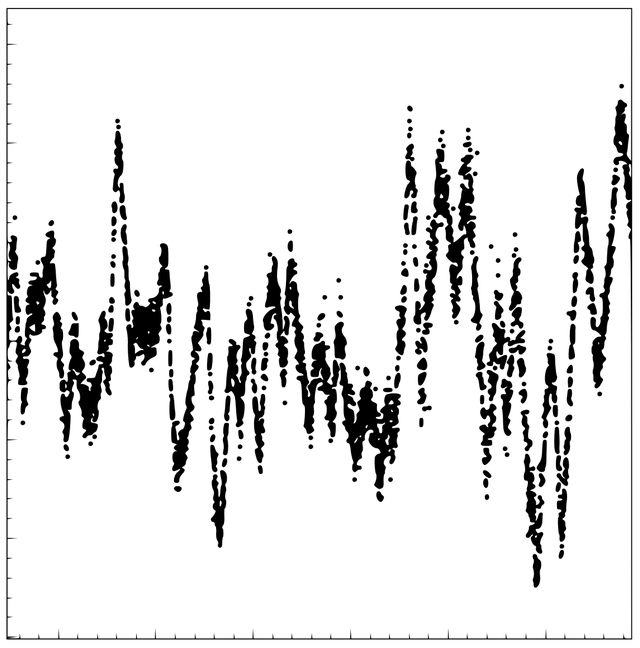
TESS: A Sky Full of Other Worlds

With the resounding success of the Kepler space telescope, the astronomical community prepared for another space-based mission to continue the search for transiting exoplanets and, in 2018, the Transiting Exoplanet Survey Satellite (TESS) was launched. While *Kepler* focused on a single piece of the night sky, TESS was designed to be the first all-sky exoplanet survey. With four wide-angle cameras, each able to fit the constellation Orion inside its field of view, TESS was able to observe most of the night sky in its first two years.

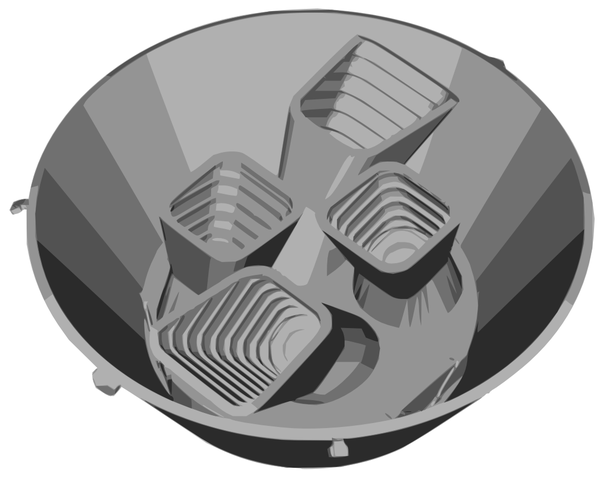
Not only does TESS search more of the sky for exoplanets than *Kepler*, but it was also designed to look at stars brighter than the ones targeted by its predecessor. Brighter stars are easier for telescopes on the ground to observe, making it possible to find out more about the planets that orbit these stars with follow-up observations. There certainly will be no shortage of targets for this either. As of 2022, TESS has discovered nearly 5,000 planet candidates, so-called “TESS Objects of Interest.” Of these TOIs, over 200 have been confirmed as real planets, including TOI-700d, the first Earth-sized planet in the habitable zone discovered with TESS.

TESS is now in its extended mission observing the sky again but, now targeting an additional 130,000 stars. The science done by TESS will not be limited to only discovering exoplanets but, the data collected will help astronomers learn more about the stars themselves. Asteroseismology, the study of a star’s interior through stellar pulsations, stands to benefit from the discovery of new variable stars with TESS.

This poster depicts TESS highlighting its camera arrangement. Each camera is angled so that TESS can cover a large swath of sky in a single pointing. The red and blue rectangles show what these cameras look like face-on.



TESS lightcurve of iota Draconis showing periodic variability in its brightness over time.



Top view of the arrangment of TESS's four cameras that allow it observe 2,300 square degrees of sky at once.

Product of the University of Kansas ExoLab
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