1
00:00:02,680 --> 00:00:06,400
NARRATOR: Humanity has had its eyes on Jupiter for centuries.

2
00:00:06,400 --> 00:00:15,100
First telescopes and in recent decades eight deep space probes were used to examine the largest planet in the

3
00:00:15,100 --> 00:00:21,850
NASA is returning to the gas giant with a large spacecraft called Juno. Equipped with unique sensors,

4
00:00:21,850 --> 00:00:26,790
Juno will look deeper into the planet's structure than ever before to find out the

5
00:00:26,790 --> 00:00:32,310
answers to basic questions about Jupiter's make up and how it formed.

6
00:00:32,310 --> 00:00:34,690
Scott Bolton Principal Investigator, Juno: Juno's looking for how Jupiter

7
00:00:34,690 --> 00:00:38,660
formed and really how planets are made in general.

8
00:00:38,660 --> 00:00:42,100
We're very much looking for the recipe for planets.

9
00:00:42,100 --> 00:00:46,280
The special thing about Juno is we're really looking at one of the first steps,

10
00:00:46,280 --> 00:00:49,610
the earliest time in our solar system's history.

11
00:00:49,610 --> 00:00:53,930
Right after the sun formed, what happened that allowed the planets to form

12
00:00:53,930 --> 00:00:58,680
and why are the planets a slightly different composition than the sun?

13
00:00:58,680 --> 00:01:02,450

NARRATOR: Jupiter is so far away from Earth that even when it is at its closest to us,

14
00:01:02,450 --> 00:01:10,350
it will still take a radio signal moving at the speed of light about 34 minutes to cross the distance.

15
00:01:10,350 --> 00:01:15,960
Getting Juno on a course to reach the distant planet is the job of an Atlas V rocket,

16
00:01:15,960 --> 00:01:18,910
one of the largest in NASA's catalog.

17
00:01:18,910 --> 00:01:23,350
Already been used to loft several NASA missions for the Launch Services Program,

18
00:01:23,350 --> 00:01:27,620
including the New Horizons spacecraft on its way to Pluto.

19
00:01:27,620 --> 00:01:33,420
Omar Baez Launch Director, Juno: It's flown as I said, 28 times, pretty challenging missions,

20
00:01:33,420 --> 00:01:36,750
pretty challenging payloads.

21
00:01:36,750 --> 00:01:44,330
It's got a heritage that goes back to the Atlas I in some of the components and in the upper stage,

22
00:01:44,330 --> 00:01:53,940
so it's an evolution of a family in its current configuration and shape and form.

23
00:01:53,940 --> 00:01:58,580
I'd say it's pretty robust.

24
00:01:58,580 --> 00:02:04,480
NARRATOR: The alignment of Earth and Jupiter leaves the mission's managers with a limited window to launc

25
00:02:04,480 --> 00:02:07,350
John Calvert Mission Manager, Juno: Juno only has a 22-day launch window,

26
00:02:07,350 --> 00:02:11,280
or else we're down for another 13 months until our next opportunity.

27
00:02:11,280 --> 00:02:14,680
And so it's those kinds of challenges with making sure you do all the

28
00:02:14,680 --> 00:02:21,090
little things necessary to maximize the opportunities you get for those 22 days.

29
00:02:21,090 --> 00:02:27,460
NARRATOR: Even riding a powerful rocket into space will not be enough on its own to push Juno to its target.

30
00:02:27,460 --> 00:02:32,420
The spacecraft still needs the kind of assist only a planet can provide.

31
00:02:32,420 --> 00:02:37,060
That's why Juno will go into an orbit that will bring it past Earth two years

32
00:02:37,060 --> 00:02:44,810
after launch and use the Earth's gravity to slingshot it out to Jupiter, arriving there in August 2016.

33
00:02:44,810 --> 00:02:49,050
Aside from distance, Jupiter offers unique challenges to a spacecraft,

34
00:02:49,050 --> 00:02:54,150
such as a radiation field rivaled in intensity only by the sun.

35
00:02:54,150 --> 00:02:58,720
BOLTON: We have a box in the middle of the spacecraft that we call a vault and it's made out of

36
00:02:58,720 --> 00:03:04,720
titanium and that shields all the electronics from the hazardous radiation.

37
00:03:04,720 --> 00:03:08,370
We're very much an armored tank going to Jupiter.

38
00:03:08,370 --> 00:03:12,770

NARRATOR: Just as Juno is building on the knowledge gained with past missions to Jupiter,

39
00:03:12,770 --> 00:03:16,680
future missions will build on Juno's findings.

40
00:03:16,680 --> 00:03:21,100
BOLTON: If we could start to understand the role that Jupiter played and how the planet formed and how

41
00:03:21,100 --> 00:03:26,710
that eventually governed the creation of the other planets and the Earth and maybe even life itself,

42
00:03:26,710 --> 00:03:32,520
then we know a little bit about how to look for other Earth-like planets,

43
00:03:32,520 --> 00:03:38,060
maybe orbiting other stars and how common those might be and the roles

44
00:03:38,060 --> 00:03:42,240
that those giant planets that we see orbiting the other stars play.

45
00:03:42,240 --> 00:03:47,130
NARRATOR: NASA's Launch Services Program has dispatched several probes to deep space in recent years,

46
00:03:47,130 --> 00:03:53,700
including the Opportunity and Spirit rovers on Mars, the Cassini spacecraft that is studying Saturn

47
00:03:53,700 --> 00:03:58,620
and the New Horizons mission that is on its way to Pluto.

48
00:03:58,620 --> 00:04:02,550
NARRATOR: The schedule does not lighten for the LSP team after Juno.

49
00:04:02,550 --> 00:04:09,860
Along with an experimental weather satellite, missions to the moon and to Mars are set for launch this year.

50
00:04:09,860 --> 00:04:13,260
CALVERT: Really, all these missions that LSP is involved in, that NASA's involved in, they're all

51
00:04:13,260 --> 00:04:21,440
precursors to the bigger picture of getting humans out beyond Earth orbit, to Mars, to an asteroid.

52
00:04:21,440 --> 00:04:28,280
NARATOR: For now, though, the team is focused on getting Juno safely on its way to Jupiter.