

gaia

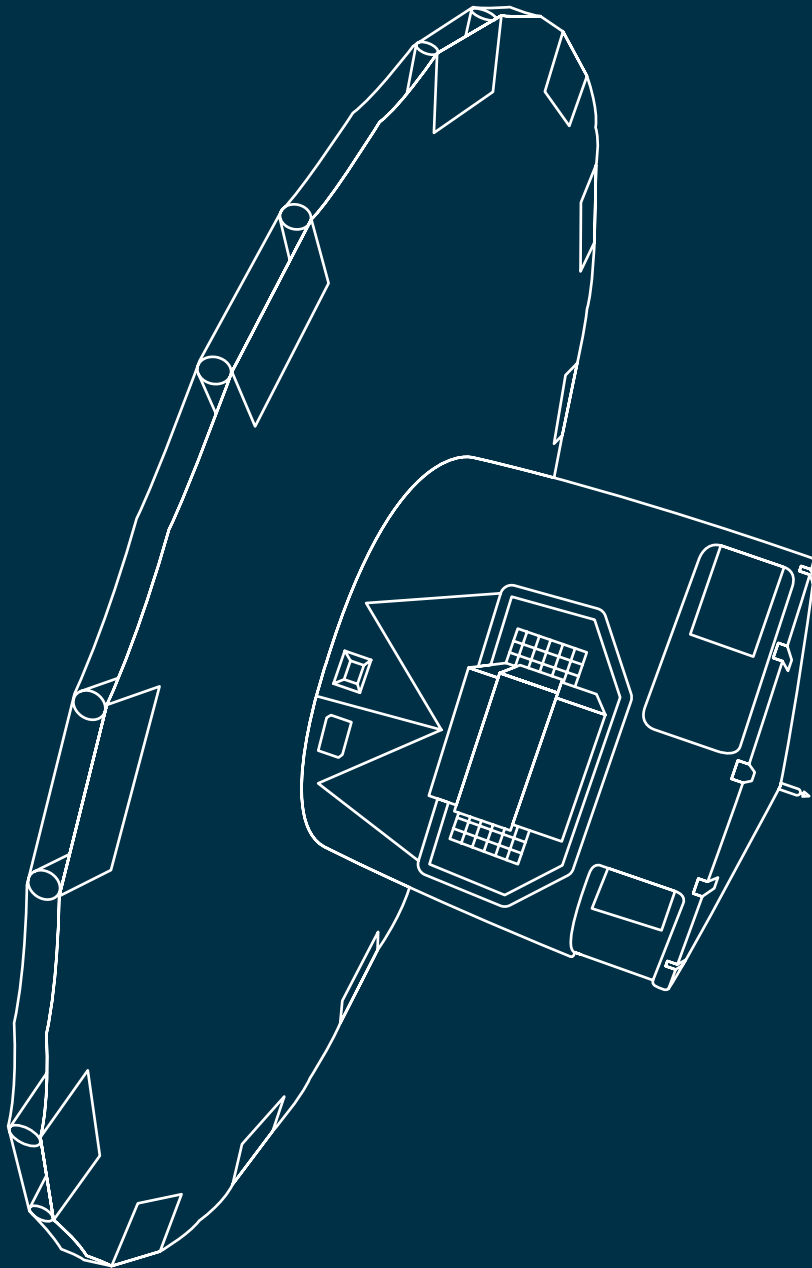
# MEDIA KIT

Data release 3



EN





**GAIA DATA RELEASE 3** →

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## REVOLUTIONISING OUR UNDERSTANDING OF THE MILKY WAY

Gaia is ESA's mission to create the most accurate and complete multi-dimensional map of our galaxy, the Milky Way. This map will contain the position, speed and direction of motion, brightness, temperature, and composition of almost two billion objects in our galaxy and beyond. This information allows astronomers to reconstruct the galaxy's past and future evolution over billions of years.

Since Gaia launched in 2013, data sets were released in 2016 and 2018 and a subset of the third data set in 2020. These data releases contained stellar positions, distances, motions across the sky, and colour information, among others.

On 13 June 2022, Gaia will release its third full data set, which will contain yet more and improved information about almost 2 billion sources: mostly stars, and a subset of Solar System objects and extragalactic sources. These data were collected between 25 July 2014 and 28 May 2017.

New in this data set are spectra for a significant number of objects, which can be used to determine accurate luminosities, temperatures, masses, and chemical compositions.

This release also includes radial velocities for 33 million stars, a five time increase as compared to data release 2. Radial velocity is the speed by which objects are moving away from or towards us – providing the third velocity dimension in the Gaia map of our galaxy.

Also new in this data set is the largest catalogue yet of binary stars in the Milky Way, which is crucial to understand stellar evolution.

Additionally, this release includes information about stars that change brightness over time, Solar System objects such as asteroids and planetary moons, and galaxies and quasars outside the Milky Way.

## WHAT DATA WILL BE RELEASED?

In December 2020, Gaia's early data release 3 brought us the largest and most accurate astrometric and photometric survey to date.

The full data release 3 will be made public on 13 June 2022 and it will contain:

- Largest ever low resolution spectroscopy survey
- Largest ever radial velocity survey
- Largest ever collection of astrophysical data for stars in the Milky Way
- For many classes of variable stars: largest survey ever
- Binary star survey that surpasses all the work on binary stars from the past two centuries
- Highest accuracy survey of asteroids combining their compositions with their orbits
- First space-based all-sky survey of quasars and of the shape of galaxies in the local Universe
- Andromeda Galaxy photometric survey

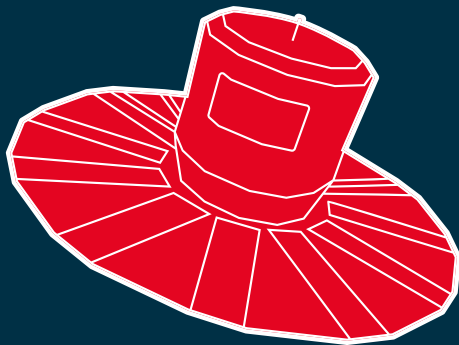
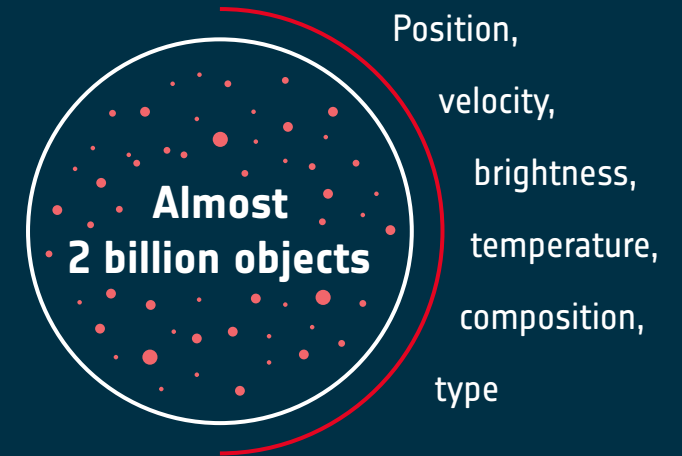
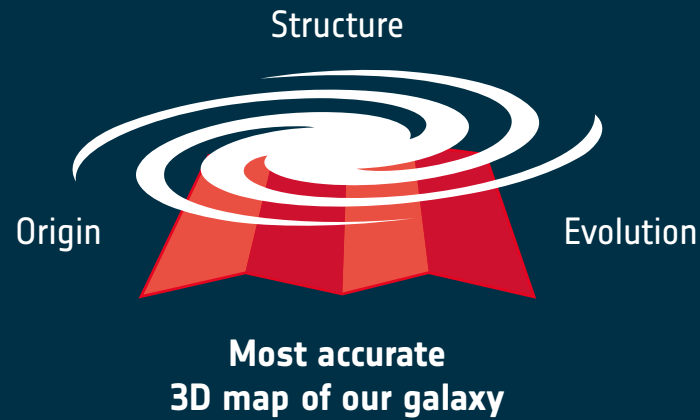
[Click here for details on how to follow the events on 13 June 2022.](#)



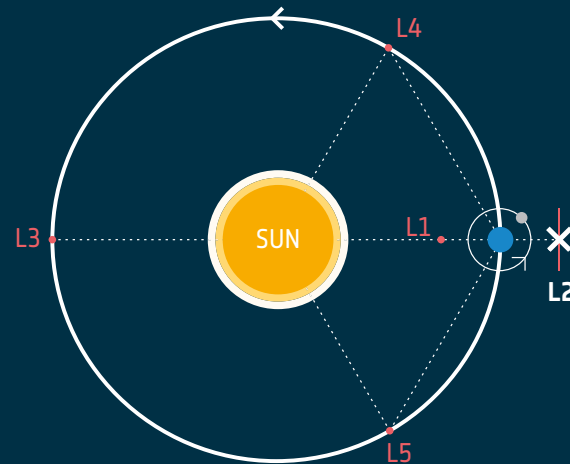
# WHAT IS GAIA?



European mission

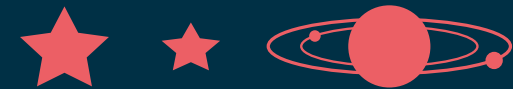


2 optical telescopes  
3 instruments  
1 billion pixel camera



In orbit around  
Lagrange point 2

## Inside our galaxy:



Stars, binary stars, exoplanets,  
interstellar medium, Solar System objects

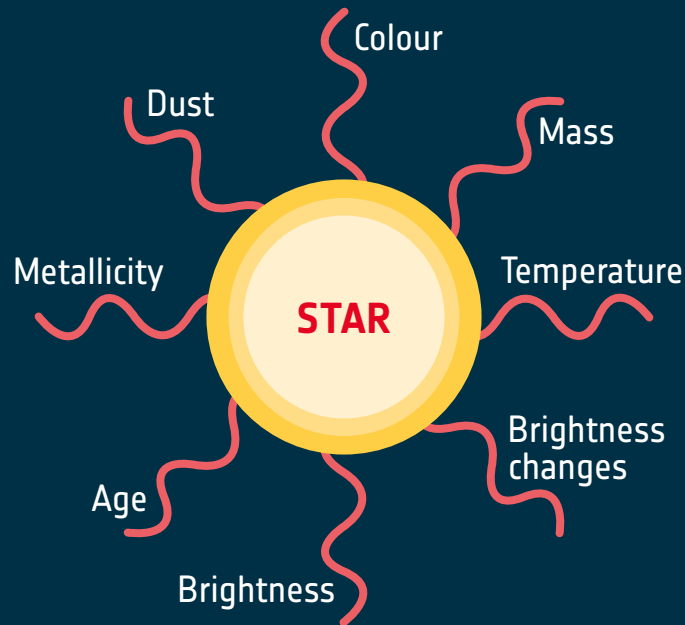
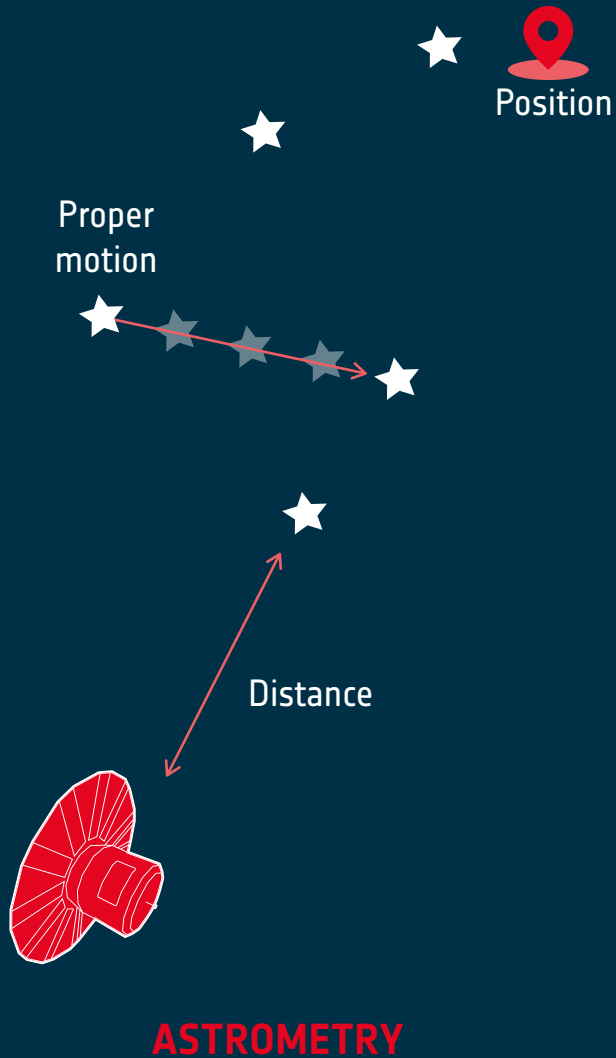
## Outside our galaxy:



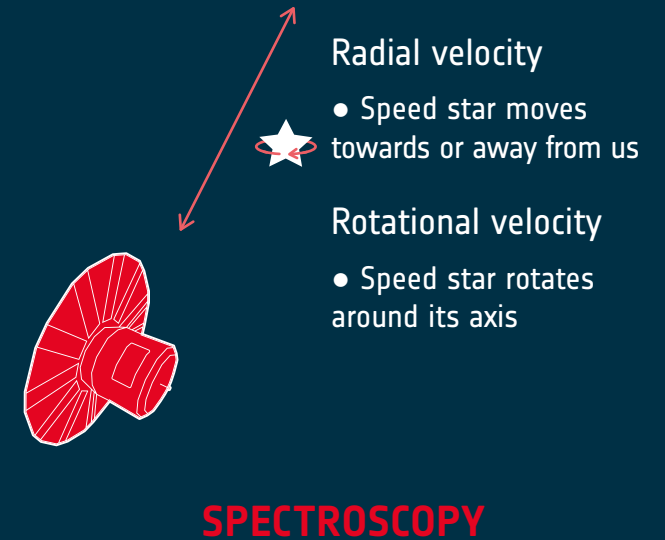
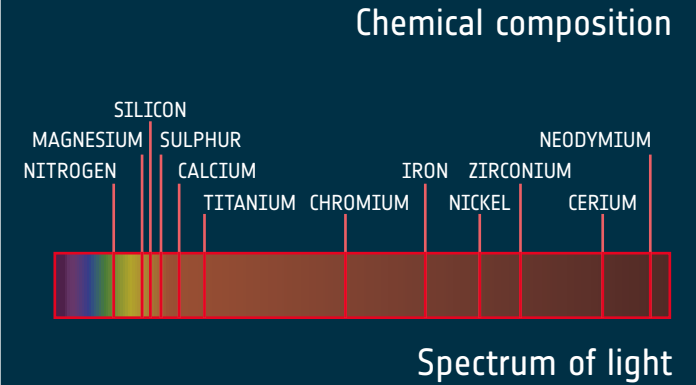
Quasars and other galaxies



Techniques to study the stars in our cosmic neighbourhood.

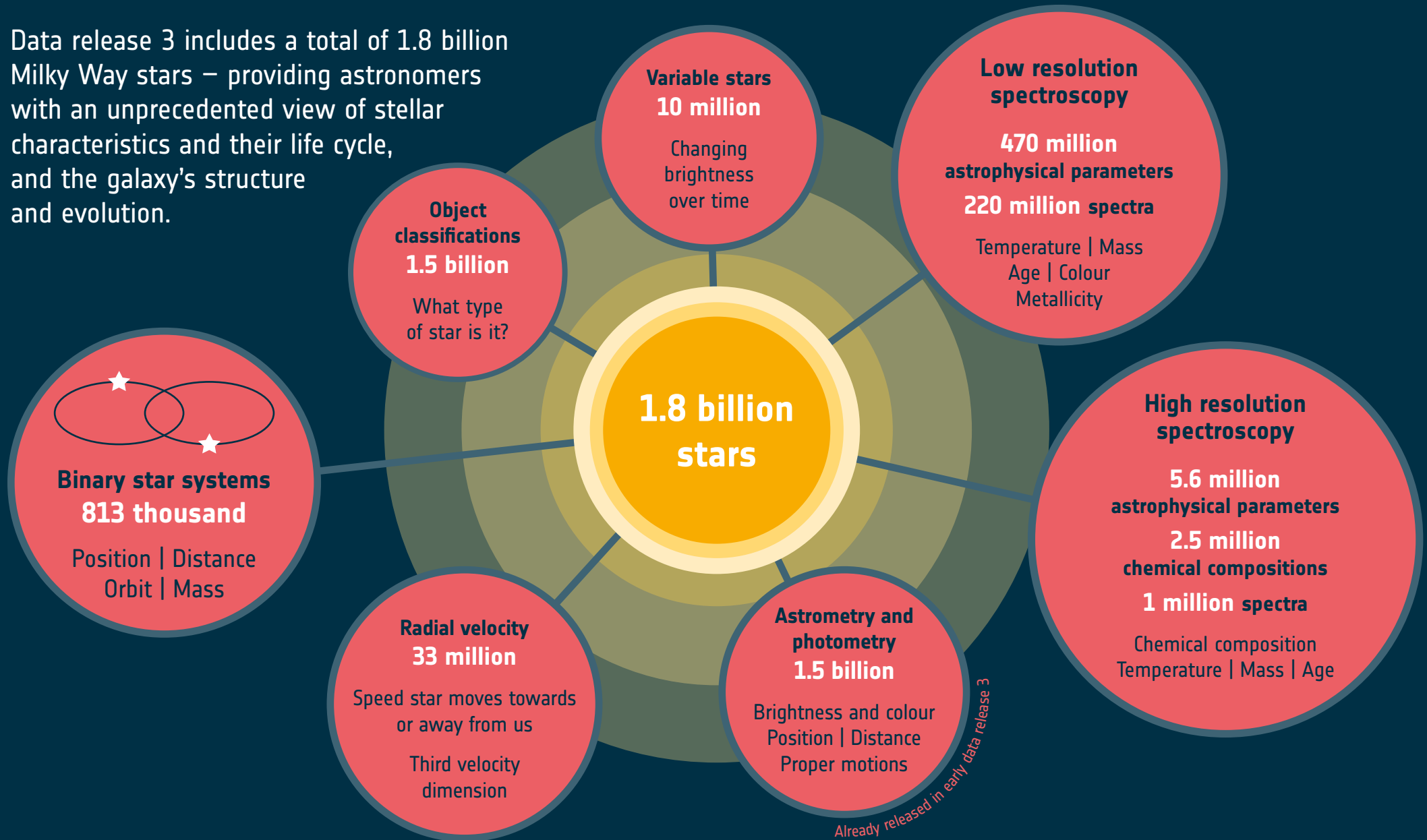


**PHOTOMETRY**





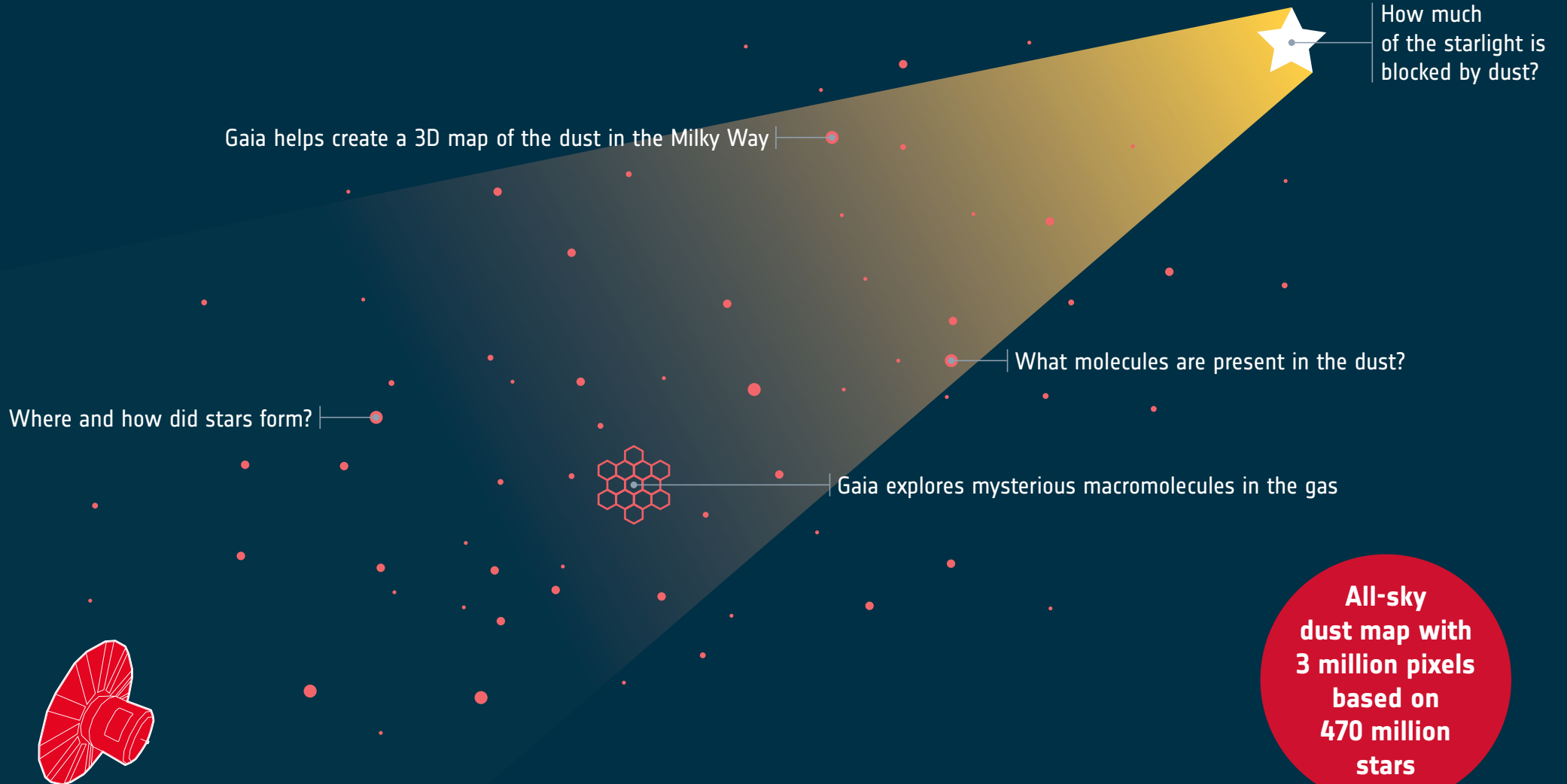
Data release 3 includes a total of 1.8 billion Milky Way stars – providing astronomers with an unprecedented view of stellar characteristics and their life cycle, and the galaxy's structure and evolution.



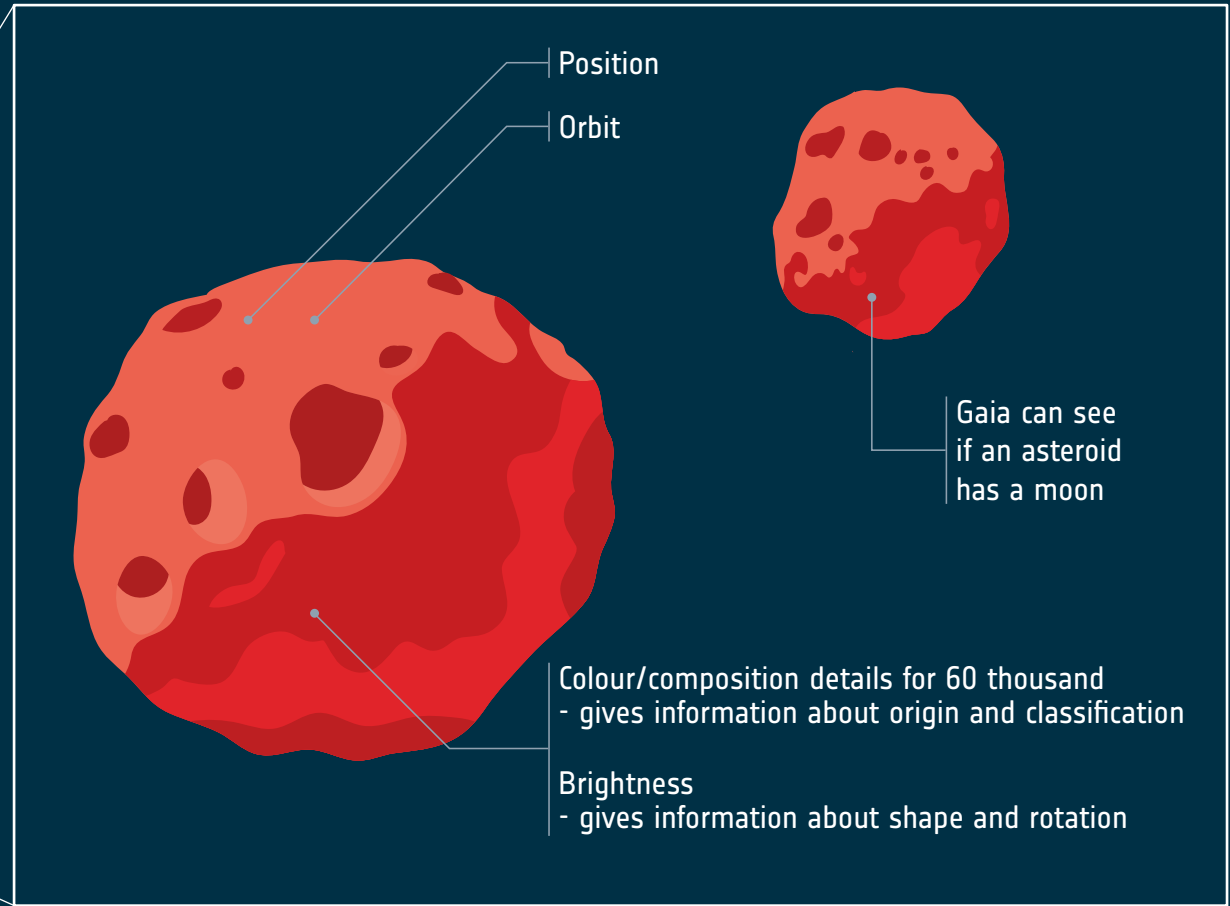
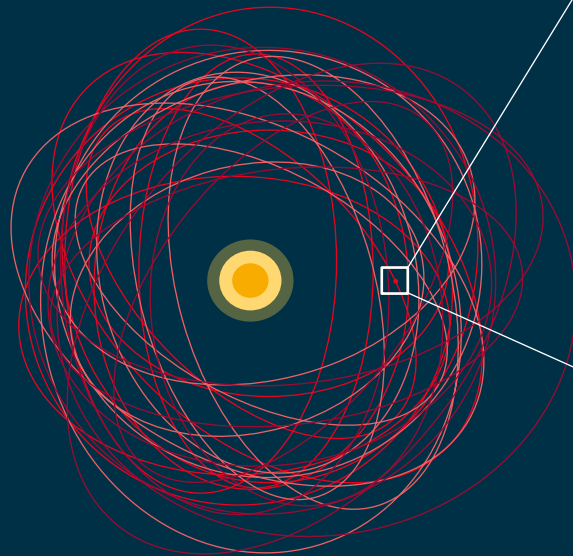
# WHAT'S IN BETWEEN STARS



ESA's Gaia not only maps the stars in our galaxy, but also what is in between the stars. This is called the interstellar medium, consisting mostly of dust and gas.



ESA's Gaia data release 3 is providing vital information about the Solar System's asteroid population, which is essential to investigate the origin of our Solar System.



## 156 thousand asteroids

Near-Earth asteroids | Main belt asteroids  
Mars crossers | Jupiter trojans  
Centaurs | Trans-Neptunian Objects

Additionally, Gaia observed:



31 moons of Mars, Jupiter, Saturn, Uranus and Neptune



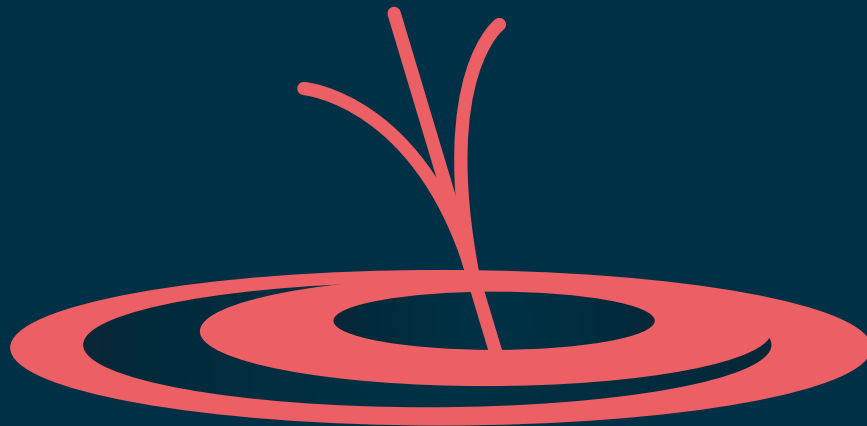
Unlike other missions that target specific objects, ESA's Gaia is a survey mission. This means that while surveying the entire sky multiple times, it is bound to see objects outside the Milky Way as well, such as quasars and other galaxies. Gaia's data release 3 provides astronomers with details on a few million extragalactic objects.

## 1.9 million quasars

Supermassive black holes accreting matter

Redshift | Brightness | Colour

Host galaxy detected for 60 thousand quasars



## 2.9 million galaxies

Brightness | Colour

Star formation history | Shape



**On 13 June 2022, about fifty scientific papers will be published of which nine are specifically dedicated to demonstrating the great potential of Gaia's new data.**

These nine performance verification papers are titled:

- Mapping the asymmetric disc of the Milky Way
- Pulsations in main-sequence OBAF stars as observed by Gaia
- Reflectance spectra of Solar System small bodies
- The galaxy in your preferred colours. Synthetic photometry from Gaia low-resolution spectra
- Stellar multiplicity, a teaser for the hidden treasure
- The extragalactic content
- Chemical cartography of the Milky Way
- Golden sample of astrophysical parameters
- Exploring and mapping the diffuse interstellar bands at 862 nm

**In the future, Gaia is expected to release even more accurate and additional data:**

- Full astrometric and photometric catalogues
- Radial velocity of fainter stars
- High-resolution spectra of 150 million stars
- All available variable stars and binary star systems
- Improved distances (parallaxes) and motions across the sky (proper motions)
- Improved source classifications (for example whether a star is hot or cold)
- Extended list of exoplanets
- Gravitationally lensed objects

All spokespeople can be reached  
via **ESA Media Relations**: [media@esa.int](mailto:media@esa.int)  
Flags represent spoken languages.

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## Antonella Vallenari

Gaia Consortium Deputy Chair  
Location: INAF, Italy



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Gaia operations manager at CNES  
Location: CNES, France



## Orlagh Creevey

Gaia Consortium lead on astrophysical parameters  
Location: Observatoire de la Côte d'Azur, France



## Paolo Tanga

Gaia Consortium lead on Solar System objects  
Location: Observatoire de la Côte d'Azur, France



Austria	Italy
Belgium	Poland
Croatia	Portugal
Czech Republic	Slovenia
Denmark	Spain
Finland	Sweden
France	Switzerland
Germany	The Netherlands
Greece	United Kingdom
Hungary	

With small contributions from:

Algeria, Brazil, Chile, China, Israel, USA,  
European Southern Observatory



## MEDIA SERVICES AND LIVE UPDATES

### Media briefing on ESA web TV

On 13 June 2022 from 10:00-11:00 CEST, ESA will host a live media briefing with Gaia experts on Gaia's data release 3.

At the same time, news articles will be published on ESA channels, describing results from the demonstration papers and new images and videos.

### Speakers:

Josef Aschbacher  
ESA Director General

Günther Hasinger  
ESA Director of Science

Timo Prusti  
ESA Gaia Project Scientist

Anthony Brown  
Gaia Consortium Chair  
Leiden University

Antonella Vallenari  
Gaia Consortium Deputy Chair  
Istituto Nazionale di Astrofisica (INAF)

Conny Aerts  
Author of Gaia performance verification paper  
KU Leuven



ESA Web TV: [esawebtv.esa.int](https://esawebtv.esa.int)



**Information for general public:** [esa.int/gaia](https://www.esa.int/gaia)

**In-depth information:**

<https://www.cosmos.esa.int/web/gaia/data-release-3>



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@ESAGaia

Hashtags: **#GaiaMission**

**#GaiaDR3**

**#GaiaScience**



Merchandise

**Local events will be organised throughout Europe.**

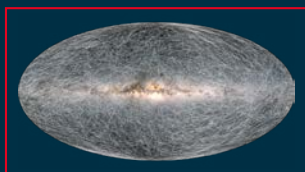
**Find the latest details here:** <https://www.cosmos.esa.int/web/gaia/dr3-events>



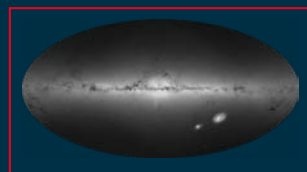
New images and videos will be released on 13 June 2022

The full library of Gaia images can be found [here](#) and videos [here](#).

## IMAGES



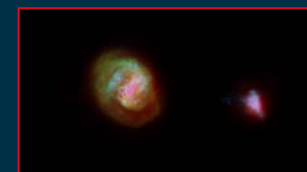
Stellar motion



Density of stars



Colour of the sky



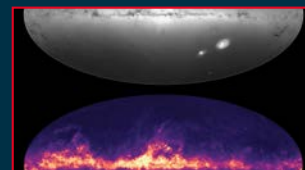
Magellanic Clouds



Milky Way's warp



Milky Way anatomy



Gaia all-sky views



ESA's fleet of cosmic observers

## VIDEOS



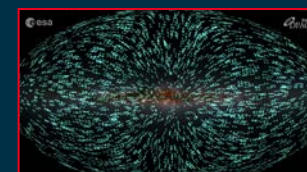
Gaia 3D spacecraft model



Orbits of nearby stars



Stellar motion



Solar system acceleration



Gaia astronomical revolution



Universe of Gaia



Gaia asteroid discoveries



Gaia scanning the sky



**WHAT IS GAIA?**

European mission

Structure: Origin, Evolution

Most accurate 3D map of our galaxy

Almost 2 billion objects: Position, velocity, brightness, temperature, composition, Type

Inside our galaxy: Maps stars, maps, measures, measures motion, Star system orbits

Outside our galaxy: Quasars and other galaxies

To orbit around Lagrange point 2

7 optical telescopes, 3 instruments, 1 billion pixel camera

WHAT IS GAIA?

**GAIA'S OBSERVING TECHNIQUES**

Techniques to study the stars in our cosmic neighbourhood.

Proper motion: Distance

ASTROMETRY

Star: Colour, Mass, Temperature, Brightness, Age

PHOTOMETRY

Spectrum of light: Chemical composition

Radial velocity: Speed star moves towards or away from us

Rotational velocity: How fast star rotates around its axis

SPECTROSCOPY

GAIA'S OBSERVING TECHNIQUES

**MILKY WAY STARS**

Data release 3 includes a total of 1.8 billion Milky Way stars - providing astronomers with an unprecedented view of stellar characteristics and their life cycle, and the galaxy's structure and evolution.

1.8 billion stars

- Stellar mass: 10 billion tonnes of stars in all
- Low resolution spectroscopy: 170 million individual parameters
- High resolution spectroscopy: 0.6 million individual parameters
- Stellar populations: 1 billion stars
- Stellar mass: 0.1 billion tonnes
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MILKY WAY STARS

**WHAT'S IN BETWEEN STARS**

ESA's Gaia not only maps the stars in our galaxy, but also what is in between the stars. This is called the interstellar medium, consisting mostly of dust and gas.

Gaia helps create a 3D map of the dust in the Milky Way

Where and how all stars form?

What molecules are present in the dust?

Gaia explores mysterious interstellar clouds in the gas

All sky dust map with 1 million pixels based on 1.8 billion stars

WHAT'S IN BETWEEN STARS

**SOLAR SYSTEM**

ESA's Gaia data release 3 is providing vital information about the Solar System's stellar population, which is essential to investigate the origin of our Solar System.

Position, Mass

How far star is from planet from a moon

Stellar composition details for 80 thousand stars: gives information about age and composition

Rotation: gives information about shape and rotation

Additionally, Gaia observed: 10 types of stars, planets, Saturn, Uranus and Neptune

150 thousand asteroids: Near-Earth asteroids | Main belt asteroids | Many comets | Outer trojans | Centaurs | Short-Periodic Objects

SOLAR SYSTEM

**OUTSIDE OUR GALAXY**

Unlike other missions that target specific objects, ESA's Gaia is a survey mission. This means that while surveying the entire sky multiple times, it is bound to see objects outside the Milky Way as well, such as quasars and other galaxies. Gaia's data release 3 provides astronomers with details on a few million extragalactic objects.

1.8 million sources: Supermassive black holes emitting matter | Redshift | Brightness | Colour | Host galaxy detected for 30 thousand quasars

0.6 million galaxies: Brightness | Colour | Star formation history | Shape

OUTSIDE OUR GALAXY

**GAIA DATA PROCESSING AND ANALYSIS CONSORTIUM**

- Austria
- Belgium
- Croatia
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Greece
- Hungary
- Italy
- Poland
- Portugal
- Slovenia
- Spain
- Sweden
- Switzerland
- The Netherlands
- United Kingdom

Other member organisations:

- Algeria, Brazil, Chile, China, Israel, USA

ESA, DPAC

GAIA DATA PROCESSING AND ANALYSIS CONSORTIUM



## THE EUROPEAN SPACE AGENCY

Established in 1975, ESA now has 22 Member States and cooperates with many others. These countries are home to more than 500 million European citizens. If you're one of them, then we're working for you.

Our mission is the peaceful exploration and use of space for the benefit of everyone. We watch over Earth, develop and launch inspiring and unique space projects, fly astronauts and push the boundaries of science and technology, seeking answers to the big questions about the Universe.

We are a family of scientists, engineers and business professionals from all over Europe, working together in a diverse and multinational environment.

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