

Updated 2024 February 21

## **Planet Hunters TESS**

### **Introduction**

You will need to register before you can start your search for exoplanets.

From the Planet Hunters TESS [website](#) – Figure 1.

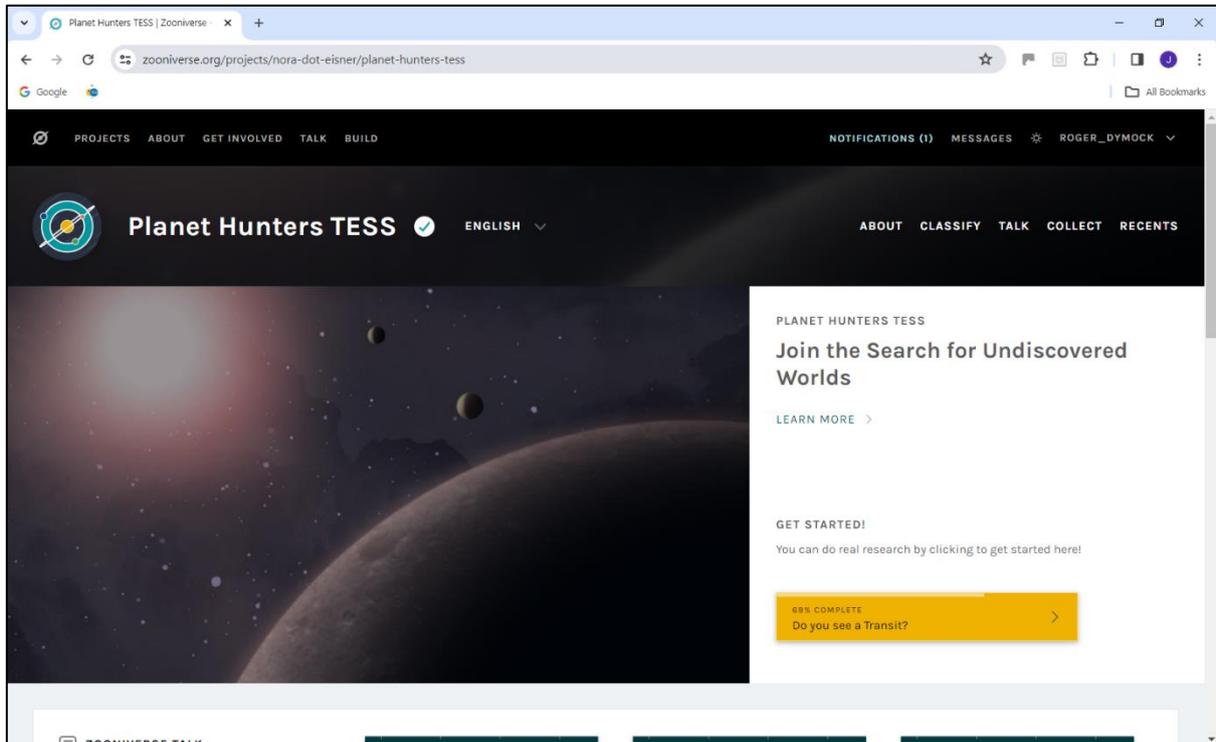


Figure 1. Planet Hunter’s TESS homepage

‘The recently launched [Transiting Exoplanet Survey Satellite \(TESS\)](#) is providing us with a huge amount of data that lets us look for planets outside of our own Solar System, including planets that could support life. With your help, we are going to find planets that will help us understand how these extrasolar systems form and evolve over time. The results may even bring us closer to answering the question that we all want to answer: Are we alone in the Universe?’

For a description of exoplanets, the transit detection method and TESS select the ‘Learn more’ button.

### **Learn more**

Selecting this option opens a page describing; the Planet Hunters mission, exoplanets, detection and TESS. Which part of the sky the satellite is observing can be determined by clicking on this [link](#) in the TESS part of the page. For example, between 2023 September and 2024 September TESS has imaged, will image Sectors 070 to 083 – Figure 2.

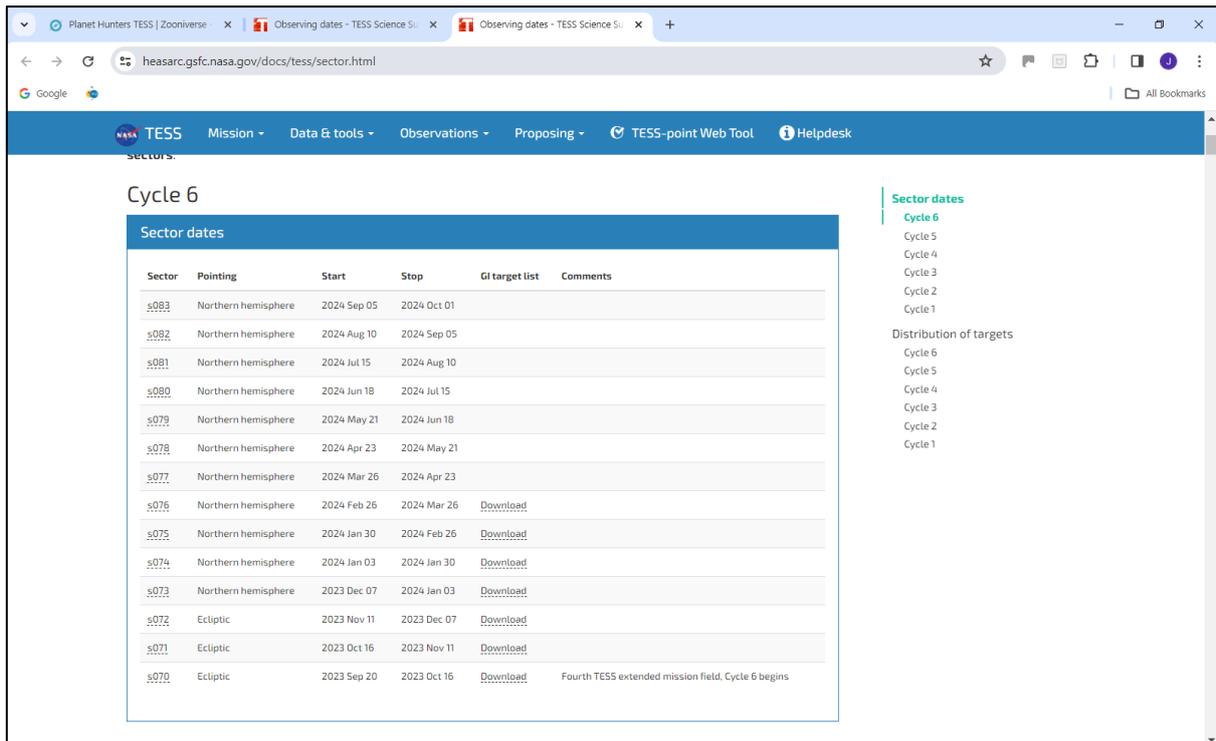


Figure 2. TESS schedule

Schedules and skymaps can be found on the [TESS Observations page](#).

### Tutorial

To access the tutorial, recommended, click on 'Classify' on the home page and then select the Tutorial tab. The Field Guide gives examples of transits and other events which might be mistaken for transits e.g. Eclipsing Binaries. A short video shows how to mark a possible transit.

### Detecting transits - Select the Task tab

Figure 3 shows a possible transit, with transits marked, compared with an example in the Field Guide which can be accessed via the button at the bottom right of the image.

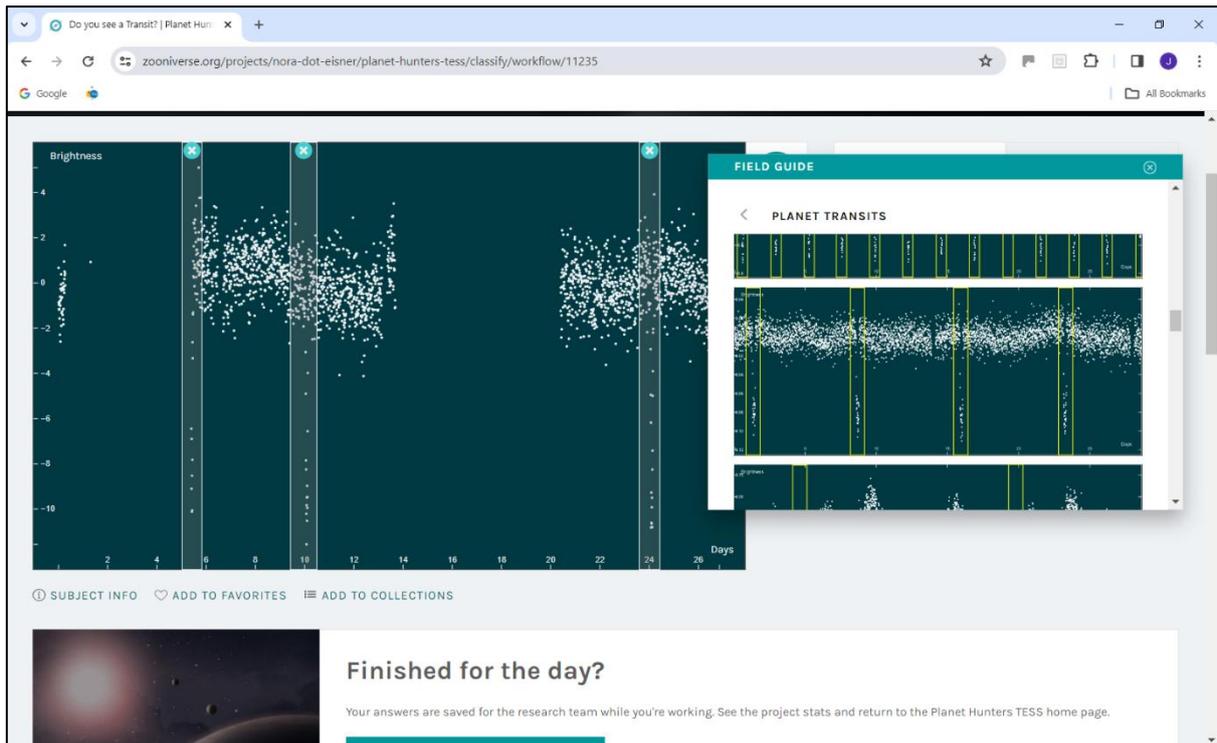


Figure 3. Typical transit light curve

If no transits are observed then click on 'Done' to move to the next image. If transits are noted then mark them as in Figure 3 and move to the next image by clicking on 'Done'. If you wish to access more information on transit candidate then click on 'Done and Talk' and follow the instructions in the [Data Reduction Guide](#) - examples follow.

The image used for classification is shown in Figure 4.

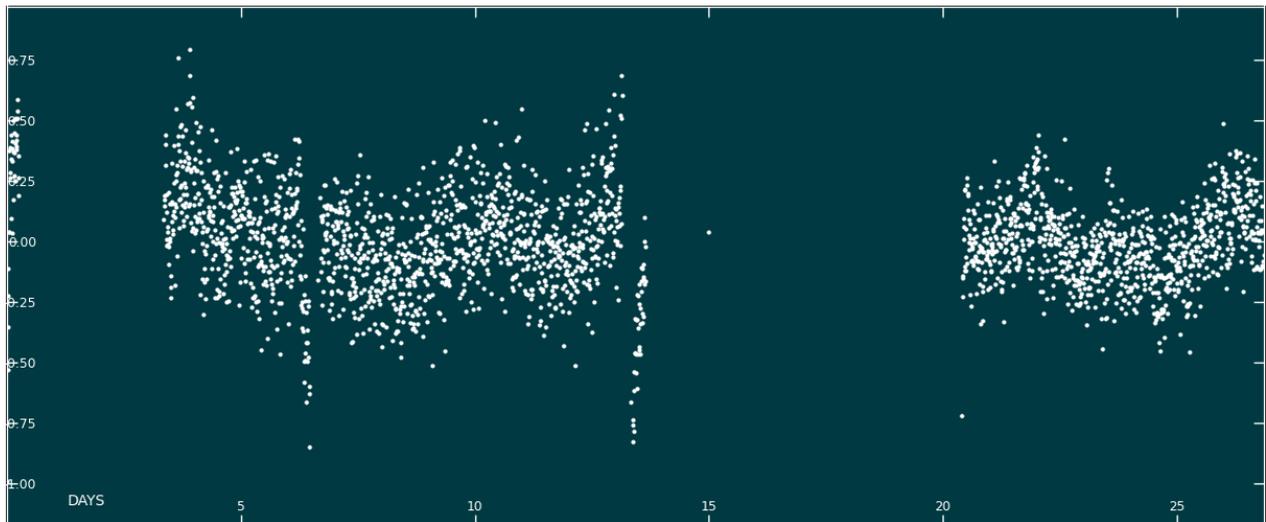


Figure 4. Image for classification –

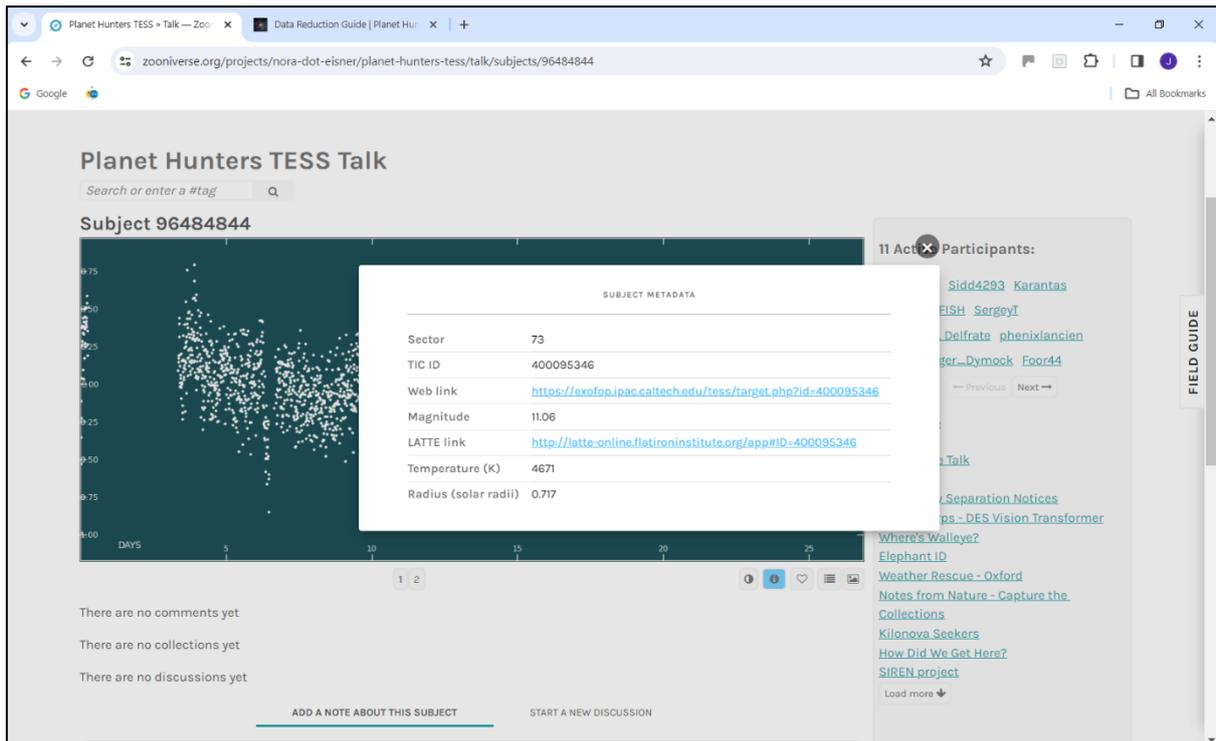


Figure 5. Metadata showing the TIC ID 400095346

To ascertain whether or not the candidate is a TESS Object Of Interest (TOI) go to the [TESS data alerts page](#). Scroll down to the TOI Target Information list and check the TIC ID against the list in the first column (in this case it wasn't on the list). If the object is on the list it is already known to the TESS team. Before you leave the talk page please tell everyone else what you've found – you can say “This is TESS Object of Interest (TOI) XXX” where XXX is the number that appears in the 2nd column on the data alerts table.

Even if not already known to the TESS team the object may be a Threshold Crossing Event (TCE) which means an exoplanet might exist. To check if the candidate is a TCE go to the [Exomast](#) webpage and enter the TIC ID in the box and click on the 'Search' button – Figure 6. Note; Include 'TIC' and a space before the number.

Suggestion - keep the TESS data alerts and Exomast pages open in separate tabs then you can use Find and paste the TIC in the box for the former and paste the TIC into the Search box for the latter.

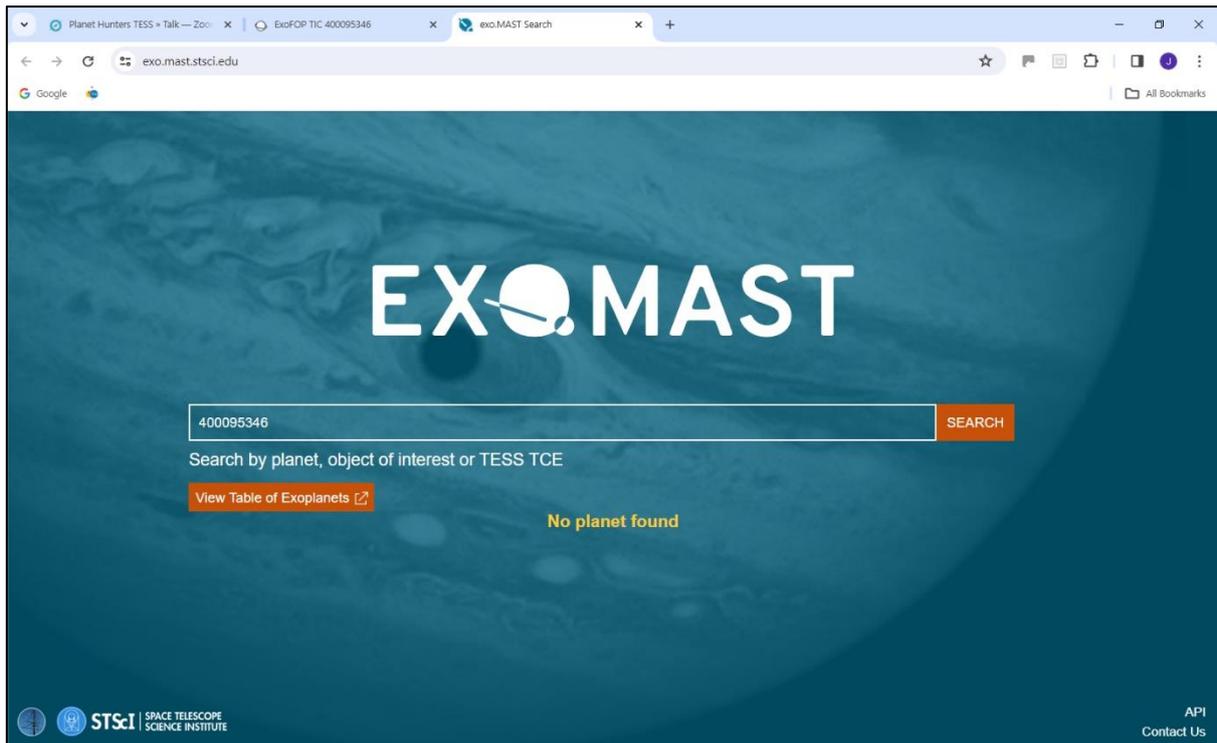


Figure 6. Exomast search screen.

An example of data for a known planet, host star and planetary system is shown in Figure 7.

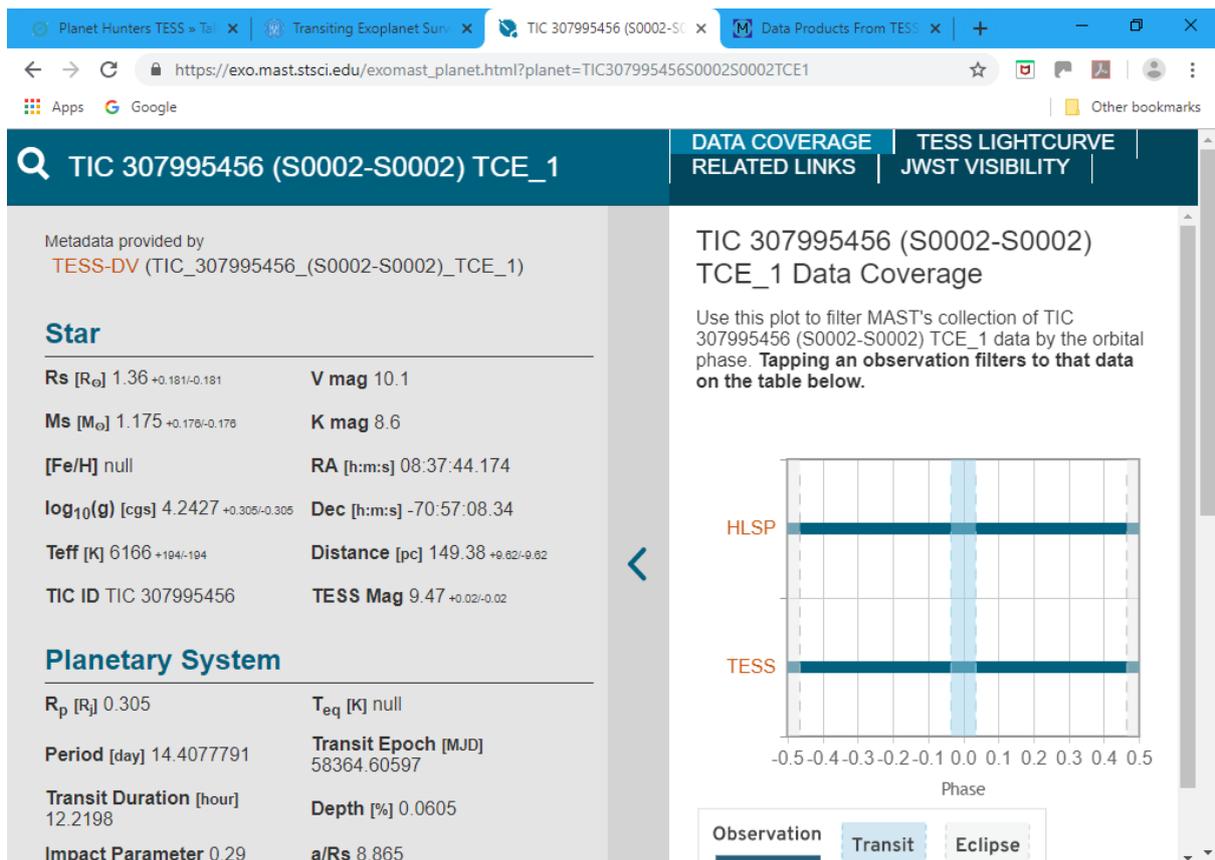


Figure 7. Data from Exomast search.

Even more data can be displayed by selecting RELATED LINKS which leads to the Vetting Summary Page and Full Vetting Report and TESS LIGHTCURVE which displays both folded and observed light curves.

If you find a TCE please flag such an object as a #TCE on the talk page (if possible, including a link to the EXOMAST page for that TCE).

A candidate that is a TCE but not a TOI is an object that the TESS pipeline flagged, but the TESS team decided wasn't a good enough planet candidate to be promoted to TOI status. So, if you find a TCE that isn't a TOI, please let the TESS team know by including "@researchers" in your comment on talk – Figures 8 and 9. They will get notified automatically and – time permitting – will look at it more closely.

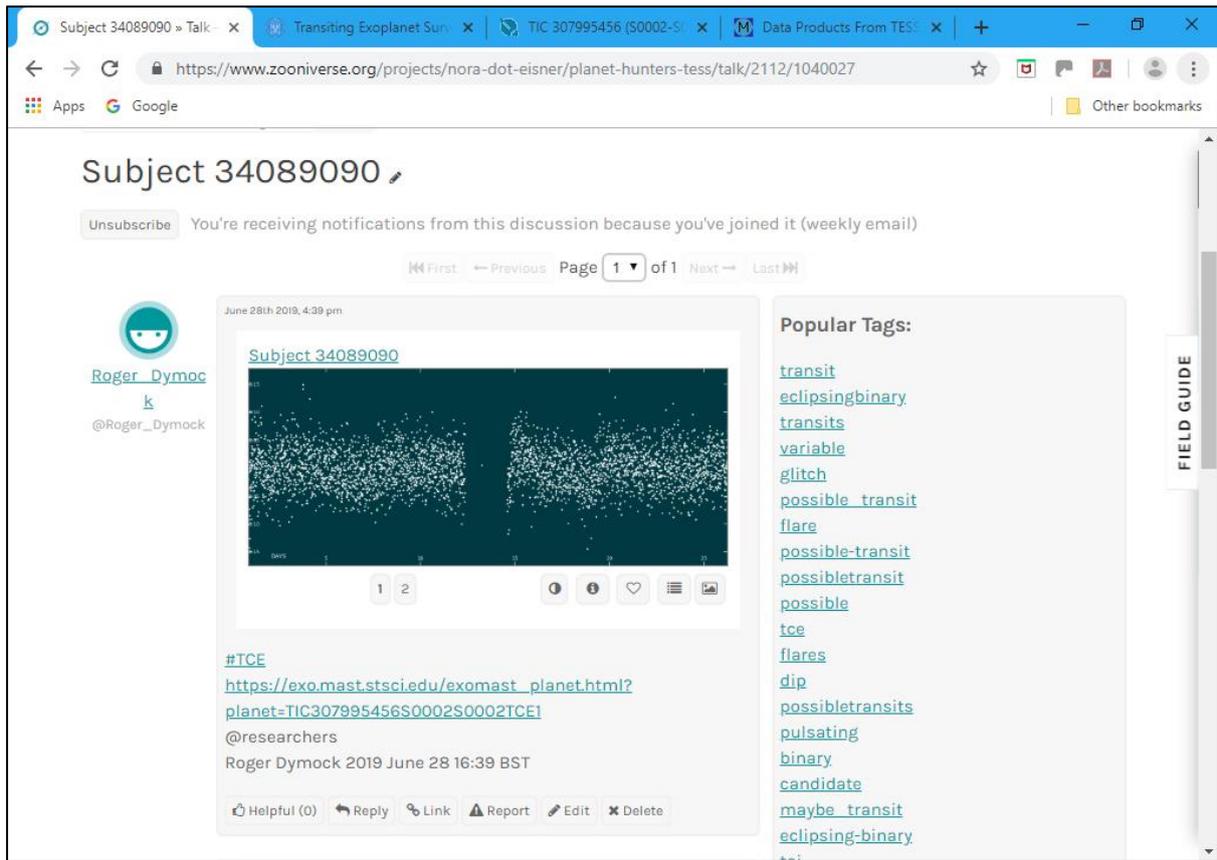


Figure 8. Post showing candidate that is a TCE but not a TOI

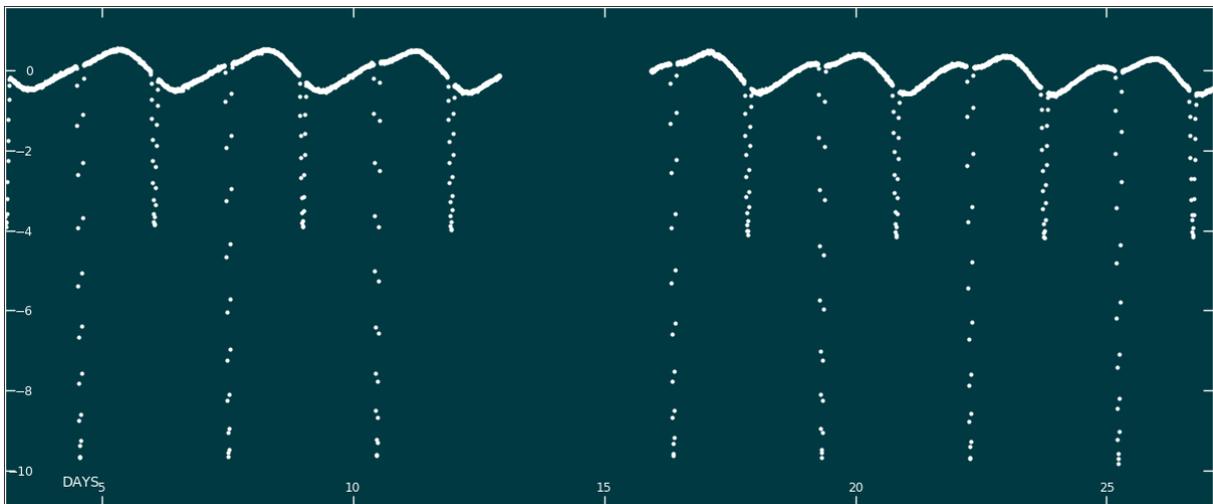


Figure 9. Image of TIC 55404385. Another example of a TCE but not a TOI

Figure 10 shows an example of an eclipsing binary according to the TESS Data Alerts page. Figure 11 shows further information obtained by selecting 'dvs.pdf' on the relevant line of data.

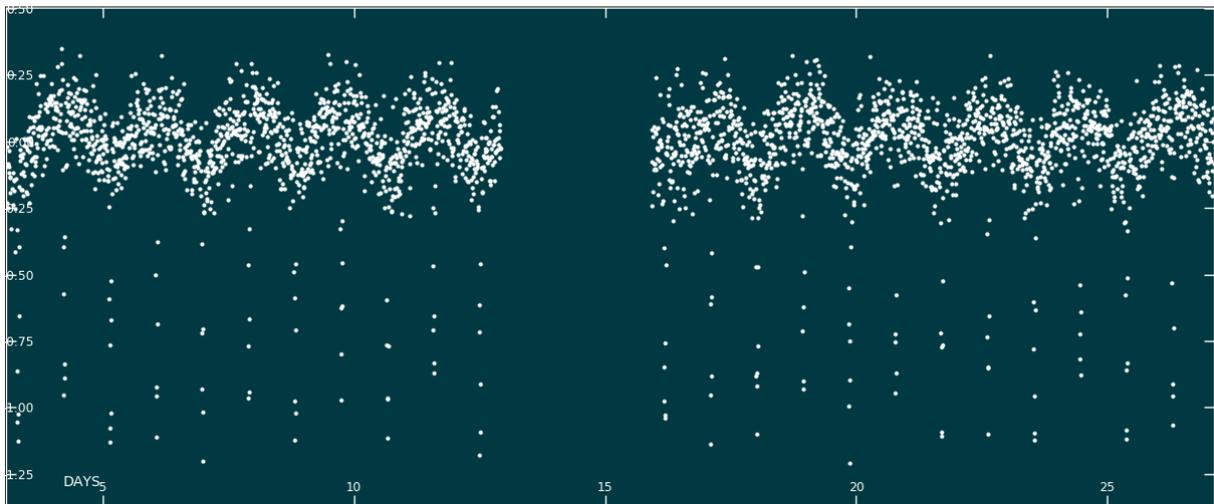


Figure 10. Eclipsing binary TOI 373844472

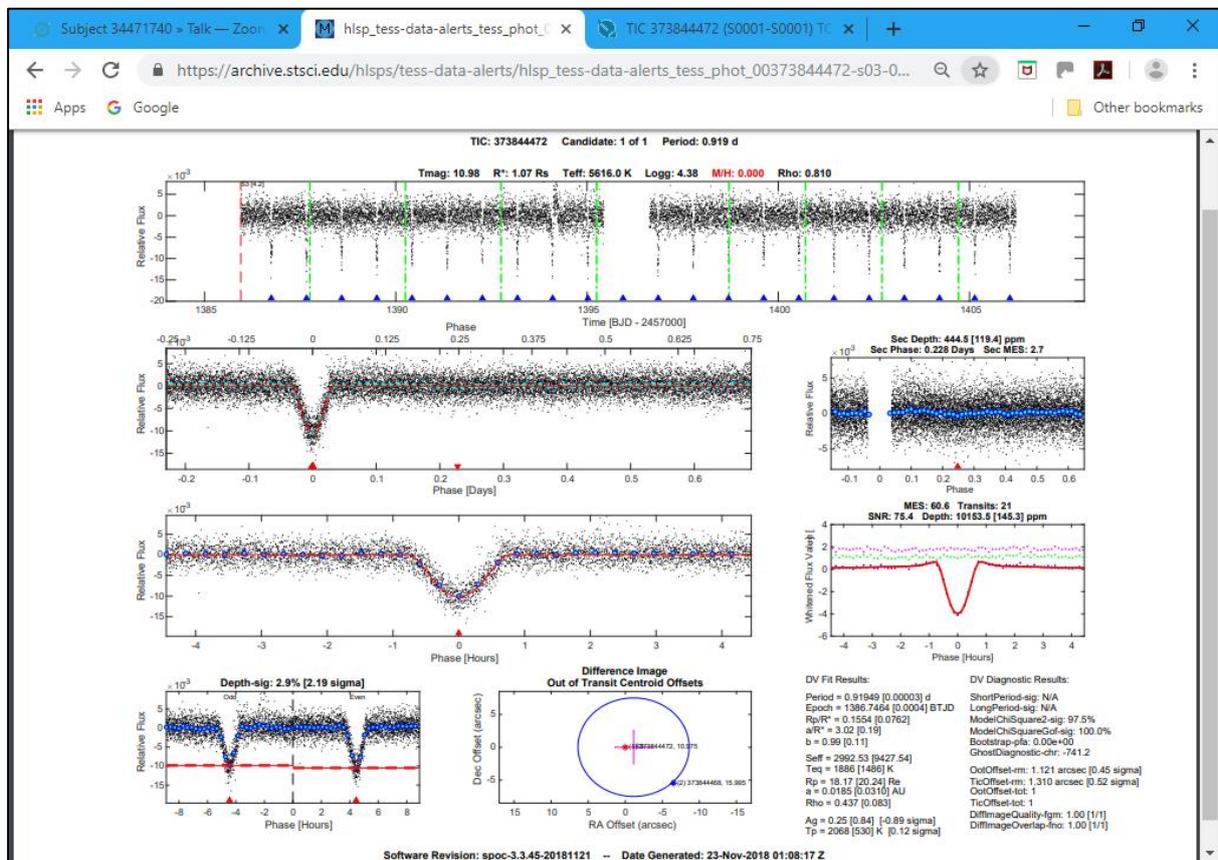


Figure 11. Data for TOI 373844472

## The TESS Input Catalog (TIC)

(Taken from post by Melina Thevenot on the General Help Forum)

The **TIC** is used to help identify targets for the TESS mission, and to calculate physical and observational properties of planet candidates. The current version is TIC-8 which uses the GAIA DR2 catalog as a base and merges a large number of other photometric catalogs, including 2MASS, UCAC4, APASS, SDSS, WISE, etc. There are roughly 1.5 billion stellar and extended sources in TIC-8, containing compiled magnitudes including B, V, u, g, r, i, z, J, H, K, W1-W4, and G. This version was released in May 2019, and is expected to be the

last official version of the TIC produced by the TESS mission, although future, independent development of the TIC is possible.

### Collections

Images can be saved via the ‘Add to collections’ link under the image which opens the ‘Add to collection’ window. Images can then be added to an existing collection or a new one created both of which can be personal to the user by checking the ‘Private collection’ box or public by not doing so – Figure 12.

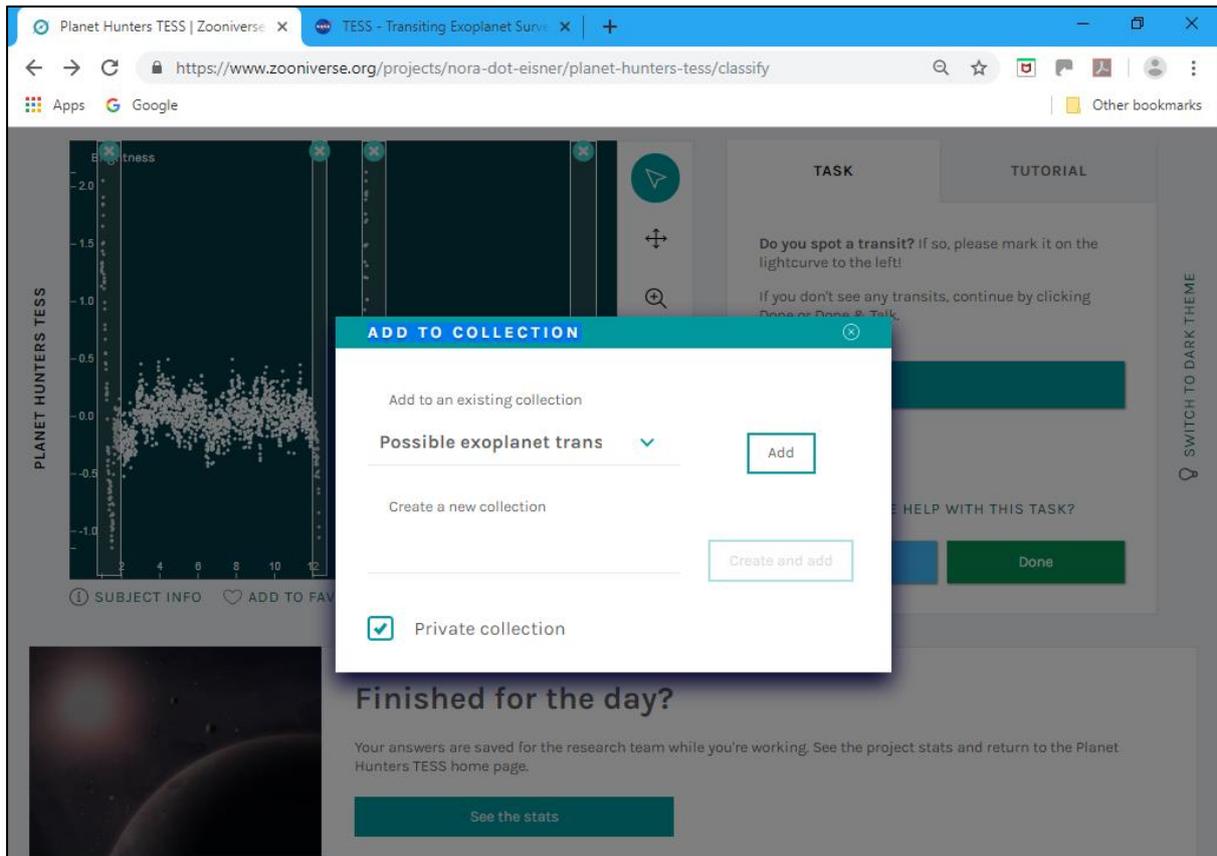


Figure 12. Image collection

### Talk

Selecting ‘Talk’ at the top of the homepage will take you to the Planet Hunters TESS talk page.

Notes – Images and comments relating to suspected exoplanets

Planets – Discussion on exoplanet candidates

General Help – As its title suggests

Chat – Introduce yourself to the rest of the community it says but seems to cover a much wider range of topics

Strange Stars – Includes discussions of multiple star systems

### Finished for the day?

Select ‘See the stats’ to see classification data and then sign out.