



1

00:00:00,000 --> 00:00:03,020

TEXT: On September 8, 2016 NASA launched OSIRIS-REx

2

00:00:03,920 --> 00:00:07,440

TEXT: OSIRIS-REx is a mission to explore near-Earth asteroid Bennu.

3

00:00:08,860 --> 00:00:12,240

TEXT: The launch began a seven-year journey from Earth to Bennu and back.

4

00:00:12,640 --> 00:00:14,540

TEXT: OSIRIS-REx Overview

5

00:00:14,540 --> 00:00:18,080

OSIRIS-REx is NASA's first
asteroid sample return mission.

6

00:00:18,085 --> 00:00:21,622

So, OSIRIS-REx will spend about
two years journeying to asteroid

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00:00:21,622 --> 00:00:22,289

Bennu.

8

00:00:22,289 --> 00:00:24,725

Once we get there we'll spend
a couple years surveying the

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00:00:24,725 --> 00:00:27,561

surface of the asteroid to find
the best place to get a sample

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00:00:27,561 --> 00:00:30,998

from and then we'll go ahead and
return it to Earth and have that

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00:00:30,998 --> 00:00:34,034

sample for scientists
to study in perpetuity.

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00:00:34,034 --> 00:00:36,270

OSIRIS-REx is an
amazing mission.

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00:00:36,270 --> 00:00:39,840

It's the third mission in the
New Frontiers line, a PI-led

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00:00:39,840 --> 00:00:42,943

mission to go to asteroid Bennu,
collect a sample and bring it

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00:00:42,943 --> 00:00:43,944

back to the Earth.

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00:00:43,944 --> 00:00:47,381

Asteroid Bennu contains
isotopes, minerals and chemicals

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00:00:47,381 --> 00:00:50,250

from the early solar system
and by studying these on Earth,

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00:00:50,250 --> 00:00:52,486

we'll better understand the
origin of the solar system, the

19

00:00:52,486 --> 00:00:54,721

origin of planets, perhaps
even the origin of life.

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00:00:59,660 --> 00:01:02,696

Bennu was chosen as the target
asteroid from the science team

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00:01:02,696 --> 00:01:06,099

after evaluating three critical
criteria: the first of which was

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00:01:06,099 --> 00:01:07,000
accessibility.

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00:01:07,000 --> 00:01:08,936
So Bennu is really optimal.

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00:01:08,936 --> 00:01:12,239
It has an orbit of about 1.2
years and it passes by Earth

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00:01:12,239 --> 00:01:13,106
every six years.

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00:01:13,106 --> 00:01:15,676
Second criteria was the size.

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00:01:15,676 --> 00:01:18,512
We needed something large enough
to where it wasn't rotating too

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00:01:18,512 --> 00:01:19,179
fast.

29

00:01:19,179 --> 00:01:22,082
The smaller the body,
typically the faster it rotates.

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00:01:22,082 --> 00:01:24,518
We wanted something that we
would be able to do close

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00:01:24,518 --> 00:01:27,788
proximity operations with, all
that detailed mapping we want to

32

00:01:27,788 --> 00:01:31,391
do of the surface, and we wanted
something that was rotating at a

33

00:01:31,391 --> 00:01:34,594
speed that we could be able to
match, and then slowly lower

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00:01:34,594 --> 00:01:36,430
ourselves to
retrieve that sample.

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00:01:36,430 --> 00:01:39,232
The third criteria
was the composition.

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00:01:39,232 --> 00:01:42,469
We wanted an asteroid that
was pristine, that had a known

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00:01:42,469 --> 00:01:46,440
geologic context that was
carbon-rich and Bennu really fit

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00:01:46,440 --> 00:01:48,642
the mold for all
three of those criteria,

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00:01:48,642 --> 00:01:50,644
and that's why it's the
destination asteroid.

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00:01:52,980 --> 00:01:57,250
OSIRIS-REx arrives at Bennu in
August of 2018 and our mission

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00:01:57,250 --> 00:01:59,920
profile is designed to get us
ever closer to the surface of

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00:01:59,920 --> 00:02:02,589
the asteroid to understand
the nature of its surface.

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00:02:02,589 --> 00:02:06,093
What we really want to know is,
can we get the spacecraft down

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00:02:06,093 --> 00:02:07,661
to the point where we
want to get the sample?

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00:02:07,661 --> 00:02:09,029
We call that deliverability.

46
00:02:09,029 --> 00:02:12,733
If we reach that point, will the
spacecraft remain safe? Meaning

47
00:02:12,733 --> 00:02:15,802
it can get away from the
asteroid and still be functional

48
00:02:15,802 --> 00:02:17,971
especially for returning
a sample to the Earth.

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00:02:17,971 --> 00:02:21,008
And then we also want to know if
we touch down on that spot, will

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00:02:21,008 --> 00:02:22,275
we get a sample?

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00:02:22,275 --> 00:02:24,211
We call that the
sampleability assessment.

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00:02:24,211 --> 00:02:27,514
So those are the key parameters
that drive our observation

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00:02:27,514 --> 00:02:31,151
planning of Bennu and we're

going to spend about 10 months

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00:02:31,151 --> 00:02:34,121
globally mapping the asteroid
and then performing detailed

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00:02:34,121 --> 00:02:36,456
site reconnaissance of specific
locations where we think we want

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00:02:36,456 --> 00:02:37,524
to get the sample.

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00:02:41,094 --> 00:02:42,262
Status check.

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00:02:42,262 --> 00:02:43,430
Go Atlas.

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00:02:43,430 --> 00:02:44,598
Go Centaur.

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00:02:44,598 --> 00:02:45,866
Go OSIRIS-REx.

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00:02:45,866 --> 00:02:48,835
What I personally am most
excited about for the OSIRIS-REx

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00:02:48,835 --> 00:02:51,905
mission will be the first images
that we get when approaching

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00:02:51,905 --> 00:02:52,572
Bennu.

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00:02:52,572 --> 00:02:55,575
So right now we have a sense of
what Bennu looks like and what

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00:02:55,575 --> 00:02:58,645
its shape is from ground-based
assets like Arecibo and the

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00:02:58,645 --> 00:03:01,515
Goldstone radars, but we
won't know what the shape is

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00:03:01,515 --> 00:03:02,282
completely.

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00:03:02,282 --> 00:03:05,686
We won't have a perfect sense of
it until we actually encounter

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00:03:05,686 --> 00:03:06,353
the asteroid.

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00:03:06,353 --> 00:03:10,157
I am going to be really excited
when those images come back.

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00:03:10,157 --> 00:03:14,461
For me, getting that sample back
to Earth is the most exciting

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00:03:14,461 --> 00:03:17,364
part because we will have
something that preserves

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00:03:17,364 --> 00:03:20,300
material from over four and
a half billion years ago.

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00:03:20,300 --> 00:03:22,102
Who doesn't want that?

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00:03:22,102 --> 00:03:25,639

So sample return is really the most exciting part, I think, of

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00:03:25,639 --> 00:03:26,506
this mission.

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00:03:26,506 --> 00:03:30,343
I've been working on OSIRIS
and its precursor concepts since

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00:03:30,343 --> 00:03:31,011
2004.

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00:03:31,011 --> 00:03:32,746
The launch is about
the halfway point.

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00:03:32,746 --> 00:03:35,782
So for me, launch is a major
milestone, but not the most

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00:03:35,782 --> 00:03:37,217
exciting part of the mission.

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00:03:37,217 --> 00:03:40,420
The most exciting part is the
stories that Bennu has to tell

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00:03:40,420 --> 00:03:42,422
us that we haven't
even thought of yet.

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00:03:42,556 --> 00:03:46,059
And liftoff of OSIRIS-REx!

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00:03:46,059 --> 00:03:51,298
Its seven-year mission: to
boldly go to the asteroid Bennu

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00:03:51,298 --> 00:03:52,699
and back.