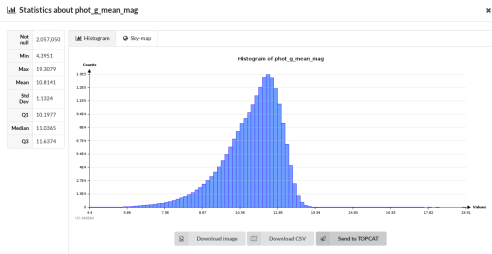
- name
- unit
- type
- short AND long description
- UCD (only for VO clients like TOPCAT and Aladin)
- indexed (faster when a constraint is set on it)
- ...

**ra (in deg)**  
DOUBLE  
Right ascension  
[Longer description?](#)

Barycentric right ascension  $\alpha$  of the source in ICRS at the reference epoch ref\_epoch

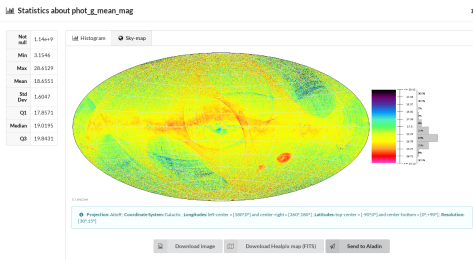
pos.eq.ra;meta.main 

# IId - Statistics, Histogram and Skymaps



- Basic statistical information: *min*, *max*, *mean*, *standard deviation*, *quartiles*, *filling* (count of not NULL values)
- An histogram (as image, but also as a source file allowing an easy reproduction and manipulation)

# IId - Statistics, Histogram and Skymaps



- Basic statistical information: *min, max, mean, standard deviation, quartiles, filling (count of not NULL values)*
- An histogram (as image, but also as a source file allowing an easy reproduction and manipulation)
- A so-called skymap (as image, but also as a source file displayable interactively in Aladin)

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Search by:

- Gaia source ID
- object name
- position
- file

On:

- Gaia (gaia\_source)
- TGAS (tgas\_source)

***Usable ONLY on the Web page of the ARI's Gaia services ; this is not a VO service.***

## Closest source (545.47" ⓘ)

source_id	381269022869555968
ra	10.840210972° +/- 0.32 mas
dec	41.365278748° +/- 0.11 mas
l	121.303428863°
b	-21.480930379°
ecl_lon	28.026816727°
ecl_lat	33.379270699°
parallax	0.93 mas +/- 0.28 mas
pmra	1.92 mas/yr +/- 1.08 mas/yr
pmdec	-7.17 mas/yr +/- 0.31 mas/yr
phot_g_mean_mag	10.76 mag

Search by:

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On:

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20 other candidates



- Input: Position + radius
- Output: VOTable containing all sources inside the specified cone

*Usable on the Web page and  
TOPCAT.*

The screenshot shows the 'Cone Search' web interface. At the top, it says 'Cone Search (on TGAS)' and has a 'SAMP' button. Below this, there are two main input sections separated by an 'OR' label. The first section is 'Object name' with a text input field and a 'VizieR' logo. The second section is 'Position (ICRS epoch=2015)' with two sub-inputs: 'RA in degrees or HMS' and 'DEC in degrees or DMS'. Below these is a 'Radius:' section with a dropdown menu showing '1'. There is also a 'How many columns?' section with a slider. At the bottom, there is a 'Download' button and a 'Reset' button. A small note at the bottom of the form reads: 'Common information (position, position proper motion, magnitude and error)'.



- Input: Position + radius
- Output: VOTable containing all sources inside the specified cone

*Usable on the Web page and  
TOPCAT.*

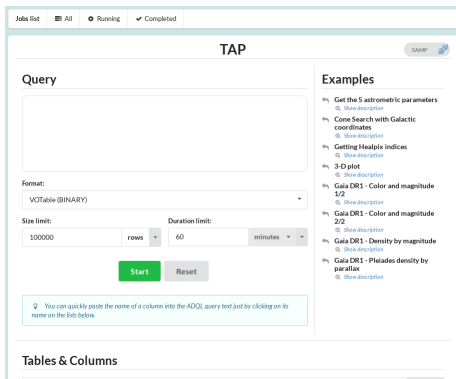
The screenshot shows the 'Cone Search' application window. The 'Available Cone Services' section is active, displaying a search for 'ari gaia' in the 'RegTAP' registry. The search results table is as follows:

Short Name	Title	Subjects	Identifier
ARI-Gaia	ARI's Gaia Cone Search Service	Gaia	ivo://uni-heidelberg.de/gaia/co
ARI-Gaia	ARI's TGAS Cone Search Service	TGAS	ivo://uni-heidelberg.de/tgas/co

Below the table, the 'AccessURL', 'Description', and 'Version' fields are visible. The 'Resource Count' is 2. The 'Cone Parameters' section shows the 'Cone URL' as 'http://gaia.ari.uni-heidelberg.de/cone/tgas?'. The search parameters are: Object Name (empty), RA (empty degrees, 12000), Dec (empty degrees, 12000), Radius (empty degrees), and Verbosity (2 (normal)).

- Based on an interrogation language based on SQL: *ADQL* (Astronomical Data Query Language)
- Very long queries are possible through the asynchronous mode
- **UPLOAD** capability
- List of query examples

*Usable on the Web page, TOPCAT and any other TAP client (e.g. TAPHandle, PyVO).*



The screenshot displays the TAP web interface. At the top, there are tabs for 'Jobs list', 'All', 'Running', and 'Completed'. The main heading is 'TAP' with a 'SAMP' button. Below this is a 'Query' section with a large text input area. Underneath the input area, there are settings for 'Format:' (set to 'VOTable (BINARY)'), 'Size limit:' (set to '100000' rows), and 'Duration limit:' (set to '60' minutes). There are 'Start' and 'Reset' buttons. A tip box below the buttons says: 'You can quickly paste the name of a column into the ADQL query text just by clicking on its name on the jobs below.' To the right, there is an 'Examples' section with a list of query examples, each with a 'show description' link. The examples include: 'Get the 5 astrometric parameters', 'Cone Search with Galactic coordinates', 'Getting Healpix indices', '3-D plot', 'Gaia DR1 - Color and magnitude 1/2', 'Gaia DR1 - Color and magnitude 2/2', 'Gaia DR1 - Density by magnitude', and 'Gaia DR1 - Ptolemaes density by parallax'.

- Based on an interrogation language based on SQL: **ADQL** (Astronomical Data Query Language)
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The screenshot shows the 'Table Access Protocol (TAP) Query' window. It features a 'Metadata' section with a tree view of tables and a table of columns. Below this is the 'Service Capabilities' section, including 'Query Language: ADQL-2.0', 'Max Rows: 100000 (default)', and 'Uploads: 1000krow'. The 'ADQL Text' section contains a query: `SELECT TOP 50000 gaia.source_id, gaia.hip, gaia.phot_g_mean_mag*5*log10(gaia.parallax)-10 AS g_sag_abs_gaia, gaia.phot_g_mean_mag*5*log10(hip.plx)-10 AS g_sag_abs_hip, hip.b_v`. The status bar at the bottom indicates 'Service-Provided 5/8: Gaia DR1 - Color and magnitude 1/2'.

Service	Schema	Table	Columns	FKeys	Hints
gaia	gaia	source_id	BIGINT	✓	Unique source i
gaia	gaia	ra	DOUBLE	✓	Right ascension
gaia	gaia	dec	DOUBLE	✓	Declination
gaia	gaia	l	DOUBLE	✓	Galactic longit
gaia	gaia	b	DOUBLE	✓	Galactic latitud
gaia	gaia	ecl_lon	DOUBLE	✓	Ecliptic longit
gaia	gaia	ecl_lat	DOUBLE	✓	Ecliptic latitud
gaia	gaia	parallax	DOUBLE	✓	Parallax
gaia	gaia	pmra	DOUBLE	✓	Proper motion in
gaia	gaia	pmdec	DOUBLE	✓	Proper motion in
gaia	gaia	phot_g_mean_mag	DOUBLE	✓	G-band mean m
gaia	gaia	ref_epoch	DOUBLE	✓	Reference epoch

## IIIId - Services limits

	<b>Output formats</b>	<b>Output size</b>	<b>Execution duration</b>	<b>Upload limit</b>
<b>Single Source</b>	VOTable, CSV, JSON + SAMP	20	-	-
<b>Cone Search</b>	VOTable + SAMP	10,000,000.	-	-
<b>TAP</b>	VOTable, FITS, CSV, TSV, JSON, HTML + SAMP	100,000 (default) 10,000,000 (max)	1 hour (default) 4 hours (max)	1,000,000

These services are "alive": we are making them evolve in function of their usage AND mostly of YOUR feedback.

The help section is far from being complete. So do not hesitate to complain about missing information.

In case you have question, I will be here for this whole workshop but also by email at the following address:

**[gmantele@ari.uni-heidelberg.de](mailto:gmantele@ari.uni-heidelberg.de)**