

Draft: Call for Community Input into the TESS Extended Mission Planning

Note: The intent of this announcement is to give the community advance notice of this upcoming opportunity to provide input to the TESS extended mission planning. The final text of the call for community input is anticipated to be released before May 1, 2024, which will include relevant information describing TESS's observing constraints (e.g., pointing restrictions, cadence limitations, etc.). The deadline for community input is anticipated to be June 14, 2024. Please reach out with questions or comments to tesshelp@bigbang.gsfc.nasa.gov.

The TESS mission invites the astronomical community's input on science cases that should be prioritized in TESS's future extended missions, including those that could be enabled by alternate observing strategies. Examples of these alternate observing strategies include but are not limited to longer sector durations, different sector pointings, and new cadences for pre-selected targets and/or full-frame images. An accompanying document describes limitations imposed by mission parameters *[to be released with the official call for community input]*. TESS science spans many areas of astrophysics and solar system science. As such, researchers from around the world, across all career stages, positions, and types of institutions are encouraged to submit their ideas. The format of requested input is a short 1-2 paragraph "science pitch" submitted via a Google Form, similar to the science pitches solicited in 2023 for the definition of the Roman Space Telescope's Core Community Surveys. The TESS mission will use the science pitches to inform planning for TESS's third extended mission and beyond. Please direct questions to tesshelp@bigbang.gsfc.nasa.gov.

Background on the TESS Mission

NASA's Transiting Exoplanet Survey Satellite (TESS) launched in 2018 to perform a near all-sky survey to search for planets transiting nearby stars. During its 2-year prime mission (2018-2020), over 200,000 pre-selected stars were monitored at 2-minute cadence. Full-frame images (FFIs) of the entire, four camera field-of-view (24 x 96 degrees) were obtained at a cadence of 30 minutes to facilitate additional science. Most of the northern and southern ecliptic hemispheres were surveyed during the prime mission.

In its first extended mission (2020-2022), TESS introduced a new 20-second cadence mode for pre-selected targets, continued its 2-minute cadence mode for pre-selected targets, and shortened the FFI cadence to 10 minutes. In its second extended mission (2022-2025), TESS shortened the FFI cadence to 200-seconds and maintained the 20-second and 2-minute cadence mode for pre-selected targets. In both extended missions, the northern and southern ecliptic hemispheres were re-observed and parts of the ecliptic plane were surveyed for the first time. TESS will have gathered data for 97% of the sky by the end of the second extended mission.

The observing strategy for TESS since launch is that it tiles over the sky, observing a 24 x 96 degree section of sky for a 27-day period of time known as a sector, before moving on to the next sector. This observing strategy along with the different FFI and postage stamp target cadences available have enabled TESS to evolve to be a general-purpose time-domain facility in its extended mission.

TESS's third extended mission is expected to occur September 2025-September 2028, with operations contingent upon the outcome of the 2025 Astrophysics Senior Review.