
Psyche
#MissionToPsyche

1
00:00:05,990 --> 00:00:03,270
there aren't

2
00:00:08,230 --> 00:00:06,000
many classes of objects left in our

3
00:00:11,030 --> 00:00:08,240
solar system that we haven't looked at

4
00:00:15,190 --> 00:00:11,040
up close with a spacecraft and one of

5
00:00:18,230 --> 00:00:15,200
them that's left is the metal asteroids

6
00:00:20,390 --> 00:00:18,240
16 psyche is an asteroid that orbits the

7
00:00:23,109 --> 00:00:20,400
sun out between mars and jupiter the

8
00:00:25,750 --> 00:00:23,119
reason that psyche is unique is that it

9
00:00:28,310 --> 00:00:25,760
is metal-rich it's believed that it may

10
00:00:30,230 --> 00:00:28,320
be a remnant core of an early

11
00:00:32,150 --> 00:00:30,240
planetesimal that was formed in the very

12
00:00:34,709 --> 00:00:32,160
very earliest parts of the formation of

13
00:00:36,389 --> 00:00:34,719

the solar system and after this planet

14
00:00:38,470 --> 00:00:36,399
started forming and this metal core

15
00:00:40,549 --> 00:00:38,480
formed inside of that it collided with

16
00:00:44,229 --> 00:00:40,559
other bodies that then stripped off the

17
00:00:47,430 --> 00:00:44,239
rocky mantle leaving this core in place

18
00:00:50,389 --> 00:00:47,440
this is the part of planets that we

19
00:00:51,830 --> 00:00:50,399
can't sample directly today it's too hot

20
00:00:53,750 --> 00:00:51,840
the pressure's too high our instruments

21
00:00:55,510 --> 00:00:53,760
would melt can't drill a hole that deep

22
00:00:57,350 --> 00:00:55,520
in the earth or other planets so how do

23
00:00:59,349 --> 00:00:57,360
we study the core

24
00:01:01,270 --> 00:00:59,359
of our planet psyche gives us the

25
00:01:03,349 --> 00:01:01,280
opportunity to visit a core the only way

26
00:01:05,670 --> 00:01:03,359
that humankind can ever do and it would

27
00:01:06,440 --> 00:01:05,680
be the first metal object that humankind

28
00:01:09,190 --> 00:01:06,450
has ever visited

29
00:01:11,429 --> 00:01:09,200
[Music]

30
00:01:12,789 --> 00:01:11,439
we've been approved to go in august of

31
00:01:14,230 --> 00:01:12,799
2022.

32
00:01:17,109 --> 00:01:14,240
it'll take a number of years to get

33
00:01:19,030 --> 00:01:17,119
there flies past mars gives us a gravity

34
00:01:20,870 --> 00:01:19,040
assist uses that propulsion system to

35
00:01:23,270 --> 00:01:20,880
then slowly creep up

36
00:01:25,600 --> 00:01:23,280
so at the end of 2025 getting there in

37
00:01:27,670 --> 00:01:25,610
early 2026.

38
00:01:29,749 --> 00:01:27,680

[Music]

39
00:01:32,950 --> 00:01:29,759
we'll go into four concentrically

40
00:01:34,789 --> 00:01:32,960
smaller orbits to collect the necessary

41
00:01:36,950 --> 00:01:34,799
measurements that we need from our three

42
00:01:39,350 --> 00:01:36,960
primary instruments so our payload

43
00:01:42,069 --> 00:01:39,360
consists of a couple of imagers which

44
00:01:43,910 --> 00:01:42,079
are cameras that take pictures of psyche

45
00:01:45,510 --> 00:01:43,920
also a gamma-ray neutron spectrometer

46
00:01:47,670 --> 00:01:45,520
which allows us to measure the elemental

47
00:01:49,190 --> 00:01:47,680
composition of the surface of psyche and

48
00:01:51,270 --> 00:01:49,200
then a magnetometer which will allow us

49
00:01:54,469 --> 00:01:51,280
to detect any magnetic field that's left

50
00:01:56,550 --> 00:01:54,479
at psyche if psyche still has some sort

51
00:01:58,230 --> 00:01:56,560
of remnant magnetic field that that

52
00:02:00,310 --> 00:01:58,240
probably tells us it really was a core

53
00:02:02,469 --> 00:02:00,320
it's a strong indicator we also use the

54
00:02:04,789 --> 00:02:02,479
radio on the spacecraft as an instrument

55
00:02:08,869 --> 00:02:04,799
so we can map out the gravity and map

56
00:02:10,389 --> 00:02:08,879
out the interior structure that way

57
00:02:11,750 --> 00:02:10,399
we're using a particular thruster

58
00:02:13,589 --> 00:02:11,760
technology hall effect thruster

59
00:02:15,350 --> 00:02:13,599
technology they operate five times more

60
00:02:17,910 --> 00:02:15,360
efficiently than normal rockets so they

61
00:02:19,110 --> 00:02:17,920
use a lot less fuel and is what allows

62
00:02:21,510 --> 00:02:19,120
us to get into orbit around this

63
00:02:23,430 --> 00:02:21,520

asteroid solar electric propulsion has

64
00:02:25,750 --> 00:02:23,440
been around for quite a while and it has

65
00:02:27,430 --> 00:02:25,760
flown before but we are continuing to

66
00:02:30,790 --> 00:02:27,440
push the boundaries we're going to have

67
00:02:32,949 --> 00:02:30,800
big five panel fold-out solar panels

68
00:02:34,309 --> 00:02:32,959
that will provide the electricity for

69
00:02:36,630 --> 00:02:34,319
the thrusters

70
00:02:38,790 --> 00:02:36,640
which use as propellant

71
00:02:40,229 --> 00:02:38,800
the noble gas xenon this will be the

72
00:02:41,710 --> 00:02:40,239
first time that hall effect thrusters

73
00:02:43,990 --> 00:02:41,720
are flown in deep space

74
00:02:45,990 --> 00:02:44,000
[Music]

75
00:02:48,630 --> 00:02:46,000
studying the evolution of a planetary

76
00:02:50,630 --> 00:02:48,640
body is a detective story

77
00:02:52,869 --> 00:02:50,640
there's a magic to when you actually are

78
00:02:55,190 --> 00:02:52,879
on the launch pad and you say we're go

79
00:02:56,790 --> 00:02:55,200
for launch and you feel like singing and

80
00:02:58,949 --> 00:02:56,800
dancing and you feel like throwing up at

81
00:03:00,550 --> 00:02:58,959
the same time let's go discover things

82
00:03:01,830 --> 00:03:00,560
about our solar system that we have no

83
00:03:04,630 --> 00:03:01,840
other way to do

84
00:03:06,790 --> 00:03:04,640
i think that it's fundamental to who we

85
00:03:09,190 --> 00:03:06,800
are and also who we should be it's an

86
00:03:12,000 --> 00:03:09,200
incredible opportunity to be a part of