1
00:00:08,900 --> 00:00:11,031
NARRATOR:
The first spacecraft equipped to take a sample

2
00:00:11,031 --> 00:00:15,920
from an asteroid is preparing to lift off
from Florida's Space Coast in September on

3
00:00:15,920 --> 00:00:21,210
a mission vital to unwrapping some of the
secrets of mysterious near-Earth objects.

4
00:00:21,210 --> 00:00:26,390
Near-Earth objects emit no light of their
own, so researchers get few opportunities

5
00:00:26,390 --> 00:00:30,730
to study them as they cross through sunlight
that reflects their features to instruments

6
00:00:30,730 --> 00:00:32,800
on the ground.

7
00:00:32,800 --> 00:00:35,260
That's where Osiris-Rex comes in.

8
00:00:35,260 --> 00:00:41,190
Weighing 4,650 pounds when fully fueled, the
boxy spacecraft will rocket away from Earth

9
00:00:41,190 --> 00:00:43,960
on a path toward an asteroid called Bennu.

10
00:00:43,960 --> 00:00:48,040
Dante Lauretta:
OSIRIS-REx is an awesome acronym that captures

11
00:00:48,040 --> 00:00:51,610
the primary scientific objectives of our program.

12
00:00:51,610 --> 00:00:57,900
It is Origins (seeking answers to clues of
the origin of our planet and to the origin

13
00:00:57,900 --> 00:01:02,820
of life), Spectral Interpretation (spectroscopy
is a technique we use with telescopes and

14
00:01:02,820 --> 00:01:06,960
spacecraft instruments to determine the composition
of an objects surface by having the sample

15
00:01:06,960 --> 00:01:09,820
back on Earth we'll be able to tell how
well that technique works), Resource Identification

16
00:01:09,820 --> 00:01:14,140
(we're going to a near-Earth asteroid, we're
going to map it with our cameras and our other

17
00:01:14,140 --> 00:01:20,870
science instruments to identify the minerals
and chemicals that may be on its surface),

18
00:01:20,870 --> 00:01:26,120
Security (because it's a near-Earth asteroid
there is a small likelihood it may impact

19
00:01:26,120 --> 00:01:27,820
the Earth sometime in the 22nd century.

20
00:01:27,820 --> 00:01:29,990
We're going to refine its orbit and understand
the properties of sunlight and heat that may

21
00:01:29,990 --> 00:01:34,170
change that orbit), Regolith Explorer (regolith
is a term for the gravel and dust on the surface

22
00:01:34,170 --> 00:01:38,659
of the asteroid, and our prime objective is
to explore that material by bringing it back

23
00:01:38,659 --> 00:01:39,659
to Earth).

24
00:01:39,659 --> 00:01:42,190
NARRATOR:
A United Launch Alliance Atlas V has been

25
00:01:42,190 --> 00:01:47,900
stacked at Space Launch Complex 41 to start
the spacecraft on its way.

26
00:01:47,900 --> 00:01:52,850
Standing some 19 stories tall, the rocket
with the spacecraft protected inside a payload

27
00:01:52,850 --> 00:01:56,770
fairing will fly on a carefully planned course
into space.

28
00:01:56,770 --> 00:02:00,810
Tim Dunn:
NASA and LSP have a great history of launching

29
00:02:00,810 --> 00:02:07,600
our science missions on Atlas V. It began
in 2006, and we have launched 12 critical

30
00:02:07,600 --> 00:02:11,290
science missions on this workhorse launch
vehicle.

31
00:02:11,290 --> 00:02:13,819
OSIRIS-REx will be our 13th mission.

32
00:02:13,819 --> 00:02:16,910

NARRATOR:
The small spacecraft will go into orbit around

33
00:02:16,910 --> 00:02:23,219
the floating rock and carefully survey its
surface, relaying the data back to Earth.

34
00:02:23,219 --> 00:02:26,999
Scientists will select the best place for
the spacecraft to reach out its mechanical

35
00:02:26,999 --> 00:02:33,380
arm and tap on the surface to trap dust and
material in a tiny canister.

36
00:02:33,380 --> 00:02:37,319
Researchers would like to find material from
the original formation of the solar system.

37
00:02:37,319 --> 00:02:40,190
LAURETTA:
The primary objective of OSIRIS-REx is to

38
00:02:40,190 --> 00:02:45,779
bring back 60 grams of pristine carbon-rich
material from the surface of asteroid Bennu.

39
00:02:45,779 --> 00:02:50,549
We’re really interested in the organic chemistry
of these asteroids, and the roles these kinds

40
00:02:50,549 --> 00:02:52,719
of objects play in the origin of life.

41
00:02:52,719 --> 00:02:55,510
NARRATOR:
Osiris-Rex will retract its arm and place

42
00:02:55,510 --> 00:03:00,530
the canister in a capsule where it will be

protected during the ride back to Earth.

43
00:03:00,530 --> 00:03:05,810
With its mission done, the spacecraft will
fly by our home planet in 2023 and release

44
00:03:05,810 --> 00:03:08,590
the capsule holding the asteroid sample.

45
00:03:08,590 --> 00:03:12,919
The capsule, protected by a heat shield and
equipped with a parachute, is to fall through

46
00:03:12,919 --> 00:03:16,189
the atmosphere and be retrieved in the American
Southwest.

47
00:03:16,189 --> 00:03:19,750
LAURETTA:
The OSIRIS-REx mission uses a sample return

48
00:03:19,750 --> 00:03:24,340
capsule, to bring the material back to the
surface of the Earth, will land at the Utah

49
00:03:24,340 --> 00:03:27,930
Heston Training Range, southwest of Salt Lake
City.

50
00:03:27,930 --> 00:03:30,859
NARRATOR:
From there, researchers will carefully evaluate

51
00:03:30,859 --> 00:03:35,099
what is expected to be a couple ounces of
asteroid that could answer some of our most

52
00:03:35,099 --> 00:03:38,251
fundamental questions about Earth, the solar
system and the universe.

53
00:03:38,251 --> 00:03:43,209
Part of the analysis will include a close
look at what was found that may have been

54
00:03:43,209 --> 00:03:47,569
picked up on Earth during processing instead
of from the asteroid.

55
00:03:47,569 --> 00:03:51,650
Planners thought of that, though, and have
a step in place they say will prevent confusion.

56
00:03:51,650 --> 00:03:54,269
Rex Englehardt:
In this case we're doing something a little

57
00:03:54,269 --> 00:03:58,139
bit different that's never been done before
called "contamination knowledge" we're

58
00:03:58,139 --> 00:04:02,909
able to put plates out there where we have
them in the same environment as the spacecraft

59
00:04:02,909 --> 00:04:04,099
and we'll save them.

60
00:04:04,099 --> 00:04:08,989
In a few years when the sample comes back,
we will have these pristine, in storage, and

61
00:04:08,989 --> 00:04:14,510
when we start analyzing the sample we brought
back, we can go back and look and see, "Do

62
00:04:14,510 --> 00:04:18,019
we have that, did we see that on the ground
or did we bring that back from the asteroid?"

63
00:04:18,019 --> 00:04:20,780
NARRATOR:
Teams have been working on the Osiris-Rex

64
00:04:20,780 --> 00:04:25,930
mission for more than 10 years to plan a sample-return
flight, develop the spacecraft and get to

65
00:04:25,930 --> 00:04:27,530
this point close to launch.

66
00:04:27,530 --> 00:04:30,139
Engelhardt:
I was involved with the original spacecraft

67
00:04:30,139 --> 00:04:37,900
selection process when OSIRIS-Rex won, that
selection, and we bought the rocket for it

68
00:04:37,900 --> 00:04:39,130
in 2013, and I've been integrating that
rocket ever since.

69
00:04:39,130 --> 00:04:41,060
Lauretta:
The OSIRIS-REx team has worked really hard

70
00:04:41,060 --> 00:04:45,080
to make this mission a success, and everybody
is very excited and enthusiastic.