
NASA
SPOC
STAR WASH

1
00:00:00,000 --> 00:00:03,460
(Music)

2
00:00:03,460 --> 00:00:05,540
NASA's new planet-hunting mission is the

3
00:00:05,540 --> 00:00:10,100
Transiting Exoplanet Survey Satellite - or TESS.

4
00:00:10,100 --> 00:00:12,260
It's got four cameras to take a near all-sky

5
00:00:12,260 --> 00:00:14,210
survey in search of planets around the nearest,

6
00:00:14,210 --> 00:00:15,810
brightest stars.

7
00:00:15,810 --> 00:00:17,630
How do you actually find planets?

8
00:00:17,630 --> 00:00:20,180
TESS records the small dips in brightness of stars

9
00:00:20,180 --> 00:00:23,610
as planets transit, or cross, in front of them.

10
00:00:23,610 --> 00:00:25,980
Every two weeks, TESS sends the data to Earth,

11
00:00:25,980 --> 00:00:29,560
about 10 billion pixels at a time.

12
00:00:29,560 --> 00:00:32,120
When it first arrives it's pretty muddy.

13
00:00:32,120 --> 00:00:34,830

At NASA's Ames Research Center in Silicon Valley,

14
00:00:34,830 --> 00:00:36,860
a supercomputer runs a bunch of code

15
00:00:36,860 --> 00:00:38,300
to clean up the data.

16
00:00:38,300 --> 00:00:40,790
The code is developed by the Science Processing

17
00:00:40,790 --> 00:00:43,560
Operations Center - or SPOC.

18
00:00:43,560 --> 00:00:47,430
And you can think of its job as a "Star-wash."

19
00:00:47,430 --> 00:00:51,140
The raw data goes through a 5-step cleanup.

20
00:00:51,140 --> 00:00:53,740
First, the star data is spritzed to convert

21
00:00:53,740 --> 00:00:59,250
pixels into measurements of brightness.

22
00:00:59,250 --> 00:01:01,280
Next, the brightness measurements are lined up

23
00:01:01,280 --> 00:01:05,550
into a time series we call a "light curve."

24
00:01:05,550 --> 00:01:08,280
Then, the grime in the data from the movement of

25
00:01:08,280 --> 00:01:11,690
the spacecraft is rubbed away, leaving behind

26
00:01:11,690 --> 00:01:14,290
the pure signals of the star.

27
00:01:14,290 --> 00:01:16,160
With all this buffing, we can see a change

28
00:01:16,160 --> 00:01:18,260
in the star's brightness, but it could be

29
00:01:18,260 --> 00:01:20,430
caused by any number of things:

30
00:01:20,430 --> 00:01:22,100
a crossing planet, the eclipse of a

31
00:01:22,100 --> 00:01:26,380
double-star system, or some other cosmic activity.

32
00:01:26,380 --> 00:01:28,170
So, the last step in our Starwash is

33
00:01:28,170 --> 00:01:30,550
to give each light curve some ratings.

34
00:01:30,550 --> 00:01:33,310
As the star data exits the pipeline, scientists

35
00:01:33,310 --> 00:01:36,560
examine it closely to decide what it might be,

36
00:01:36,560 --> 00:01:38,510
perhaps a planet?

37
00:01:38,510 --> 00:01:40,860
And then they send it on its way for follow-up

38
00:01:40,860 --> 00:01:43,020

observations that will confirm whether

39
00:01:43,020 --> 00:01:44,630
we have found a planet.