



Space telescope PLATO 2.0 to search for a 'second Earth'

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Situated at a favourable, stable distance from its star and having liquid water on its surface – this is what the planets that scientists involved in the Planetary Transits and Oscillations of Stars (PLATO) mission seek to discover outside of the Solar System. An international consortium under the leadership of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) will search for this 'second Earth'. The space telescope that the European Space Agency (ESA) selected from among five proposed missions on 19 February 2014 is scheduled to launch in 2024. "This unique European space telescope, designed to search for exoplanets, will enable German and European scientists to engage in truly cutting-edge research in this field of astronomy," says DLR Executive Board Chairman Johann-Dietrich Wörner.

PLATO will observe the sky for at least six years from the second Lagrange point of the Earth-Sun system. Planetary researchers estimate that the telescope will discover and characterise thousands of new planets around other stars. "The first objective is to locate a planetary system similar to the Solar System" says Heike Rauer from the DLR Institute of Planetary Research, who leads the PLATO instrument consortium. Thirty-four telescopes will be mounted on the observation platform for that goal. "We will find planets that orbit stars similar to the Sun within the habitable zone – planets that may have liquid water on their surface and on which the development of life as we know it might be possible", continues Rauer.

The scientists will utilise an indirect method to discover distant planets circling their host stars – any planet passing between the star and the observatory, as it travels on its orbit will briefly reduce the luminosity of the star during this 'transit'. PLATO will also measure the stars' seismic activity, and coupled with ground-based radial velocity measurements, planetary researchers will not only be able to identify the existence of planets outside of the Solar System, but also to determine the mass, radius and age of the host stars. "We are interested in rocky planets with an iron core like that of Earth – not in small gaseous planets," emphasises Rauer. The mission will observe approximately half of the sky, examining around one million stars.

Looking into the past and future of the Solar System

As well as searching for a 'second Earth', the planetary researchers will gain insights into the development of planetary systems themselves. Current knowledge concerning the age of extrasolar planets is very incomplete. The celestial bodies observed by PLATO will vary in age. "Observing planets during the many different stages in the development of planetary systems will provide us with information on the past and future of the Solar System," explains Tilman Spohn, Head of the DLR Institute for Planetary Research in Berlin. PLATO will provide scientists with a vast quantity of data with a hitherto unseen precision. The scientific data centre for the mission will be located at the Max Planck Institute for Solar System Research in Katlenburg, Germany.

The DLR scientists will use the experience they gained during the CoRoT and Kepler missions to further the cause of the PLATO Mission. These two missions discovered numerous exoplanets: "But a second Earth was not among them," says Heike Rauer with a tinge of regret. These two missions ended in the summer of 2013 following many years of service. However, the coming 10 years will see the start of the follow-up missions Kepler-2, TESS (NASA) and CHEOPS (ESA), all designed to discover and analyse exoplanets. Then, PLATO will begin its quest for planets with orbital periods similar to those of the inner planets of the Solar System. "There are so many interesting questions, and we are only just beginning to be able to provide answers."

The Mission

The space telescope PLATO is a European Space Agency (ESA) mission. DLR leads the international instrument consortium. The DLR Space Administration is the largest contributor to the ESA science programme, investing in payload development and scientific data centres. Among others, the international consortium includes research institutions from Germany, France, Italy, Great Britain and Spain.

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PLATO space telescope



The PLATO space telescope will search for a 'second Earth'. It will investigate planets outside the Solar System that orbit their host star in the 'habitable zone'.

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Thirty-four telescopes will search the sky



The European space telescope PLATO will search for planetary systems that resemble the Solar System and perhaps have a 'second Earth'. Here, Heike Rauer (right) and Ruth Titz-Weider (left) from the DLR Institute of Planetary Research in Berlin are examining a prototype telescope.

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