NASA

velocities measured by Gaia will be able to investigate which is right. The probe might even help to reveal whether dark matter killed the dinosaurs, as suggested by a theory from 2013.

DISPUTED STELLAR DISTANCES

Gaia will provide precise measurements of how far individual stars lie from the Sun.

One of the first groups of stars that researchers want to check is the Pleiades, a cluster in the constellation Taurus. Most observations, including one made with the Hubble Space Telescope, put the cluster about 135 parsecs (440 light years) away (D. R. Soderblom *et al. Astron. J.* **129,** 1616–1624; 2005). But results based on data from Hipparcos, an ESA space mission that preceded Gaia, suggest that it is only 120 parsecs away (F. Van Leeuwen *Astron. Astrophys.* **497,** 209–242; 2009).

The discrepancy cast some doubt on the Hipparcos result. Gaia uses a method that is similar to, but much more evolved than, that of the earlier mission, so astronomers will be watching it closely.

NEW WORLDS

Astronomers have discovered thousands of planets orbiting other stars, mostly by detecting tiny dips in a star's brightness when an orbiting planet passes in front of it. Gaia will instead seek planets by looking for slight wobbles in the star's position caused by a planet's gravitational pull.

Gaia's technique is best suited to detecting large planets in relatively wide orbits, says Alessandro Sozzetti, a Gaia researcher at the Astrophysical Observatory of Turin in Italy. And unlike the more common transit method, it directly measures a planet's mass. If it works, it will be a striking comeback for a technique that has seen many false starts. But it will require several years of observation, with a sneak preview expected by 2018, Sozzetti says.

HOW FAST IS THE UNIVERSE EXPANDING?

Gaia explores the Milky Way, but its influence extends to the wider observable Universe.

To estimate the distances to faraway galaxies, astronomers typically use stellar explosions called Type Ia supernovae. The explosions' apparent brightnesses reveal how far away they and their galaxies are. Such 'standard candles' have been the main tool for estimating the rate of expansion of the Universe, and have led astronomers to propose that a mysterious 'dark energy' is accelerating the expansion.

The method depends on a comparison with other types of standard candle in the Milky Way. In its first release, Gaia will measure the distances to thousands of such stars. Such measurements may eventually resolve conflicting estimates of the rate of cosmic expansion.

INVISIBLE ASTEROID THREATS

As it scans the sky, Gaia is expected to discover hundreds of asteroids inside the Solar System, says Gaia astronomer Paolo Tanga of the Côte d'Azur Observatory in Nice, France.

When it spots a near-Earth object, an asteroid whose orbit brings it within about 200 million kilometres of Earth, Gaia can alert observatories to use ground-based telescopes to establish whether the object is a threat.

It will scan nearly the entire sky and might reveal objects that, during certain times, are too close to the Sun to observe from Earth, says Anthony Brown, an astronomer at the Leiden Observatory in the Netherlands and chair of Gaia's data-processing collaboration. Asteroid paths will also enable Gaia to perform sensitive tests of the general theory of relativity. ■

Read a longer version at go.nature.com/2cy81uy

CORRECTION

The News story 'Mars contamination fear could divert Curiosity rover' (*Nature* **537,** 145–146; 2016) should have made it clear that the dark streaks near Curiosity are only 'potential' recurring slope lineae. And it should have said that the Murray formation — not the Murray Buttes — was formed from ancient lake sediments.