
LANDSAT 9 THINGS

1
00:00:14,948 --> 00:00:18,518
Landsat archives, its 9 millionth scene.

2
00:00:19,185 --> 00:00:21,721
Each scene is a satellite image from space

3
00:00:21,755 --> 00:00:24,591
about 115 miles wide.

4
00:00:25,091 --> 00:00:28,194
Researchers and, well,
just about anyone can download

5
00:00:28,194 --> 00:00:31,531
scenes from the Landsat
archive managed by USGS.

6
00:00:32,198 --> 00:00:34,701
Landsat holds the title
for the longest continuous

7
00:00:34,768 --> 00:00:37,270
space-based record of Earth in existence.

8
00:00:38,705 --> 00:00:42,709
That's 50 years of scenes
like these, helping scientists

9
00:00:42,709 --> 00:00:45,879
and researchers
understand how our planet is changing over

10
00:00:45,879 --> 00:00:46,846
time.

11
00:00:49,449 --> 00:00:50,383
It will take Landsat

12

00:00:50,383 --> 00:00:53,920
9 and its sister satellite, Landsat 8,

13
00:00:53,920 --> 00:00:57,323
8 days to image
all of Earth's land and coastal areas.

14
00:00:58,024 --> 00:01:00,460
That means
we get a complete picture of Earth

15
00:01:00,460 --> 00:01:02,662
every eight days.

16
00:01:04,264 --> 00:01:05,398
In this case, two

17
00:01:05,398 --> 00:01:08,468
satellites are better than one.

18
00:01:08,468 --> 00:01:13,740
Landsats 8 and 9 can work together to provide

19
00:01:13,740 --> 00:01:18,244
near real time data about what's happening
on the surface of our planet.

20
00:01:23,850 --> 00:01:24,784
Landsat collects

21
00:01:24,784 --> 00:01:28,121
images of each of our planet's
seven continents.

22
00:01:28,121 --> 00:01:31,991
Farms, forests, waterways, glaciers,

23
00:01:31,991 --> 00:01:34,527
urban areas, Landsat sees it all.

24
00:01:36,096 --> 00:01:37,630
Remember, you can't manage

25
00:01:37,630 --> 00:01:41,668
what you can't measure,
whether it's deforestation in the Amazon

26
00:01:42,068 --> 00:01:44,671
or ice loss in Antarctica,

27
00:01:44,671 --> 00:01:48,641
or urban sprawl in Shanghai.

28
00:01:52,011 --> 00:01:53,513
Fire engine

29
00:01:59,819 --> 00:01:54,981
liftoff

30
00:01:59,819 --> 00:02:03,223
Landsat 6 launched on October fifth, 1993.

31
00:02:03,890 --> 00:02:08,261
Apogee kick motor should ignite right now
and take Landsat

32
00:02:08,261 --> 00:02:11,531
to its final circular orbit--
but it never made it to orbit.

33
00:02:12,599 --> 00:02:14,567
NASA's team of scientists and engineers

34
00:02:14,567 --> 00:02:17,403
got to work immediately
to figure out what went wrong.

35

00:02:18,037 --> 00:02:20,940
Turns out it was a rupture in the rocket
fuel chamber.

36
00:02:21,741 --> 00:02:24,744
They used failure as an opportunity
to learn.

37
00:02:24,744 --> 00:02:27,680
Six years later,
the team launched Landsat 7.

38
00:02:27,780 --> 00:02:30,950
Liftoff of the Delta
II rocket with the advanced...

39
00:02:30,984 --> 00:02:31,684
One of the most

40
00:02:31,684 --> 00:02:35,855
technologically advanced Earth
observing satellites of its generation

41
00:02:35,855 --> 00:02:37,757
still in use today.

42
00:02:41,761 --> 00:02:42,662
At least one

43
00:02:42,662 --> 00:02:46,232
Landsat satellite has been orbiting Earth
since 1972.

44
00:02:46,766 --> 00:02:49,969
That's nearly 50 years of steadfast
observation.

45
00:02:50,904 --> 00:02:53,039
That first Landsat proved we could gather

46
00:02:53,039 --> 00:02:55,275
digitally encoded data from space.

47
00:02:56,876 --> 00:02:58,578
And changed the way we look at Earth

48
00:02:58,578 --> 00:02:59,712
forever.

49
00:03:08,421 --> 00:03:09,122
Never before

50
00:03:09,122 --> 00:03:13,026
seen snapshots of land resources
and the environment would be key

51
00:03:13,026 --> 00:03:16,696
for critical decision
making decades into the future.

52
00:03:21,067 --> 00:03:24,070
Landsat collects light.

53
00:03:24,070 --> 00:03:27,207
How intense that light is tells us about
what's on the ground.

54
00:03:27,207 --> 00:03:31,277
You can think of intensity
like shades of a different color.

55
00:03:31,277 --> 00:03:34,314
Landsat 9,
the newest satellite to join the Landsat

56
00:03:34,314 --> 00:03:38,451
fleet, sees 16,384 shades.

57

00:03:39,152 --> 00:03:42,222
That's four times the depth of color
of the previous Landsat,

58
00:03:43,089 --> 00:03:46,259
meaning we'll be able to see more detail
in darker spots

59
00:03:46,259 --> 00:03:49,262
like coastal waters and dense forests.

60
00:03:53,499 --> 00:03:54,100
True color

61
00:03:54,100 --> 00:03:58,171
images are made by combining red, blue
and green light.

62
00:03:58,605 --> 00:04:02,709
Combined together, these visible
bands of light make up all the colors

63
00:04:02,709 --> 00:04:06,312
in the rainbow
and all of Landsat's true color images.

64
00:04:07,247 --> 00:04:10,516
Landsat
also captures light that we can't see.

65
00:04:10,516 --> 00:04:13,319
That type of light
can reveal some incredible things

66
00:04:13,319 --> 00:04:17,390
when you look at a false color image, like
the difference between types of plants,

67
00:04:17,390 --> 00:04:21,394
how healthy those plants are, healthy

coral reefs and even dead coral reefs.

68
00:04:21,427 --> 00:04:26,966
Fire tracking, ocean pollution,
the possibilities are nearly endless.

69
00:04:31,037 --> 00:04:33,873
There
are two instruments aboard Landsat 9.

70
00:04:33,873 --> 00:04:36,943
OLI-2 is all about light.

71
00:04:38,044 --> 00:04:40,280
Once in orbit, OLI-2 collects

72
00:04:40,280 --> 00:04:43,416
sunlight reflected off Earth's surface.

73
00:04:44,317 --> 00:04:47,420
The light passes through a set of filters
to separate out nine

74
00:04:47,420 --> 00:04:52,058
specific wavelength bands in visible
and infrared frequencies.

75
00:04:52,425 --> 00:04:55,461
Each band provides
different pieces of information

76
00:04:55,461 --> 00:04:58,698
about what is down on the surface.

77
00:04:58,698 --> 00:05:03,336
The second instrument aboard Landsat
9 called TIRS-2, collects thermal

78
00:05:03,336 --> 00:05:06,372

infrared wavelengths,
or temperature signatures

79
00:05:06,372 --> 00:05:09,809
emitted by the Earth itself.

80
00:05:13,880 --> 00:05:15,448
50 years ago, the U.S.

81
00:05:15,448 --> 00:05:18,318
Geological Survey had an idea.

82
00:05:18,318 --> 00:05:20,353
Satellites orbiting Earth
that could help us

83
00:05:20,353 --> 00:05:22,822
monitor our natural resources.

84
00:05:23,589 --> 00:05:26,659
Today,
the Landsat program is jointly managed

85
00:05:26,659 --> 00:05:30,730
by NASA and the USGS,
providing an unparalleled record

86
00:05:30,730 --> 00:05:34,200
of Earth's changing landscapes
for the benefit of all.

87
00:05:35,068 --> 00:05:37,837
50 years of satellites.