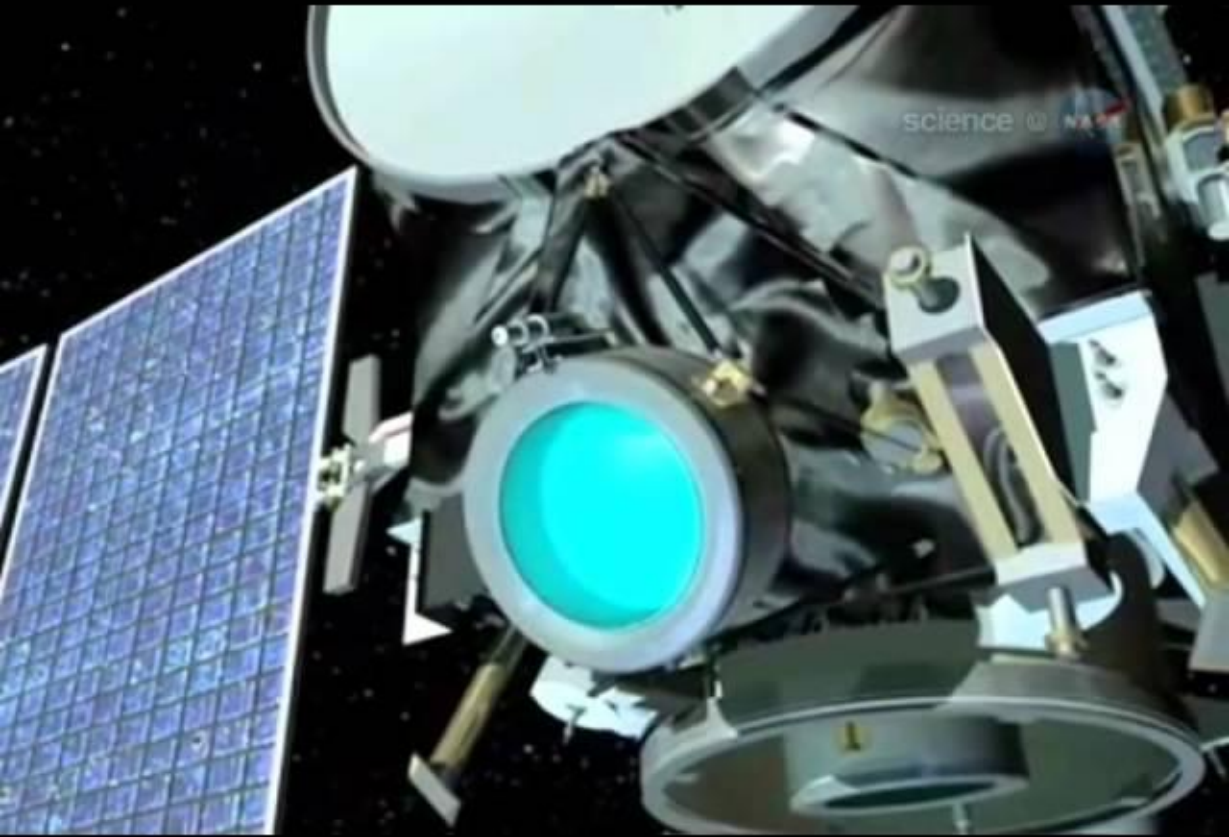
science @ NASA

1
00:00:11,240 --> 00:00:07,400
Dawn's smooth move presented by science

2
00:00:13,160 --> 00:00:11,250
at NASA when a nasa spacecraft goes into

3
00:00:15,530 --> 00:00:13,170
orbit around a new world for the first

4
00:00:17,750 --> 00:00:15,540
time the control room is usually packed

5
00:00:21,260 --> 00:00:17,760
to capacity with scientists engineers

6
00:00:23,779 --> 00:00:21,270
and dignitaries ready to leap and shout

7
00:00:27,859 --> 00:00:23,789
when the retrorockets fire it's a big

8
00:00:30,250 --> 00:00:27,869
noisy event July fifteenth 2011 was one

9
00:00:33,110 --> 00:00:30,260
of those days NASA's Dawn spacecraft

10
00:00:35,330 --> 00:00:33,120
approached Vesta and became the first

11
00:00:38,510 --> 00:00:35,340
probe from earth to orbit a main belt

12
00:00:40,330 --> 00:00:38,520
asteroid Dawn's cameras revealed a dozen

13
00:00:42,319 --> 00:00:40,340

at world of transcendent beauty

14
00:00:45,200 --> 00:00:42,329
thrilling everyone who works in the

15
00:00:49,250 --> 00:00:45,210
project needless to say the control room

16
00:00:51,170 --> 00:00:49,260
was silent actually it was empty says

17
00:00:54,110 --> 00:00:51,180
Don chief engineer mark Raymond of

18
00:00:56,569 --> 00:00:54,120
NASA's Jet Propulsion Laboratory Don

19
00:00:58,790 --> 00:00:56,579
entered orbit on a Friday night i myself

20
00:01:02,330 --> 00:00:58,800
was out dancing with my wife and friends

21
00:01:04,390 --> 00:01:02,340
what gives Raymond an avid folk dancer

22
00:01:06,530 --> 00:01:04,400
explains I really was out dancing

23
00:01:09,590 --> 00:01:06,540
confident that the padded ER being

24
00:01:12,399 --> 00:01:09,600
performed 188 million kilometers away

25
00:01:16,640 --> 00:01:12,409
would be executed with lawless precision

26
00:01:18,800 --> 00:01:16,650
indeed Don is unprecedented while most

27
00:01:21,170 --> 00:01:18,810
spacecraft blast off earth atop a

28
00:01:23,510 --> 00:01:21,180
firestorm of conventional rocket exhaust

29
00:01:26,420 --> 00:01:23,520
then coast to their destinations with

30
00:01:27,859 --> 00:01:26,430
engines turned off to conserve fuel dawn

31
00:01:30,020 --> 00:01:27,869
was able to continue thrusting

32
00:01:32,240 --> 00:01:30,030
throughout its voyage Dawn's

33
00:01:34,310 --> 00:01:32,250
fuel-efficient ion engines gently

34
00:01:37,280 --> 00:01:34,320
propelled the spacecraft toward Vesta

35
00:01:39,350 --> 00:01:37,290
for more than three years never exerting

36
00:01:42,590 --> 00:01:39,360
more force than the weight of a feather

37
00:01:44,569 --> 00:01:42,600
held in your open palm yet over time

38
00:01:47,240 --> 00:01:44,579

gathering enough speed to catch an

39
00:01:49,969 --> 00:01:47,250
asteroid racing halfway across the solar

40
00:01:52,789 --> 00:01:49,979
system with the ion engines firing

41
00:01:54,940 --> 00:01:52,799
almost constantly mission controllers

42
00:01:57,440 --> 00:01:54,950
were able to actively steer the probe

43
00:01:59,600 --> 00:01:57,450
gradually reshaping Dawn's orbit around

44
00:02:02,840 --> 00:01:59,610
the Sun until it matched the orbit of

45
00:02:05,209 --> 00:02:02,850
Vesta itself meeting Vesta for orbital

46
00:02:07,670 --> 00:02:05,219
insertion wasn't a jarring encounter of

47
00:02:10,400 --> 00:02:07,680
mismatched velocities it was more like

48
00:02:12,110 --> 00:02:10,410
two dancers merging and practiced rhythm

49
00:02:14,780 --> 00:02:12,120
to a familiar tune

50
00:02:17,690 --> 00:02:14,790
dawn did not miss a beat as it flew into

51
00:02:19,880 --> 00:02:17,700
vestas grasp says Raymond the spacecraft

52
00:02:22,280 --> 00:02:19,890
moved gently into orbit with the same

53
00:02:25,550 --> 00:02:22,290
grace it has displayed during its nearly

54
00:02:28,670 --> 00:02:25,560
1,000 days of ion propulsion through the

55
00:02:30,800 --> 00:02:28,680
solar system calculations show that the

56
00:02:33,380 --> 00:02:30,810
moment of orbit insertion occurred on

57
00:02:36,289 --> 00:02:33,390
Friday night July fifteenth around nine

58
00:02:39,020 --> 00:02:36,299
forty-five pacific time at that moment

59
00:02:41,690 --> 00:02:39,030
Dawn's orbit around the Sun finally was

60
00:02:43,690 --> 00:02:41,700
so close to that of Vesta that the proto

61
00:02:46,099 --> 00:02:43,700
planets gravity could take hold of it

62
00:02:48,009 --> 00:02:46,109
radio signals picked up by the Deep

63
00:02:50,839 --> 00:02:48,019

Space Network on July sixteenth

64
00:02:54,289 --> 00:02:50,849
confirmed that the spaceship an asteroid

65
00:02:56,630 --> 00:02:54,299
were truly a pair Don will spend the

66
00:02:59,180 --> 00:02:56,640
next year circling Vesta in a series of

67
00:03:01,729 --> 00:02:59,190
descending passes bringing the giant

68
00:03:03,890 --> 00:03:01,739
asteroids surface ever closer to Dawn's

69
00:03:06,500 --> 00:03:03,900
cameras and other science instruments

70
00:03:09,140 --> 00:03:06,510
because Vesta is a relic of long ago

71
00:03:11,030 --> 00:03:09,150
planet formation a glimpse into the

72
00:03:13,430 --> 00:03:11,040
ancient history of our solar system

73
00:03:16,009 --> 00:03:13,440
could be revealed under dawn's careful

74
00:03:20,059 --> 00:03:16,019
scrutiny this really beautiful dance

75
00:03:22,640 --> 00:03:20,069
says Raymond is just getting started for

76
00:03:24,620 --> 00:03:22,650
updates from dusta and more smooth moves