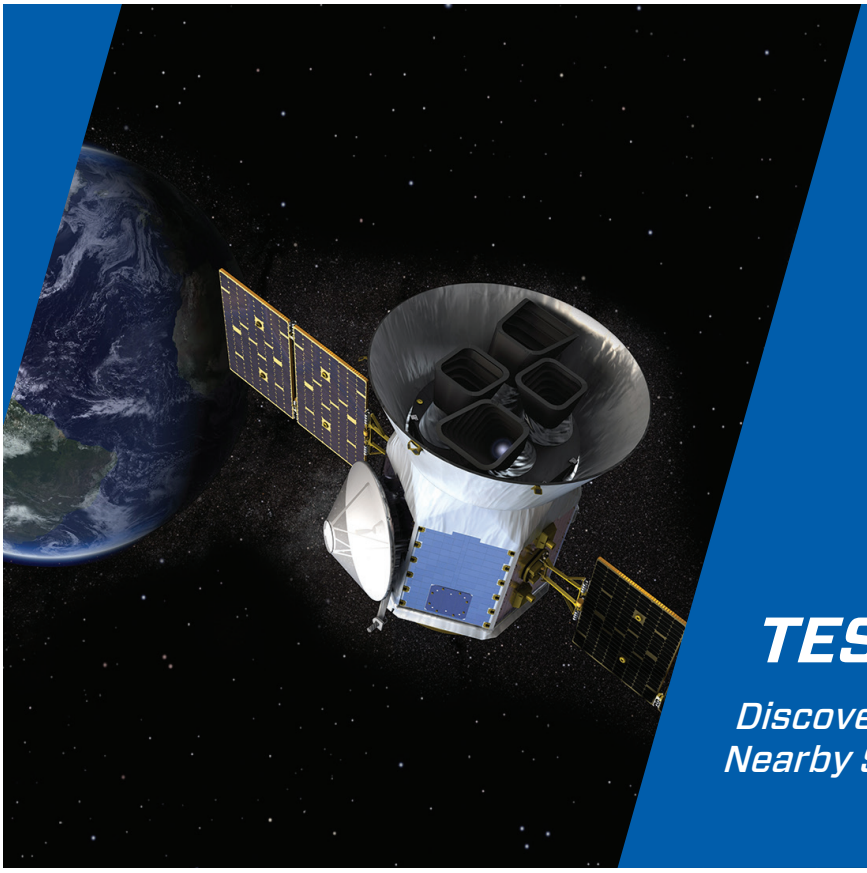

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TESS

Discovering Exoplanets Orbiting Nearby Stars

The Transiting Exoplanet Survey Satellite (TESS) is an Explorer-class planet finder. In the first-ever space-borne all-sky transit survey, TESS will identify planets ranging from Earth-sized to gas giants, orbiting a wide range of stellar types and orbital distances. The principal goal of the TESS mission is to detect small planets with bright host stars in the solar neighborhood, so that detailed characterizations of the planets and their atmospheres can be performed.

TESS will monitor the brightness of more than 200,000 stars during a two year mission, searching for temporary drops in brightness caused by planetary transits. Transits occur when a planet's orbit carries it directly in front of its parent star as viewed from Earth. TESS is expected to catalog more than 20,000 transiting exoplanet candidates, including a sample of approximately 500 Earth-sized and 'Super Earth' planets, with radii less than twice that of the Earth. TESS will detect small rock-and-ice planets orbiting a diverse range of stellar types and covering a wide span of orbits, including rocky worlds in the habitable zones of their host stars.

Spacecraft

The TESS mission is based on Northrop Grumman's LEOStar™-2 platform, a flexible, high-performance spacecraft for space and Earth science, remote sensing and other applications. TESS is the eighth LEOStar-2 based spacecraft built for NASA.

Facts At A Glance

- TESS will carry out the first space-borne all-sky transit survey, covering 400 times as much sky as any previous planet-hunting mission.
- From its planned high-Earth orbit, TESS will approach close enough to the Earth for high data-downlink rates, while remaining above the planet's harmful radiation belts.

Mission

Identifying candidate exoplanet candidates for further study by the James Webb Space Telescope and other future telescopes

Customer

NASA Goddard Space Flight Center

Specifications

Spacecraft

Launch Mass:	362 kg (798 lb.)
Redundancy:	Selective
Solar Arrays:	530 W (EoL) Two wing solar array, fixed and articulating modes
Stabilization:	3-Axis Zero Momentum Bias via 4 Hydrazine thrusters, Four wheel fine-pointing ACS
Propulsive	Mono-propellant blow-down system
Capability:	268 m/s
Orbit:	17 Earth-radii perigee, 59 Earth-radii apogee
Mission Life:	Two Years
Pointing:	3.6 arcsec control, 0.05 arcsec/hour stability
Data Downlink:	1 Mbps S-band; 100 Mbps Ka-band

Launch

Launch Vehicle:	Falcon 9
Launch Site:	Kennedy Space Center
Date:	April 18, 2018

Instrument

The TESS instrument consists of four wide field-of-view CCD cameras. The CCDs, manufactured at the MIT Lincoln Lab, are extremely efficient for photon detection and are a derivative of silicon CCDs previously developed for space-based x-ray missions including NASA's Chandra X-ray observatory and several Japanese missions.

Mission Partners

NASA Goddard Space Flight Center

Mission management

Massachusetts Institute of Technology (MIT)

Principal investigator Dr. George Ricker, instrument development

Additional Partners

MIT Kavli Institute for Astrophysics and Space Research (MKI) and MIT Lincoln Laboratory, NASA's Ames Research Center, the Smithsonian Astrophysical Observatory, and the Space Telescope Science Institute

Northrop Grumman

Spacecraft development, observatory integration and testing, mission operations

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