1
00:00:14,490 --> 00:00:10,049
if all goes as planned three two we have

2
00:00:17,580 --> 00:00:14,500
main engine start in 2007 and liftoff a

3
00:00:21,340 --> 00:00:17,590
delta 2 rocket will carry dawn beyond

4
00:00:24,850 --> 00:00:23,380
when that dawn spacecraft lifts off and

5
00:00:26,200 --> 00:00:24,860
we're on our way to finding out about

6
00:00:28,179 --> 00:00:26,210
some of the biggest mysteries in the

7
00:00:31,690 --> 00:00:28,189
solar system that's something we can all

8
00:00:33,729 --> 00:00:31,700
be part of it's so cool going to the

9
00:00:37,000 --> 00:00:33,739
asteroid belt this ring of broken up

10
00:00:39,700 --> 00:00:37,010
debris between Mars and Jupiter these

11
00:00:43,030 --> 00:00:39,710
are among the last unexplored worlds in

12
00:00:47,590 --> 00:00:43,040
the inner solar system the asteroid belt

13
00:00:50,049 --> 00:00:47,600

is really fascinating because it's kind

14
00:00:53,350 --> 00:00:50,059
of like the boneyard of material that's

15
00:00:56,680 --> 00:00:53,360
left over from forming all these planets

16
00:00:58,510 --> 00:00:56,690
it's fragments of explosions of

17
00:01:01,720 --> 00:00:58,520
planetary embryos perhaps during

18
00:01:03,850 --> 00:01:01,730
collisions or material that's come in

19
00:01:05,889 --> 00:01:03,860
from other parts of the solar system and

20
00:01:09,520 --> 00:01:05,899
been captured into this orbit of the

21
00:01:11,980 --> 00:01:09,530
asteroid belt we're going out to Ceres

22
00:01:15,790 --> 00:01:11,990
and also to Vesta and these are very

23
00:01:18,040 --> 00:01:15,800
different bodies Vesta is the brightest

24
00:01:21,190 --> 00:01:18,050
asteroid in the solar system and the

25
00:01:23,169 --> 00:01:21,200
only one visible to the naked eye in one

26
00:01:24,609 --> 00:01:23,179
sense it's sort of like our moon but in

27
00:01:27,580 --> 00:01:24,619
another sense that's sort of like the

28
00:01:29,890 --> 00:01:27,590
earth it's got a iron core just like the

29
00:01:32,850 --> 00:01:29,900
earth does and it may have had many of

30
00:01:36,310 --> 00:01:32,860
the processes acting that the earth has

31
00:01:38,560 --> 00:01:36,320
the three science instruments on Don all

32
00:01:40,929 --> 00:01:38,570
work together to tell us about the

33
00:01:43,539 --> 00:01:40,939
surfaces of the body and from that week

34
00:01:45,520 --> 00:01:43,549
we try to work back to you know how the

35
00:01:47,160 --> 00:01:45,530
whole thing was put together and what

36
00:01:49,630 --> 00:01:47,170
happened to it

37
00:01:52,179 --> 00:01:49,640
scientists believe series represents a

38
00:01:53,770 --> 00:01:52,189

transition from the rocky terrestrial

39
00:01:56,050 --> 00:01:53,780
planets of the inner solar system

40
00:01:58,960 --> 00:01:56,060
which will be dashes and icy worlds of

41
00:02:02,410 --> 00:01:58,970
the outer solar system Ceres likely has

42
00:02:03,880 --> 00:02:02,420
a rocky core and a very thick ice mantle

43
00:02:05,950 --> 00:02:03,890
there's even the possibility that

44
00:02:08,979 --> 00:02:05,960
there's liquid water under the surface

45
00:02:11,140 --> 00:02:08,989
of Ceres we estimated from our

46
00:02:12,819 --> 00:02:11,150
measurements with Hubble Space Telescope

47
00:02:16,060 --> 00:02:12,829
that it's got almost a hundred

48
00:02:18,970 --> 00:02:16,070
kilometres of water on top of a rocky

49
00:02:20,620 --> 00:02:18,980
core to accomplish Don's journey into

50
00:02:22,360 --> 00:02:20,630
the heart of the asteroid belt the

51
00:02:24,340 --> 00:02:22,370
spaceship one whose engine will work

52
00:02:27,789 --> 00:02:24,350
without fail for years at a time is

53
00:02:30,310 --> 00:02:27,799
required Dawn's remarkable ion engines

54
00:02:32,190 --> 00:02:30,320
employ electrical currents magnetic

55
00:02:35,229 --> 00:02:32,200
fields and Zenon

56
00:02:37,660 --> 00:02:35,239
the high-tech innards of an ion engine

57
00:02:40,300 --> 00:02:37,670
change the xenon into a positively

58
00:02:43,390 --> 00:02:40,310
charged plasma and accelerated out the

59
00:02:45,550 --> 00:02:43,400
engine at speeds over 78,000 miles per

60
00:02:47,920 --> 00:02:45,560
hour the ion engine pushes on the

61
00:02:50,259 --> 00:02:47,930
spacecraft about as hard as the single

62
00:02:53,020 --> 00:02:50,269
piece of paper pushes on my hand but

63
00:02:55,300 --> 00:02:53,030

this very gentle thrust eventually

64
00:02:57,729 --> 00:02:55,310
builds up and allows the spacecraft to

65
00:02:59,619 --> 00:02:57,739
achieve very very high speed with the

66
00:03:02,199 --> 00:02:59,629
ion propulsion system Don will be the

67
00:03:05,259 --> 00:03:02,209
first spacecraft ever to orbit to target

68
00:03:08,080 --> 00:03:05,269
bodies after leaving Earth a mission

69
00:03:10,809 --> 00:03:08,090
into our distant past a mission for the