1
00:00:08,660 --> 00:00:06,289
can there be life elsewhere where are

2
00:00:11,240 --> 00:00:08,670
the habitable environments in our solar

3
00:00:13,879 --> 00:00:11,250
system Mars is an obvious place to think

4
00:00:16,310 --> 00:00:13,889
about but so are the icy worlds of the

5
00:00:18,769 --> 00:00:16,320
outer solar system where beneath their

6
00:00:22,519 --> 00:00:18,779
surfaces there may be liquid water

7
00:00:25,970 --> 00:00:22,529
oceans the Europa Jupiter system mission

8
00:00:29,390 --> 00:00:25,980
is a partnership between ISA and NASA to

9
00:00:33,350 --> 00:00:29,400
send two spacecraft to the Jupiter

10
00:00:36,560 --> 00:00:33,360
system one to orbit Europa the other two

11
00:00:39,470 --> 00:00:36,570
orbit Ganymede to understand what we're

12
00:00:54,590 --> 00:00:39,480
raising as the emergence of habitable

13
00:00:57,139 --> 00:00:54,600

worlds around gas giants the subsurface

14
00:01:01,040 --> 00:00:57,149
oceans are certainly the key driver for

15
00:01:03,049 --> 00:01:01,050
exploration of these worlds Europa is a

16
00:01:06,200 --> 00:01:03,059
fascinating place with an ocean that

17
00:01:09,410 --> 00:01:06,210
might be only tens of kilometres below

18
00:01:12,109 --> 00:01:09,420
the surface and may communicate actively

19
00:01:14,899 --> 00:01:12,119
with the surface there up shins through

20
00:01:17,510 --> 00:01:14,909
icy convection blobs of warm ice moving

21
00:01:20,719 --> 00:01:17,520
up to the surface through cracking

22
00:01:23,719 --> 00:01:20,729
breaking of the ice so there could be

23
00:01:27,440 --> 00:01:23,729
signs on the surface of what's going on

24
00:01:29,240 --> 00:01:27,450
deep down below the surface so what we

25
00:01:33,499 --> 00:01:29,250
can do with a spacecraft in orbit around

26
00:01:37,969 --> 00:01:33,509
Europa is measure how you OPA flexes as

27
00:01:40,670 --> 00:01:37,979
it's stretched by Jupiter's gravity that

28
00:01:45,920 --> 00:01:40,680
tells us something very specific about

29
00:01:49,010 --> 00:01:45,930
how stiff that ice shell is and by how

30
00:01:53,230 --> 00:01:49,020
stiff it is we can get a measure of its

31
00:01:56,660 --> 00:01:53,240
thickness you rope as may be rarer

32
00:01:58,750 --> 00:01:56,670
example of an ocean in contact with a

33
00:02:01,070 --> 00:01:58,760
rocky mantle

34
00:02:03,680 --> 00:02:01,080
ganymede actually might be a more common

35
00:02:08,560 --> 00:02:03,690
example of a notion where it's it's a

36
00:02:12,680 --> 00:02:09,859
Callisto

37
00:02:15,470 --> 00:02:12,690
the relatively dead world has not the

38
00:02:18,950 --> 00:02:15,480

level of activity that Europa and

39
00:02:22,490 --> 00:02:18,960
Ganymede have yet we think that Callisto

40
00:02:24,800 --> 00:02:22,500
has an ocean beneath its surface it's

41
00:02:26,510 --> 00:02:24,810
not out of the question that if there

42
00:02:28,550 --> 00:02:26,520
are liquid water oceans down there and

43
00:02:34,220 --> 00:02:28,560
there's heat and there's energy that

44
00:02:36,770 --> 00:02:34,230
there could possibly be life the Europa

45
00:02:40,250 --> 00:02:36,780
spacecraft will make three or four close

46
00:02:43,100 --> 00:02:40,260
flybys of Io the most volcanic Li active

47
00:02:45,380 --> 00:02:43,110
world in our solar system in fact we

48
00:02:48,020 --> 00:02:45,390
might even be able to fly through one of

49
00:02:50,810 --> 00:02:48,030
these volcanic plumes and sample the

50
00:02:52,280 --> 00:02:50,820
material that's spewing out and we're

51
00:02:54,470 --> 00:02:52,290
not going to forget the big guy either

52
00:02:57,890 --> 00:02:54,480
Jupiter we're gonna be able to make

53
00:03:02,420 --> 00:02:57,900
observations of Jupiter and its rings as

54
00:03:05,120 --> 00:03:02,430
we orbit for about two years what's

55
00:03:07,699 --> 00:03:05,130
really compelling about these worlds is

56
00:03:10,790 --> 00:03:07,709
our search for whether there is life

57
00:03:13,090 --> 00:03:10,800
elsewhere not just in the solar system

58
00:03:15,620 --> 00:03:13,100
but in the universe can these be

59
00:03:18,380 --> 00:03:15,630
habitable environments that's really