Exoplanet Watch

https://exoplanets.nasa.gov/exoplanet-watch/about-exoplan-

Exoplanet Watch is a citizen science project geared towards amateur astronomers, colleges, and universities, to observe transiting exoplanets with small telescopes.

By using small ground-based telescopes, an observer can constrain the orbital period of a planet i.e., how fast it goes around its host star. An example of a transit light curve from a small 6 inch telescope is shown below.

Exoplanet Watch works to achieve the following objectives:

- To make the hunt for exoplanets using large telescopes more efficient
- To detect and confirm new exoplanets
- To search for blended pairs and spatially resolve a field to confirm the radius of a newly discovered planet
- To look for star spots and other stellar variability on host stars

Citizen scientists will observe the transiting exoplanets and then upload the results to the American Association of Variable Star Observers Exoplanet Database. Exoplanet Watch scientists will then analyze the data to achieve the science goals listed above.

The website listed above provides a detailed explanation about how you can get involved and what to look for in your data. Good luck and happy hunting!

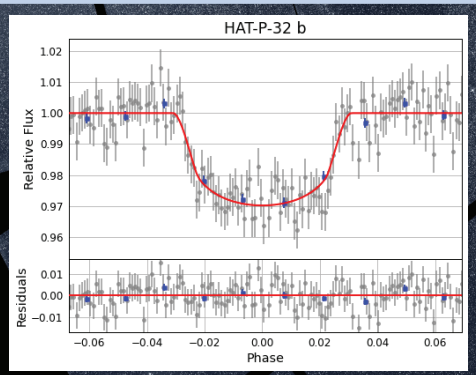
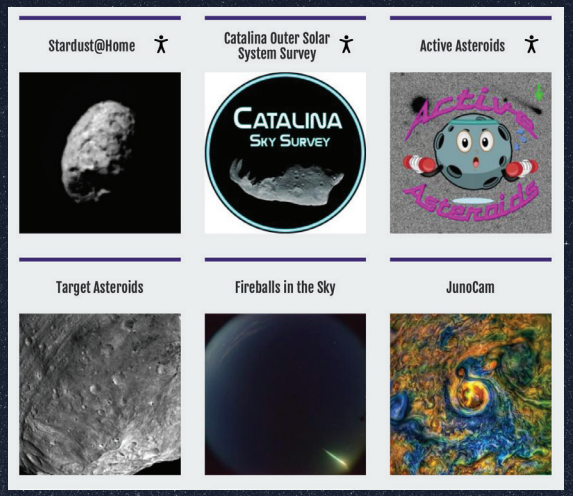


Image credits: Top - NASA/JPL-Caltech. Bottom - Zellem et al. 2020

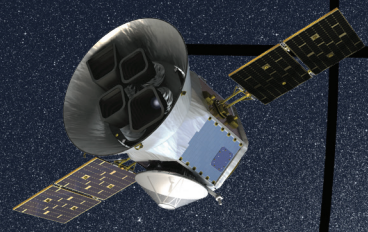
Additional Citizen Science Projects



Want other ways to get involved? Check out the other Citizen Science Projects listed here: *https://science.nasa.gov/citizenscience*. The image above is taken from this page.

National Aeronautics and Space Administration

CITIZEN SCIENCE WITH TESS!



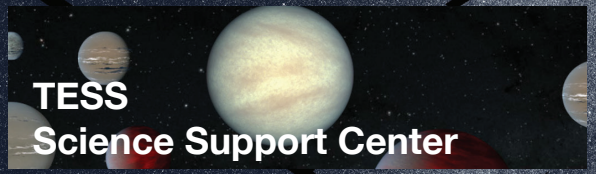
National Aeronautics and Space Administration

Goddard Space Flight Center
8800 Greenbelt Rd
Greenbelt, MD 20771
www.nasa.gov/tess

www.nasa.gov

NP-2021-10-699-GSFC

Get involved in TESS



The **Transiting Exoplanet Survey Satellite (TESS)** is a NASA-sponsored Astrophysics Explorer-class mission that is performing a near all-sky survey to search for planets transiting nearby stars.

Launched on April 18, 2018, TESS successfully completed its prime mission on July 4th, 2020. Since then, TESS has entered its extended mission, during which it has continued to scan the sky for exoplanets and transient events.

TESS's extended mission is more science community-focused, with the Guest Investigator (GI) Program having significantly increased scope. This program enables teams to propose new 2-minute and 20-second cadence targets for observation; provides funding to US investigators to analyze 2-minute and 20-second cadence and full-frame image (FFI) data; and provides funding for US investigators to collect ground-based data that supports TESS science. The GI Program is managed by NASA's Goddard Space Flight Center.

We need you to help find planets!

There is no exclusive-use data rights to observations collected by TESS. All data are made available through the MAST public archive once data processing and validation is complete. Anyone can apply for TESS time, and anyone can use TESS data!

Do you want to discover your own exoplanets using TESS data? If so, try Planet Hunters, or Planet Patrol. Alternatively, you could try Exoplanet Watch, where you can search for planets using ground-based telescope data.

Each item listed is part of NASA citizen science projects, which are collaborations between scientists and members of the public.

In these collaborations, volunteers (referred to as citizen scientists) have supported thousands of important scientific discoveries. Now you can too! Get involved!

Image credits: Top - NASA/JPL-Caltech

https://www.zooniverse.org/projects/nora-dot-eisner/planet-hunters-tess

TESS records how the brightness of a star changes as a planet passes in front of it, which is called a transit.

As the planet transits the star, the stellar brightness dips. The size of this dip depends on the size of the star and the size of the planet. If the planet is large, it will block out more light causing a bigger dip. If the planet remains the same but the star is larger, the dip will be shallower. The size of the dip can therefore be used to infer properties about the system.

For a transit to be observed, the system must be orientated such that the planet passes between us and its host star. If this is the case, we will see a dip each time the planet completes a full orbit, but if the planet does not cross our line of sight, we will not observe the transit.

Scientists have developed extremely effective computer algorithms to detect transit events in TESS light curves. However, no algorithm is 100% efficient. Noise from scattered light and instrumental effects can sometimes make it hard to identify a transit, and often there is no substitute for the human eye.

Planet Hunters asks for volunteers to visually search through TESS light curves to look for those transits that might have been missed. To date, volunteers have found over 100 new planetary systems in TESS's predecessor, Kepler. Now you can get involved in the hunt for TESS planets by following the link provided above.

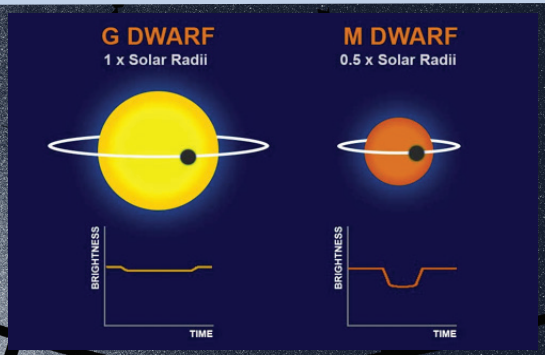
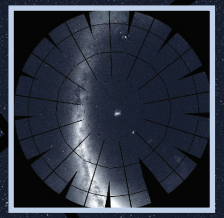


Image credits: Top - Planet Hunters TESS.
Bottom - Nora Eisner



https://www.zooniverse.org/projects/marckuchner/planet-patrol

Each year, the TESS mission monitors the brightness of millions of stars in the search for planets. Automated algorithms are good at detecting the deeper transits of larger planets and stars. However, smaller planets or those with longer periods, in more crowded fields, or with weak signals, require human intervention.

At Planet Patrol, you will help find transiting exoplanet systems from TESS that confuse automated algorithms. The goal of Planet Patrol is to visually inspect images corresponding to thousands of TESS planet candidate host stars and weed out those images that are contaminated by instrument and/or astrophysical artifacts.

TESS planet candidates benefit from this scrutiny because several kinds of signals can masquerade as transiting planets: variable stars, eclipsing binary stars, instrumental artifacts, or blended stars.

You can help by looking through the TESS data, one image at a time, to minimize the effects of background noise, and therefore increase the efficiency of automated processes. Your work will help ensure that questionable celestial targets are actually planets or not, and help us all find new worlds.

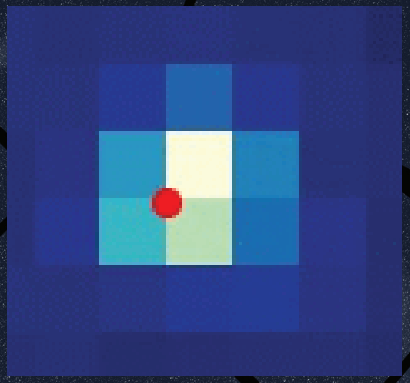


Image credits: Top - NASA/MIT/TESS and Ethan Kruse (USRA).
Bottom - Planet Patrol