NASA PLANET HUNTER ON ITS WAY TO ORBIT

NASA's planet-hunter, the Transiting Exoplanet Survey Satellite (TESS), launched on a SpaceX Falcon 9 on April 18

NASA's Transiting Exoplanet Survey Satellite (TESS) launched on the first-of-its-kind mission to find worlds beyond our solar system, including some that could support life. Researchers will use spectroscopy to determine a planet's mass, density and atmospheric composition. Water, and other key molecules, in its atmosphere can give us hints about a planet's capacity to harbor life. TESS, which is expected to find thousands of new exoplanets orbiting nearby stars, lifted off at 6:51 p.m. EDT Wednesday on a SpaceX Falcon 9 rocket from Space Launch Complex 40 at Cape Canaveral Air Force Station in Florida. Its twin solar arrays successfully deployed.

Thomas Zurbuchen, associate administrator of NASA's Science Mission in Washington said:

"*We are thrilled TESS is on its way to help us discover worlds we have yet to imagine, worlds that could possibly be habitable, or harbor life. With missions like the James Webb Space Telescope to help us study the details of these planets, we are ever the closer to discovering whether or not we are alone in the universe."*

Over the course of several weeks, TESS will use six thruster burns to travel in a series of progressively elongated orbits to reach the Moon, which will provide a gravitational assist so that TESS can transfer into its 13.7-day final science orbit around Earth. After approximately 60 days of check-out and instrument testing, the spacecraft will begin its work.

George Ricker, at the Massachusetts Institute of Technology's (MIT) Kavli Institute for Astrophysics and Space Research in Cambridge, explains:

One critical piece for the science return of TESS is the high data rate associated with its orbit. Each time the spacecraft passes close to Earth, it will transmit full-frame images taken with the cameras. That's one of the unique things TESS brings that was not possible before.

For this two-year survey mission, scientists divided the sky into 26 sectors. TESS will use four unique wide-field cameras to map 13 sectors encompassing the southern sky during its first year of observations and 13 sectors of the northern sky during the second year, altogether covering 85 percent of the sky. NASA's Kepler spacecraft found more than 2,600 exoplanets, most orbiting faint stars between 300 and 3,000 light-years from Earth, using this same method of watching for transits. TESS will focus on stars between 30 and 300 light-years away and 30 to 100 times brighter than Kepler's targets. It will allow researchers to use spectroscopy, the study of the absorption and emission of light, to determine a planet's mass, density and atmospheric composition. Water, and other key molecules, in its atmosphere can give us hints about a planets' capacity to harbor life.

Stephen Rinehart, TESS project scientist at NASA's Goddard Space Flight Center said:

It's the beginning of a new era of exoplanet research. The targets TESS finds are going to be fantastic subjects for research for decades to come. The worldwide scientific community will be able to conduct research beyond TESS's core mission in areas ranging from exoplanet characterization to stellar astrophysics, distant galaxies and solar system science.

The next generation of space telescopes is upon us. Kepler, the past master of transits, will be passing the torch of discovery to TESS. This extraordinary instrument will take a nearly full-sky survey of the closer, brighter stars to look for transiting planets. TESS, in turn, will reveal the best candidates for a still closer look with the James Webb Space Telescope, currently scheduled to launch in 2020. The Webb telescope, deploying a giant, segmented, light-collecting mirror, is designed to capture light directly from the planets themselves. The light then can be analysed showing which gases are present in the planet's atmosphere.

AK, with EarthSky and Wikipedia Notes