Using observations by TESS and many other facilities, two international teams discovered an exciting planet, called Gliese 12 b, between the sizes of Earth and Venus only 40 light-years away. It is the nearest, transiting, temperate, Earth-size world located to date.

Astronomers say it’s a unique candidate for further atmospheric study. Earth remains habitable, but Venus does not due to its complete loss of water. If Gliese 12 b retains some atmosphere, it could teach us a lot about the habitability pathways planets take as they develop.

TESS stares at a large swath of the sky for about a month at a time, tracking the brightness changes of tens of thousands of stars. Capturing transits — brief, regular dimmings of stars caused by the passage of orbiting worlds — is one of the mission’s primary goals.

During a transit, the host star’s light passes through any atmosphere, effectively sampling it. Different gas molecules absorb different colors, so the transit provides a set of chemical fingerprints that can be detected by facilities like NASA’s James Webb Space Telescope.

Gliese 12 b’s estimated size may be as large as Earth or slightly smaller — comparable to Venus in our solar system. This artist’s concept compares Earth with different possible Gliese 12 b interpretations, from no atmosphere to a thick Venus-like one. Credit: NASA/JPL-Caltech/R. Hurt (Caltech/IPAC)
