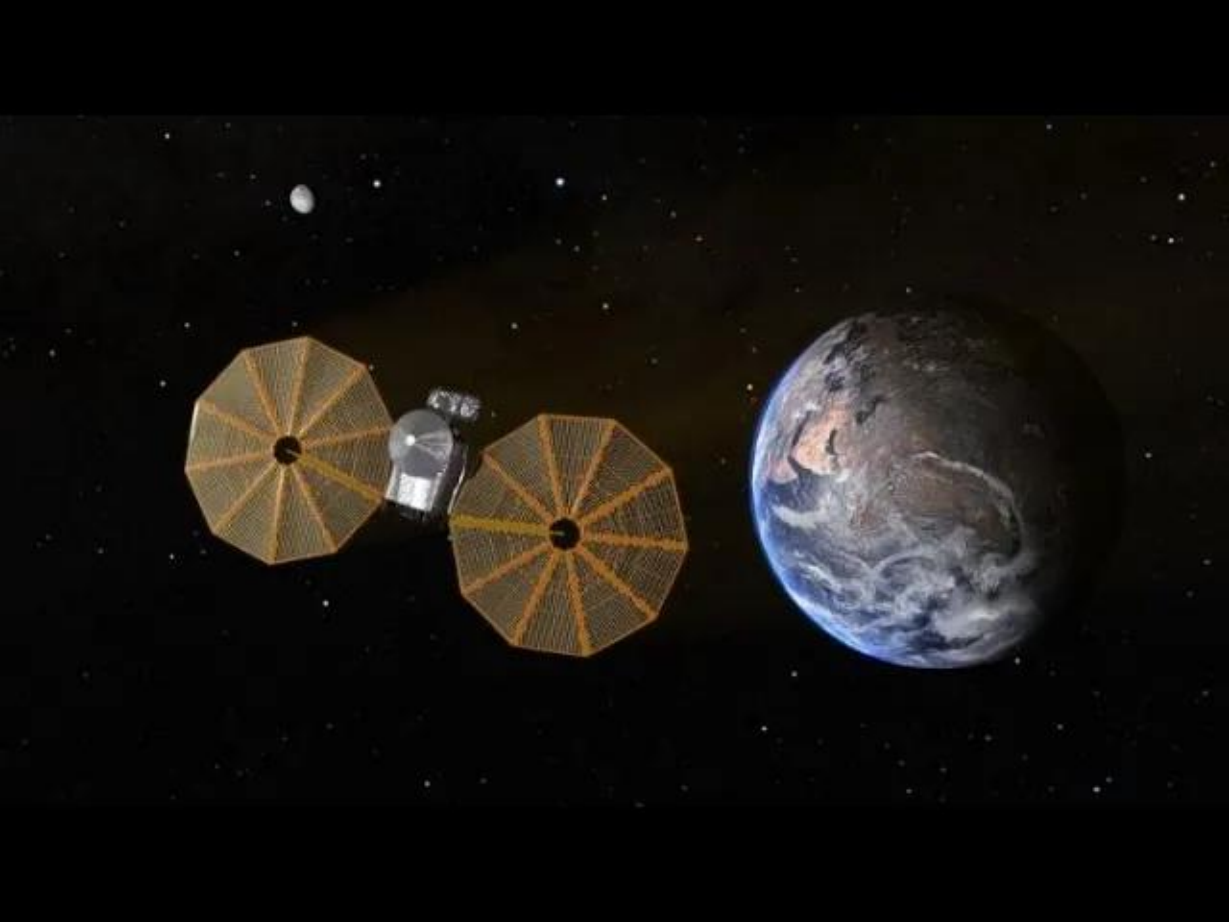

1
00:00:00,200 --> 00:00:02,300
[Music]

2
00:00:02,300 --> 00:00:05,750
NASA’s Lucy mission is heading
to the Jupiter Trojans

3
00:00:05,750 --> 00:00:08,766
two swarms of primitive
asteroids trapped in Jupiter’s

4
00:00:08,766 --> 00:00:12,733
orbit that may hold clues to the
formation of the planets.

5
00:00:12,733 --> 00:00:16,166
Lucy launched on October 16,
2021.

6
00:00:16,166 --> 00:00:18,083
After a year in orbit around
the Sun,

7
00:00:18,083 --> 00:00:20,550
it is returning home on its
launch anniversary

8
00:00:20,550 --> 00:00:23,216
for the first of three Earth
gravity assists.

9
00:00:24,266 --> 00:00:28,250
On October 16, 2022, Lucy will
fly by the Earth

10
00:00:28,250 --> 00:00:31,083
like a partner in a swing dance,
boosting its speed

11

00:00:31,083 --> 00:00:33,733
and elongating its orbit
around the Sun.

12
00:00:33,733 --> 00:00:36,883
Two years later, it will return
for a second gravitational

13
00:00:36,883 --> 00:00:40,333
tango to lengthen its orbit even
further, allowing it to reach

14
00:00:40,333 --> 00:00:44,416
the L4 Trojan asteroids that
travel ahead of Jupiter.

15
00:00:44,416 --> 00:00:47,200
After Lucy completes its first
tour of the Trojans,

16
00:00:47,200 --> 00:00:49,266
it will make its third pas de
deux with Earth

17
00:00:49,266 --> 00:00:51,100
in December 2030.

18
00:00:51,100 --> 00:00:54,000
This final flyby will increase
its orbital tilt

19
00:00:54,000 --> 00:00:56,700
and bend its path toward
the L5 Trojans

20
00:00:56,700 --> 00:00:57,900
that follow Jupiter.

21
00:00:58,900 --> 00:01:01,566
As Lucy approaches its first

gravity assist,

22
00:01:01,566 --> 00:01:03,216
it will use the Earth
and the Moon

23
00:01:03,216 --> 00:01:05,350
to calibrate its instruments.

24
00:01:05,350 --> 00:01:08,066
A day before it arrives, NASA
will begin scanning

25
00:01:08,066 --> 00:01:10,116
for potential collisions.

26
00:01:10,116 --> 00:01:13,233
Lucy’s path runs through a
cloud of over six thousand

27
00:01:13,233 --> 00:01:16,200
Earth-orbiting satellites, and
about twenty times as many

28
00:01:16,200 --> 00:01:18,450
bits of inactive debris.

29
00:01:18,450 --> 00:01:21,483
If any potential collisions are
detected, the spacecraft will

30
00:01:21,483 --> 00:01:24,916
fire its thrusters to speed up
its arrival by a few seconds,

31
00:01:24,916 --> 00:01:26,900
avoiding a catastrophic impact.

32
00:01:27,716 --> 00:01:30,216

Because Lucy will approach
from Earth’s dayside,

33
00:01:30,216 --> 00:01:33,750
it will initially be invisible
to observers on the ground.

34
00:01:33,750 --> 00:01:35,883
It will take pictures of the
Eastern Hemisphere

35
00:01:35,883 --> 00:01:38,583
and attempt to image Ethiopia,
home of the famous

36
00:01:38,583 --> 00:01:41,583
hominin fossil for which the
mission is named.

37
00:01:41,583 --> 00:01:44,283
Lucy will then pick up speed as
it races toward the

38
00:01:44,283 --> 00:01:48,000
evening terminator, or boundary
between day and night.

39
00:01:48,000 --> 00:01:50,666
It will emerge from the Sun’s
glare as night falls

40
00:01:50,666 --> 00:01:54,166
on Western Australia – with its
expansive solar arrays

41
00:01:54,166 --> 00:01:56,183
reflecting the daylight.

42
00:01:56,183 --> 00:02:00,850
An hour after sunset, at 6:55pm,

Western Australia time,

43
00:02:00,850 --> 00:02:03,816
stargazers will be treated to a
magnificent sight

44
00:02:03,816 --> 00:02:06,850
as Lucy streaks across the sky.

45
00:02:06,850 --> 00:02:09,166
Seven minutes later, Lucy
will once again

46
00:02:09,166 --> 00:02:11,216
slip from view as it
crosses into the

47
00:02:11,216 --> 00:02:13,200
shadow of the Earth.

48
00:02:13,200 --> 00:02:16,983
At 7:04 pm, Lucy will make its
closest approach at just

49
00:02:16,983 --> 00:02:20,233
219 miles above the planet:
lower than the

50
00:02:20,233 --> 00:02:22,416
International Space Station.

51
00:02:22,416 --> 00:02:25,450
This exceptionally close shave
will increase its velocity

52
00:02:25,450 --> 00:02:27,966
by four-and-a-half miles
per second.

53

00:02:28,950 --> 00:02:31,016
Lucy will traverse the night
side of Earth,

54
00:02:31,016 --> 00:02:34,333
rapidly gaining in altitude, and
emerge from the planet's shadow

55
00:02:34,333 --> 00:02:37,383
at 4:26 am, Pacific Time.

56
00:02:37,383 --> 00:02:40,500
If skies are clear, early birds
in the Western US

57
00:02:40,500 --> 00:02:43,983
will be able to spot the
spacecraft through binoculars.

58
00:02:43,983 --> 00:02:46,350
Lucy will appear in the
southwestern sky

59
00:02:46,350 --> 00:02:49,683
between Cetus and Pisces, rising
eastward until it is

60
00:02:49,683 --> 00:02:51,666
overtaken by the dawn.

61
00:02:51,666 --> 00:02:54,016
As the Sun rises over the
Rocky Mountains,

62
00:02:54,016 --> 00:02:56,100
Lucy will speed away from
Earth at more than

63
00:02:56,100 --> 00:02:58,116
14,000 miles per hour,

64
00:02:58,116 --> 00:03:01,416
crossing the lunar orbit in
less than a day.

65
00:03:01,416 --> 00:03:03,700
Lucy will take a few
final images as it

66
00:03:03,700 --> 00:03:06,483
approaches the Moon and
bids farewell to home,

67
00:03:06,483 --> 00:03:09,183
preparing for over two years
in deep space,