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#238 MARCH 2025

Sky at Night

THE UK'S BEST-SELLING ASTRONOMY MAGAZINE

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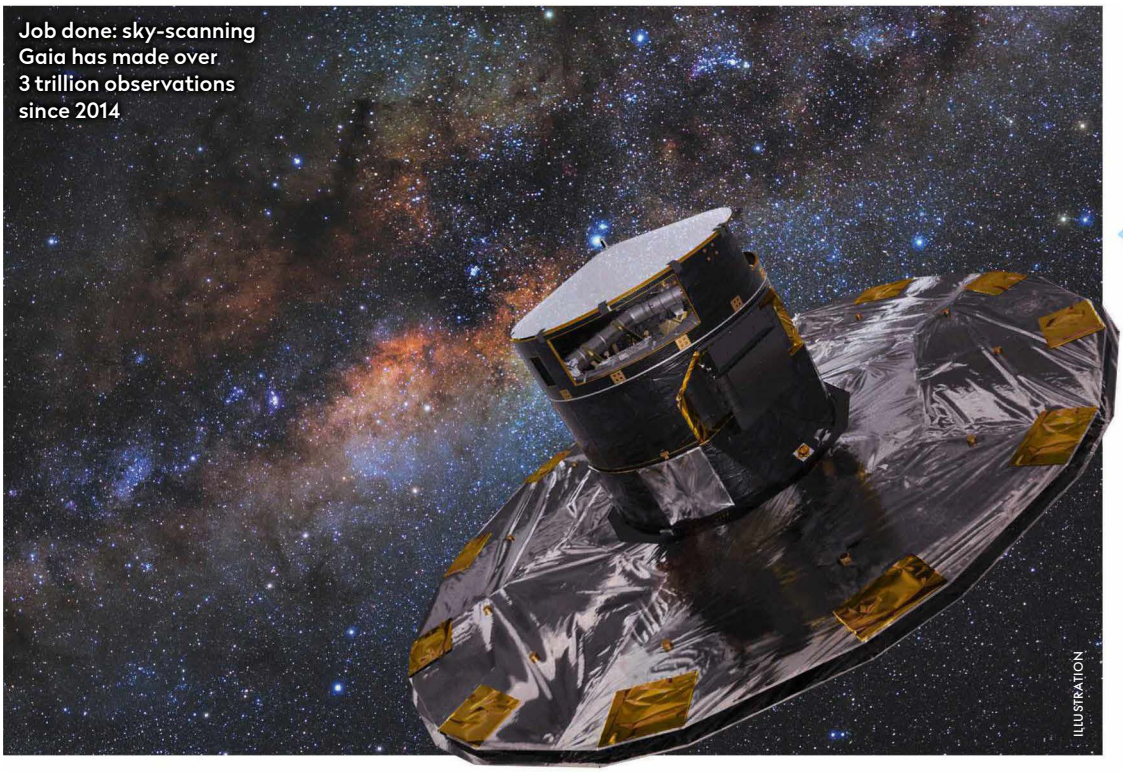
The latest astronomy and space news, written by Ezzy Pearson

BULLETIN



Job done: sky-scanning Gaia has made over 3 trillion observations since 2014

ILLUSTRATION

GAIA: ESA/ATG MEDIALAB/BACKGROUND: ESO/S. BRUNIER, ANDREAS PACK, COURTESY FACULTY OF SCIENCE RESEARCH TEAM

Gaia satellite sees its last stars

ESA's craft made the first 3D map of our Galaxy and tracked billions of stars

After spending over a decade mapping our Milky Way, the European Space Agency's Gaia satellite is now being put into retirement. The spacecraft has almost depleted its reserves of the cold nitrogen gas it uses to stay locked on target and will now be moved to a graveyard orbit.

Launched on 19 December 2013, Gaia has spent the last 11 years tracking the position, motion, brightness and other characteristics of over two billion stars. It has amassed some 142TB of data, creating the most detailed 3D models of our Galaxy ever made.

"Gaia has changed our impression of the Milky Way. Even basic ideas have been revised, such as the rotation of our Galaxy's central bar, the warp of the disc, the detailed structure of spiral arms, and interstellar dust near the Sun," says Stefan Payne-Wardenaar, scientific visualiser for the Haus der Astronomie, Germany.

"Still, the distant parts of the Milky Way remain educated guesses based on incomplete data. With further Gaia data releases, our view of the Milky Way will become even more accurate."

Over the next few weeks, the spacecraft will undertake several technology tests, revealing how the instruments have held up after a decade in space, allowing the data team to better calibrate its past measurements. Gaia was repositioned for these tests, temporarily increasing its magnitude, making the spacecraft bright enough to be seen in small amateur telescopes.

Eventually, Gaia will be moved out of its current position at Lagrange Point 2 – a gravitationally stable area of space 1.5 million km (900,000 miles) from the Sun – to prevent that orbit from becoming cluttered, before the craft is shut down on 27 March 2025.

This won't be the end for Gaia's data, however. ESA is planning to release a new data set in 2026, covering the first 5.5 years of its observations – the originally planned duration of the Gaia mission. The team hopes to make the full 11 years of data public by the end of the decade, meaning Gaia will still be revolutionising our view of the Galaxy for years to come. **www.esa.int**

Comment

by Chris Lintott

One of my favourite episodes of *The Sky at Night* covered 2018's second Gaia data release. We gave astronomers a few weeks to get to grips with the data, then stuck a camera in their faces and asked what they'd found.

Each exploded with enthusiasm; they told us about hints of the Milky Way's violent past, the stars that bounced through the Galaxy's disc and the remnants of a dwarf system which somehow acquired the most ridiculous name in all of astrophysics: the Gaia-Enceledus sausage.

Everyone said the same: that this was just the start; that the final data set would truly blow our minds. Gaia has given us the best map of the cosmos we've ever had. I can't wait to see its finished form.

Chris Lintott co-presents *The Sky at Night*