1
00:00:08,629 --> 00:00:06,150
just like scientific discoveries happen

2
00:00:10,790 --> 00:00:08,639
every day in today's laboratories so

3
00:00:12,789 --> 00:00:10,800
planetary spacecraft over the last

4
00:00:15,030 --> 00:00:12,799
several decades have made startling

5
00:00:17,269 --> 00:00:15,040
discoveries concerning the solar system

6
00:00:19,349 --> 00:00:17,279
we live in

7
00:00:21,189 --> 00:00:19,359
in the quest for better understanding of

8
00:00:29,349 --> 00:00:21,199
the world and universe

9
00:00:34,229 --> 00:00:31,830
the spectacular achievements of voyager

10
00:00:36,229 --> 00:00:34,239
1 and 2 as they flew past jupiter and

11
00:00:41,350 --> 00:00:36,239
its satellites far exceed the

12
00:00:45,670 --> 00:00:43,910
new discoveries heighten our awareness

13
00:00:47,750 --> 00:00:45,680

raising new questions

14
00:00:50,150 --> 00:00:47,760
what part do earth and its inhabitants

15
00:00:51,750 --> 00:00:50,160
play in this universal scene

16
00:00:53,990 --> 00:00:51,760
how is earth different from other

17
00:00:56,069 --> 00:00:54,000
planets in our solar system

18
00:00:58,630 --> 00:00:56,079
how are we the same

19
00:01:00,630 --> 00:00:58,640
as voyager past jupiter it discovered a

20
00:01:03,670 --> 00:01:00,640
thin ring about the planet

21
00:01:05,910 --> 00:01:03,680
what is its composition

22
00:01:08,310 --> 00:01:05,920
we know there are 16 moons are there

23
00:01:12,710 --> 00:01:10,149
several of the satellites are composed

24
00:01:15,190 --> 00:01:12,720
partially of water ice

25
00:01:17,429 --> 00:01:15,200
one is violently volcanic

26
00:01:19,749 --> 00:01:17,439
how did these bodies form and what is

27
00:01:22,070 --> 00:01:19,759
their history

28
00:01:24,469 --> 00:01:22,080
what can this giant planet tell us about

29
00:01:27,030 --> 00:01:24,479
the history of our solar system

30
00:01:29,190 --> 00:01:27,040
dr torrance johnson project scientist

31
00:01:31,350 --> 00:01:29,200
well jupiter itself of course we believe

32
00:01:33,590 --> 00:01:31,360
to be composed primarily of material

33
00:01:35,670 --> 00:01:33,600
that's very similar and virtually

34
00:01:37,350 --> 00:01:35,680
unchanged uh

35
00:01:39,510 --> 00:01:37,360
in the last four billion years to the

36
00:01:41,830 --> 00:01:39,520
material that formed all of the planets

37
00:01:43,749 --> 00:01:41,840
the fundamental solar nebula if you will

38
00:01:46,069 --> 00:01:43,759

the gas and dust from which all the

39
00:01:47,830 --> 00:01:46,079
planets formed in addition to which the

40
00:01:49,590 --> 00:01:47,840
satellite systems surrounding its

41
00:01:51,270 --> 00:01:49,600
magnetic field

42
00:01:53,429 --> 00:01:51,280
environment make it virtually a

43
00:01:56,069 --> 00:01:53,439
miniature solar system so by studying

44
00:01:58,550 --> 00:01:56,079
this system we can learn a lot about how

45
00:02:01,910 --> 00:01:58,560
the solar system as a whole formed and

46
00:02:04,950 --> 00:02:01,920
something about our own origins

47
00:02:07,109 --> 00:02:04,960
galileo the new generation spacecraft is

48
00:02:13,589 --> 00:02:07,119
designed to spend an extended period of

49
00:02:21,270 --> 00:02:15,910
the spacecraft will release a probe to

50
00:02:26,550 --> 00:02:23,270
the orbiter is then targeted to its

51
00:02:32,070 --> 00:02:26,560
first encounter io a moon known to have

52
00:02:35,750 --> 00:02:33,830
then the orbiter points its relay

53
00:02:45,670 --> 00:02:35,760
antenna toward the probe which begins

54
00:02:50,070 --> 00:02:47,589
once there it will investigate the

55
00:02:52,630 --> 00:02:50,080
composition temperatures and pressures

56
00:02:54,070 --> 00:02:52,640
at varying levels and send data back to

57
00:03:05,350 --> 00:02:54,080
the orbiter

58
00:03:07,990 --> 00:03:05,360
system measuring and observing the giant

59
00:03:10,550 --> 00:03:08,000
magnetic field and plasma as well as the

60
00:03:12,390 --> 00:03:10,560
intense radiation that surrounds jupiter

61
00:03:17,110 --> 00:03:12,400
while performing closer studies of the

62
00:03:21,589 --> 00:03:19,430
the combination of closer encounters and

63
00:03:24,070 --> 00:03:21,599

advanced instrument technologies carried

64
00:03:29,270 --> 00:03:24,080
on board galileo will give much better

65
00:03:33,270 --> 00:03:31,830
specific major advances that we've made

66
00:03:35,350 --> 00:03:33,280
is in the camera system where we're

67
00:03:37,670 --> 00:03:35,360
using the same optical system same

68
00:03:40,149 --> 00:03:37,680
telescope if you will that voyager did

69
00:03:43,270 --> 00:03:40,159
but instead of having a relatively slow

70
00:03:45,670 --> 00:03:43,280
and insensitive vidicon tube

71
00:03:47,589 --> 00:03:45,680
such as was used in tv cameras in the

72
00:03:50,309 --> 00:03:47,599
50s and 60s

73
00:03:52,710 --> 00:03:50,319
instead of that at the focus of the the

74
00:03:55,350 --> 00:03:52,720
telescope we now have a silicon based

75
00:03:57,589 --> 00:03:55,360
device a charged couple device

76
00:04:00,949 --> 00:03:57,599
camera system which gives us a

77
00:04:03,350 --> 00:04:00,959
increase in speed or sensitivity of the

78
00:04:04,710 --> 00:04:03,360
instrument of between 300 and a thousand

79
00:04:06,229 --> 00:04:04,720
times

80
00:04:09,110 --> 00:04:06,239
that allows us to take much higher

81
00:04:11,190 --> 00:04:09,120
resolution pictures much closer

82
00:04:12,789 --> 00:04:11,200
without blurring and it also gives us

83
00:04:14,390 --> 00:04:12,799
access to a little bit of the infrared

84
00:04:16,949 --> 00:04:14,400
part of the spectrum that was totally

85
00:04:18,789 --> 00:04:16,959
inaccessible to the voyager cameras

86
00:04:20,789 --> 00:04:18,799
now in addition to that in the infrared

87
00:04:23,430 --> 00:04:20,799
we have an entirely new device called

88
00:04:25,110 --> 00:04:23,440

the near-infrared mapping spectrometer

89
00:04:27,110 --> 00:04:25,120
which if you will is a little bit like a

90
00:04:28,790 --> 00:04:27,120
landsat type device

91
00:04:31,749 --> 00:04:28,800
giving us images in many different

92
00:04:33,670 --> 00:04:31,759
spectral bands and we'll have about 300

93
00:04:36,469 --> 00:04:33,680
different spectral bands what this means

94
00:04:38,550 --> 00:04:36,479
is we'll have from this device pictures

95
00:04:41,030 --> 00:04:38,560
with relatively modest resolution

96
00:04:43,270 --> 00:04:41,040
spatially but with where each pixel

97
00:04:45,189 --> 00:04:43,280
element within the picture will have a

98
00:04:46,870 --> 00:04:45,199
300 channel spectrum attached we're

99
00:04:49,830 --> 00:04:46,880
going to be using this in both jupiter

100
00:04:51,670 --> 00:04:49,840
and the satellites to map composition on

101
00:04:54,230 --> 00:04:51,680
their surfaces study the characteristics

102
00:04:56,310 --> 00:04:54,240
of jovian clouds find out where ices are

103
00:04:58,070 --> 00:04:56,320
on the surface try to identify the

104
00:05:01,430 --> 00:04:58,080
materials frozen out on the surface of

105
00:05:06,870 --> 00:05:04,150
enroute to jupiter galileo will pick up

106
00:05:09,430 --> 00:05:06,880
energy by utilizing gravity assists

107
00:05:10,710 --> 00:05:09,440
while traveling once by venus and twice

108
00:05:12,710 --> 00:05:10,720
by earth

109
00:05:15,189 --> 00:05:12,720
in addition to the bonus of studying

110
00:05:17,990 --> 00:05:15,199
these two planets and earth's moon

111
00:05:20,390 --> 00:05:18,000
galileo will perform close flybys on one

112
00:05:25,029 --> 00:05:20,400
or two asteroids never before closely

113
00:05:31,990 --> 00:05:26,790

then galileo will rendezvous with

114
00:05:36,550 --> 00:05:33,990
this unique trajectory will allow

115
00:05:38,710 --> 00:05:36,560
galileo to reach its ultimate goal

116
00:05:40,870 --> 00:05:38,720
returning a bonanza of scientific