



1
00:00:15,760 --> 00:00:14,600
first Jupiter in 1979 then Saturn two

2
00:00:20,599 --> 00:00:15,770
years later

3
00:00:23,660 --> 00:00:20,609
Uranus in 1986 and finally Neptune the

4
00:00:27,160 --> 00:00:23,670
blue giant all part of Voyager twos

5
00:00:29,960 --> 00:00:27,170
12-year grand tour of the outer planets

6
00:00:32,359 --> 00:00:29,970
having traveled over four billion miles

7
00:00:34,790 --> 00:00:32,369
through the solar system the spacecraft

8
00:00:37,299 --> 00:00:34,800
trained its aging cameras and electronic

9
00:00:39,889 --> 00:00:37,309
sensors on the mysterious blue planet

10
00:00:42,380 --> 00:00:39,899
revealing an unexpectedly turbulent

11
00:00:45,310 --> 00:00:42,390
world of violent storms and backpedaling

12
00:00:47,779 --> 00:00:45,320
winds up to 700 miles per hour a

13
00:00:50,450 --> 00:00:47,789

particular interest with the swirling

14

00:00:53,569 --> 00:00:50,460

energetic dark spots recording the

15

00:00:55,850 --> 00:00:53,579

project scientist dr. in stone we

16

00:00:58,430 --> 00:00:55,860

believe that these large spots are in

17

00:01:01,580 --> 00:00:58,440

fact huge hurricane like storm systems

18

00:01:03,830 --> 00:01:01,590

when you have opposing jet streams they

19

00:01:06,289 --> 00:01:03,840

tend to generate vortices or small

20

00:01:08,539 --> 00:01:06,299

storms and those small storms collide

21

00:01:12,350 --> 00:01:08,549

with each other and accumulate to make

22

00:01:15,320 --> 00:01:12,360

one large storm Voyager 2 also found six

23

00:01:17,179 --> 00:01:15,330

new moons around Neptune and produced

24

00:01:19,039 --> 00:01:17,189

imagery of the planets three rings

25

00:01:22,219 --> 00:01:19,049

believed to be debris left from

26

00:01:24,920 --> 00:01:22,229

collisions between larger objects after

27

00:01:27,350 --> 00:01:24,930

passing just 3,000 miles over its cloud

28

00:01:30,679 --> 00:01:27,360

tops Voyager turned its attention to

29

00:01:33,440 --> 00:01:30,689

Neptune's largest moon Triton a five

30

00:01:35,810 --> 00:01:33,450

mile tall geyser shooting dark particles

31

00:01:38,749 --> 00:01:35,820

into its atmosphere was just one of the

32

00:01:40,520 --> 00:01:38,759

surprises Triton had to offer here is a

33

00:01:41,870 --> 00:01:40,530

moon which is in a retrograde orbit that

34

00:01:43,520 --> 00:01:41,880

is it's orbiting backwards around

35

00:01:46,340 --> 00:01:43,530

Neptune compared to the way Neptune is

36

00:01:48,469 --> 00:01:46,350

rotating on tablet there was methane ice

37

00:01:50,960 --> 00:01:48,479

frozen natural gas on a surface and

38

00:01:53,120 --> 00:01:50,970

probably frozen nitrogen on a surface we

39

00:01:55,280 --> 00:01:53,130

had never seen a moon with those ices on

40

00:01:57,080 --> 00:01:55,290

their surface it is the coldest object

41

00:02:01,560 --> 00:01:57,090

we have seen in the solar system almost

42

00:02:05,830 --> 00:02:04,090

Voyager's accomplishments are even more

43

00:02:07,480 --> 00:02:05,840

impressive considering that it was

44

00:02:10,540 --> 00:02:07,490

originally supposed to visit only

45

00:02:13,330 --> 00:02:10,550

Jupiter and Saturn Uranus and Neptune

46

00:02:16,020 --> 00:02:13,340

were added bonuses achievable because of

47

00:02:22,030 --> 00:02:16,030

the spacecraft's remarkable performance

48

00:02:24,160 --> 00:02:22,040

huge antennas on the ground which by the

49

00:02:26,949 --> 00:02:24,170

time it rendezvous with Neptune took

50

00:02:29,140 --> 00:02:26,959

over four hours to reach Earth and the

51
00:02:31,449 --> 00:02:29,150
transmitter on the spacecraft used to

52
00:02:33,340 --> 00:02:31,459
send back those signals is only about as

53
00:02:37,210 --> 00:02:33,350
powerful as the light bulb in a

54
00:02:40,930 --> 00:02:37,220
refrigerator like its sister ship

55
00:02:43,390 --> 00:02:40,940
Voyager 1 Voyager 2 is now bound for the

56
00:02:46,449 --> 00:02:43,400
edges of the solar system other

57
00:02:49,270 --> 00:02:46,459
spacecraft such as Galileo scheduled for

58
00:02:51,550 --> 00:02:49,280
a return to Jupiter and Cassini which

59
00:02:53,650 --> 00:02:51,560
will revisit Saturn are slated to make

60
00:02:54,309 --> 00:02:53,660
even more detailed studies of the

61
00:02:57,460 --> 00:02:54,319
planets

62
00:02:59,680 --> 00:02:57,470
the voyagers legacy of discovery can

63
00:03:03,339 --> 00:02:59,690

never be duplicated Voyager will be

64

00:03:05,199 --> 00:03:03,349

regarded as the quintessential mission

65

00:03:07,569 --> 00:03:05,209

of exploration there has been no other

66

00:03:09,699 --> 00:03:07,579

mission which has explored so many new

67

00:03:11,410 --> 00:03:09,709

worlds and there can be no other mission

68

00:03:13,569 --> 00:03:11,420

which will do that in the future only

69

00:03:16,300 --> 00:03:13,579

Voyager has had the opportunity of

70

00:03:18,099 --> 00:03:16,310

visiting in sequence for giant planets