



DESIGNATION STATIONS

1
00:00:02,969 --> 00:00:05,338
On October 20th, 2021,

2
00:00:05,338 --> 00:00:07,907
dozens of astronomers
gathered near Las Vegas.

3
00:00:08,942 --> 00:00:12,545
They pointed their telescopes at the sky
and waited for the moment

4
00:00:12,545 --> 00:00:15,248
that the light from a faraway star
blinked out.

5
00:00:16,449 --> 00:00:20,086
It was an event so minuscule
it would have been easy to miss.

6
00:00:20,587 --> 00:00:23,790
Yet the data gathered by scientists
from those few seconds

7
00:00:24,224 --> 00:00:27,527
helped contribute to the success of NASA's
Lucy mission.

8
00:00:28,795 --> 00:00:30,697
As the astronomers observed the star,

9
00:00:30,697 --> 00:00:34,868
it appeared to blink out as asteroid
Eurybates passed in front of it.

10
00:00:34,868 --> 00:00:36,970
Eurybates is one of seven Trojan asteroids

11
00:00:36,970 --> 00:00:39,873
Lucy will visit over

the next twelve years.

12

00:00:39,873 --> 00:00:44,177

The Trojans are clustered in two swarms that orbit the Sun at the same distance

13

00:00:44,177 --> 00:00:47,680

as Jupiter, though they're as far away from Jupiter as they are from the Sun.

14

00:00:48,415 --> 00:00:51,551

These asteroids are remnants of the early solar system

15

00:00:52,185 --> 00:00:55,755

and by analyzing them up close Scientists can hone the theory

16

00:00:55,755 --> 00:00:58,892

of how the planets formed and ended up in their current locations.

17

00:01:00,060 --> 00:01:02,195

As Eurybates eclipsed the star,

18

00:01:02,195 --> 00:01:05,432

a phenomenon scientists call an occultation took place

19

00:01:05,899 --> 00:01:09,169

whereby a shadow the size of the asteroid passed over the region.

20

00:01:09,702 --> 00:01:14,240

The best known example of an occultation is a solar eclipse, which occurs

21

00:01:14,240 --> 00:01:17,610

when the moon passes between the sun and Earth, blocking

22

00:01:17,610 --> 00:01:19,712

the sun from our view.

23

00:01:20,613 --> 00:01:24,317

Leading up to the occultation, astronomers predict the asteroid's shadow's

24

00:01:24,317 --> 00:01:27,587

path across Earth and set up dozens of telescopes

25

00:01:27,587 --> 00:01:29,823

along a line that's perpendicular to that path.

26

00:01:30,990 --> 00:01:34,194

Spread out under the asteroid's shadow, they count the seconds

27

00:01:34,194 --> 00:01:36,963

the starlight blinks out as the asteroid passes in front.

28

00:01:37,497 --> 00:01:41,301

Using the asteroid's known velocity, it is possible to calculate its width.

29

00:01:41,801 --> 00:01:45,738

By observing multiple occultations of the same asteroid, scientists can catch

30

00:01:45,738 --> 00:01:49,142

different sides of the asteroid and combine their two dimensional

31

00:01:49,142 --> 00:01:52,078

silhouette projections into a three dimensional shape model.

32

00:01:52,579 --> 00:01:55,515

Observing an occultation
is one of the most reliable tools.,

33

00:01:55,515 --> 00:01:58,485

scientists have to gather information
about Lucy's target asteroids

34

00:01:58,651 --> 00:02:01,321

and prepare for flybys of each
of the mission's targets.

35

00:02:02,422 --> 00:02:03,423

The team will continue to