1
00:00:00,030 --> 00:00:04,650
NASA's Hubble Space Telescope has looked

2
00:00:02,850 --> 00:00:06,720
for evidence of atmospheres around

3
00:00:04,650 --> 00:00:09,360
several earth sized planets in the

4
00:00:06,720 --> 00:00:11,309
Trappist one system including three that

5
00:00:09,360 --> 00:00:13,620
are in the star's habitable zone where

6
00:00:11,309 --> 00:00:16,320
liquid water could exist on the surface

7
00:00:13,620 --> 00:00:18,660
a lot of astronomers and space

8
00:00:16,320 --> 00:00:20,670
enthusiasts were very excited by the

9
00:00:18,660 --> 00:00:22,619
discovery of the seven earth sized

10
00:00:20,670 --> 00:00:24,810
planets of the Trappist warning system

11
00:00:22,619 --> 00:00:27,000
the prends orbit an ultra-cool dwarf

12
00:00:24,810 --> 00:00:29,039
star about 40 light years away

13
00:00:27,000 --> 00:00:30,689
scientists have theories about what

14
00:00:29,039 --> 00:00:32,640

these plants may be like and whether

15
00:00:30,689 --> 00:00:34,500
they could support life but we won't

16
00:00:32,640 --> 00:00:36,120
know for sure until we get more

17
00:00:34,500 --> 00:00:38,430
comprehensive observations of this

18
00:00:36,120 --> 00:00:41,309
system including data on the planets

19
00:00:38,430 --> 00:00:43,200
atmospheres as a planet in the Travis

20
00:00:41,309 --> 00:00:45,450
one system passes between us and the

21
00:00:43,200 --> 00:00:47,550
star it blocks out a small portion of

22
00:00:45,450 --> 00:00:49,379
the star's light telescopes like Hubble

23
00:00:47,550 --> 00:00:51,510
can look at changes in specific

24
00:00:49,379 --> 00:00:53,430
wavelengths of light which provide clues

25
00:00:51,510 --> 00:00:55,829
to the composition in size of the

26
00:00:53,430 --> 00:00:59,940
planet's atmosphere Hubble observations

27
00:00:55,829 --> 00:01:01,890
in May 2016 of Travis one B and C showed

28
00:00:59,940 --> 00:01:04,610
that these planets do not seem to have

29
00:01:01,890 --> 00:01:07,229
thick puffy hydrogen-rich atmosphere

30
00:01:04,610 --> 00:01:09,150
this indicates a higher chance that they

31
00:01:07,229 --> 00:01:12,780
are rocky terrestrial planets

32
00:01:09,150 --> 00:01:15,960
rather than many gas giants Hubble then

33
00:01:12,780 --> 00:01:19,439
observed planets d e f and g in december

34
00:01:15,960 --> 00:01:22,220
2016 in january 2017 in near-infrared

35
00:01:19,439 --> 00:01:25,500
wavelengths and the results were similar

36
00:01:22,220 --> 00:01:27,780
Hubble found no sign of thick puffy

37
00:01:25,500 --> 00:01:29,880
hydrogen-rich atmosphere for any of the

38
00:01:27,780 --> 00:01:31,470
four planets the data suggests that

39
00:01:29,880 --> 00:01:34,619
there is not this gas giant like

40
00:01:31,470 --> 00:01:36,299
atmosphere for planets D E and F and the

41
00:01:34,619 --> 00:01:38,610

data from this round of observations was

42
00:01:36,299 --> 00:01:40,049
not as strong for planet G so while

43
00:01:38,610 --> 00:01:42,390
there's no evidence for a thick

44
00:01:40,049 --> 00:01:44,479
hydrogen-rich atmosphere on G the

45
00:01:42,390 --> 00:01:47,369
researchers are not yet ruling it out

46
00:01:44,479 --> 00:01:48,899
planets e F and G orbit at distances

47
00:01:47,369 --> 00:01:51,299
where temperatures would allow for

48
00:01:48,899 --> 00:01:53,460
liquid water while D is likely a little

49
00:01:51,299 --> 00:01:55,259
too hot Hubble is yet to take

50
00:01:53,460 --> 00:01:57,729
observations of Planet H which is

51
00:01:55,259 --> 00:02:00,460
outside the system's habitable zone

52
00:01:57,729 --> 00:02:02,049
to summarize Hubble has not seen

53
00:02:00,460 --> 00:02:06,100
evidence of thick hydrogen-rich

54
00:02:02,049 --> 00:02:09,099
atmosphere for planets b c d e and f and

55
00:02:06,100 --> 00:02:12,010
of those five planets E&S are in the

56
00:02:09,099 --> 00:02:14,410
habitable zone planet needs more data

57
00:02:12,010 --> 00:02:16,690
and Hubble is not yet looked at planet H

58
00:02:14,410 --> 00:02:17,980
it's worth noting though that even

59
00:02:16,690 --> 00:02:20,590
though planets outside the habitable

60
00:02:17,980 --> 00:02:22,420
zone still might be able to have liquid

61
00:02:20,590 --> 00:02:24,580
water somewhere on its surface in

62
00:02:22,420 --> 00:02:26,200
certain conditions it's also worth

63
00:02:24,580 --> 00:02:28,720
noting that if any of these planets have

64
00:02:26,200 --> 00:02:30,790
high-altitude clouds and Hayes's that

65
00:02:28,720 --> 00:02:33,340
would block couples ability to detect a

66
00:02:30,790 --> 00:02:35,410
thick hydrogen-rich atmosphere but such

67
00:02:33,340 --> 00:02:37,959
an atmosphere is not likely to exist on

68
00:02:35,410 --> 00:02:39,489

these planets many possibilities remain

69
00:02:37,959 --> 00:02:41,890
for what types of atmospheres these

70
00:02:39,489 --> 00:02:44,530
planets have or whether they even have

71
00:02:41,890 --> 00:02:46,870
atmospheres the Travis one planets could

72
00:02:44,530 --> 00:02:50,110
have compact atmosphere similar to Mars

73
00:02:46,870 --> 00:02:52,209
Venus Earth or something entirely

74
00:02:50,110 --> 00:02:54,370
different researchers hope to use

75
00:02:52,209 --> 00:02:55,930
Hubble's ultraviolet capabilities to

76
00:02:54,370 --> 00:02:58,239
look for evidence of water vapour or

77
00:02:55,930 --> 00:03:00,160
methane and NASA's upcoming James Webb

78
00:02:58,239 --> 00:03:02,139
Space Telescope will look in the far

79
00:03:00,160 --> 00:03:04,870
infrared to further characterize these

80
00:03:02,139 --> 00:03:06,430
atmospheres future telescopes also hope

81
00:03:04,870 --> 00:03:08,319
to look for hints of whether the planets

82
00:03:06,430 --> 00:03:11,109
are habitable and if life could be

83
00:03:08,319 --> 00:03:13,450
present the Travis one system provides

84
00:03:11,109 --> 00:03:16,600
the best opportunity we currently have

85
00:03:13,450 --> 00:03:18,280
to study earth-sized exoplanet over the

86
00:03:16,600 --> 00:03:20,170
next few years Hubble and other

87
00:03:18,280 --> 00:03:22,870
telescopes will work together each

88
00:03:20,170 --> 00:03:25,209
contributing important observations so

89
00:03:22,870 --> 00:03:27,160
for the first time ever we will have an

90
00:03:25,209 --> 00:03:29,200
in-depth understanding of a set of

91
00:03:27,160 --> 00:03:31,560
terrestrial planets outside our solar

92
00:03:29,200 --> 00:03:31,560
system

93
00:03:32,460 --> 00:03:34,520
you