1
00:00:00,000 --> 00:00:03,003
Do you remember hearing about
that weird, strange-shaped

2
00:00:03,003 --> 00:00:05,339
object that passed through our
inner solar system late last

3
00:00:05,339 --> 00:00:08,442
year? It was the first object
we've confirmed to have come

4
00:00:08,442 --> 00:00:11,445
from outside our solar system,
and was given the name

5
00:00:11,445 --> 00:00:15,282
'Oumuamua, Hawaiian for "scout
or messenger from our distant

6
00:00:15,282 --> 00:00:18,785
past." Now, scientists have
analyzed data from many

7
00:00:18,785 --> 00:00:22,055
observatories, including NASA's
Hubble Space Telescope, and

8
00:00:22,055 --> 00:00:25,158
found that this interstellar
object has gained an unexpected

9
00:00:25,158 --> 00:00:29,429
boost of speed. After 'Oumuamua
was discovered with Hawaii's

10
00:00:29,429 --> 00:00:32,165
Pan-STARRS 1 telescope as it
surveyed the skies for

11
00:00:32,165 --> 00:00:36,303
near-Earth asteroids in October
2017, observatories all around

12
00:00:36,303 --> 00:00:39,840
and above the world focused on
the approximately half-mile long

13
00:00:39,840 --> 00:00:42,743
object to learn as much as
possible about this cosmic

14
00:00:42,743 --> 00:00:46,546
visitor before it flew too far
away to see. The Hubble Space

15
00:00:46,546 --> 00:00:49,549
Telescope was used to collect
observations to determine the

16
00:00:49,549 --> 00:00:53,420
object’s trajectory over two
months in late 2017 and early

17
00:00:53,420 --> 00:00:57,658
2018. The observations were
combined with data from multiple

18
00:00:57,658 --> 00:01:01,094
ground-based observatories, which
showed ‘Oumuamua to have a

19
00:01:01,094 --> 00:01:03,297
small, continuous
non-gravitational

20
00:01:03,297 --> 00:01:07,100
“acceleration.” Something
besides just the gravity from

21
00:01:07,100 --> 00:01:09,836
the Sun and planets was
affecting the trajectory of

22
00:01:09,836 --> 00:01:14,875
‘Oumuamua. A probable source of
this acceleration is jets of gas

23
00:01:14,875 --> 00:01:18,178
coming off the object. This
behavior is similar to objects

24
00:01:18,178 --> 00:01:21,348
we have already identified as
comets – when they get close to

25
00:01:21,348 --> 00:01:24,985
the Sun, ices in the comet
sublimate into gas, and

26
00:01:24,985 --> 00:01:28,722
streamers of gas can push the
object along. Usually when

27
00:01:28,722 --> 00:01:32,659
comets do this the outgassing
can be seen because it ejects

28
00:01:32,659 --> 00:01:35,796
large amounts of dust, which form
a cloud around the object,

29
00:01:35,796 --> 00:01:41,134
called a coma, and a tail. But
with ‘Oumuamua, no type of coma

30
00:01:41,134 --> 00:01:45,205
or tail was seen. Maybe
‘Oumuamua doesn’t have much dust

31
00:01:45,205 --> 00:01:48,008
left after its interstellar
journey – an amount no more than

32
00:01:48,008 --> 00:01:50,377
a couple coffee cans of
material, making the dust too

33
00:01:50,377 --> 00:01:54,781
sparse for us to see. Or, maybe
the dust was much larger than

34
00:01:54,781 --> 00:01:58,752
normal, making it hard for us to
detect. I know that sounds

35
00:01:58,752 --> 00:02:02,155
counterintuitive, but it’s
easiest to detect dust when the

36
00:02:02,155 --> 00:02:05,025
particles are similar in size to
the wavelength of light we’re

37
00:02:05,025 --> 00:02:08,996
using. Observatories were
looking at ‘Oumuamua in visible

38
00:02:08,996 --> 00:02:12,065
light, where we have the most
sensitive detectors, but larger

39
00:02:12,065 --> 00:02:15,235
particles of dust would be
easier to detect with microwave

40
00:02:15,235 --> 00:02:20,140
or radio wavelengths. This is
definitely an unusual object,

41
00:02:20,140 --> 00:02:23,543
and unfortunately no more new
observations of ‘Oumuamua are

42
00:02:23,543 --> 00:02:27,047
possible because it’s already
too dim and far away for even

43
00:02:27,047 --> 00:02:31,284
Hubble to see. But when there’s
one weird object there are

44
00:02:31,284 --> 00:02:34,488
probably more. Sky survey
programs will keep an eye out

45
00:02:34,488 --> 00:02:37,891
for other interstellar visitors,
and the Hubble Space Telescope

46
00:02:37,891 --> 00:02:40,527
will be ready to contribute
observations to better

47
00:02:40,527 --> 00:02:43,997
understand any more orphaned
vagabonds traveling between the

48
00:02:43,997 --> 00:02:46,066
the stars.