



π IN THE SKY⁹

How far does a planet-hunting spacecraft travel to phone home?

See for yourself how pi can take you to infinity and beyond!

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TELESCOPE TANGO

NASA's TESS mission is designed to survey the entire sky in search of exoplanets, or planets orbiting stars other than our Sun. In its two-year primary mission, TESS identified more than 2,600 possible exoplanets and counting.

To locate exoplanets, the space telescope flies in a highly eccentric elliptical orbit, which had never been attempted before. This orbit, called P/2, minimizes the amount of time that light and heat from Earth and the Moon can interfere with data collection. And it still allows the spacecraft to make close passes by Earth to transmit data about its findings back to scientists. The spacecraft's 13.7 day orbit has an axis of 376,000 km at apogee and an axis of 108,400 km at perigee. Each downlink from TESS takes about three hours to complete.

While TESS actually moves at different speeds throughout its orbit – from 0.5 km/s at apogee to 4 km/s at perigee – if its velocity stayed uniform, how many kilometers would TESS need to travel to successfully transmit its data?

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