



1
00:00:00,880 --> 00:00:05,660
Music

2
00:00:05,660 --> 00:00:08,370
Jim Irons, LDCM Project Scientist, Goddard Space Flight Center: Our land cover and land use are currently

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00:00:08,370 --> 00:00:15,470
changing at a rate unprecedented in human history. In order for us to manage and cope with these changes,

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00:00:15,470 --> 00:00:21,810
we need to have the observation, the information, the data that allow us to understand what's going on on the

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00:00:21,810 --> 00:00:24,140
surface of the Earth, where most of us live.

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00:00:24,140 --> 00:00:30,990
Narrator: NASA's Landsat Data Continuity Mission, or LDCM, is set to lift off from the agency's west coast

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00:00:30,990 --> 00:00:34,640
launch site at Vandenberg Air Force Base, California . . .

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00:00:34,640 --> 00:00:41,800
joining a long line of Landsat satellites and kicking off a new era in Earth observation.

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00:00:41,800 --> 00:00:47,440
A joint effort between NASA and the U.S. Geological Survey, the Landsat program has provided a

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00:00:47,440 --> 00:00:55,460
continuous view of Earth's surface -- and created a valuable archive of data -- for more than 40 years.

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00:00:55,460 --> 00:01:02,160
The first Landsat launched in 1972 to begin the successful series. Each generation has improved its

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00:01:02,160 --> 00:01:11,490
observational abilities, although one version, Landsat 6, did not reach orbit as planned.

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00:01:11,490 --> 00:01:18,960

The most recent mission, Landsat 7, took its place in orbit in 1999 and is still operating today.

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00:01:18,960 --> 00:01:23,690

The Landsat Data Continuity Mission builds on this legacy of success.

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00:01:23,690 --> 00:01:29,680

Jim Irons, LDCM Project Scientist, GSFC: We can find the scene or the image from that location in 1972,

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00:01:29,680 --> 00:01:41,420

and go to the catalog of data from the LDCM, find the data acquired in 2013, and we can compare those two

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00:01:41,420 --> 00:01:46,970

images directly, as well as all the images that have been collected in the interim.

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00:01:46,970 --> 00:01:52,890

Narrator: Built by Orbital Sciences Corporation, the LDCM spacecraft features two advanced scientific

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00:01:52,890 --> 00:02:01,470

instruments. The Operational Land Imager, or OLI, measures visible, near infrared, and short wave infrared

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00:02:01,470 --> 00:02:10,090

wavelengths. The Thermal Infrared Sensor, or TIRS, tracks surface temperatures. Both instruments are design

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00:02:10,090 --> 00:02:16,370

to focus longer on a given area using what scientists call a "push-broom" approach.

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00:02:16,370 --> 00:02:23,070

Del Jenstrom, Deputy Project Manager, Goddard Space Flight Center: Push-broom sensors have thousands o

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00:02:23,070 --> 00:02:24,600

detectors that just image the Earth as the satellite passes over the surface of the Earth.

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00:02:24,600 --> 00:02:29,790

The older Landsat satellites -- Landsat 7, Landsat 5 -- use a whisk-broom technology,

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00:02:29,790 --> 00:02:35,580

which is many fewer detectors scanning back and forth with a mechanical scanner.

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00:02:35,580 --> 00:02:42,690

Narrator: Both instruments will observe a 185-kilometer-wide swath of land, moving from north to south on

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00:02:42,690 --> 00:02:49,790

Earth's sunlit side. LDCM will collect data on a new area of land on every orbit.

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00:02:49,790 --> 00:02:54,700

It will take 16 days to bring the entire surface into view.

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00:02:54,700 --> 00:02:58,290

The data is received at one of three ground stations.

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00:02:58,290 --> 00:03:05,280

Then the U.S. Geological Survey's Earth Resources Observation Systems Data Center in Sioux Falls, S.D.

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00:03:05,280 --> 00:03:09,340

processes and distributes the resulting images.

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00:03:09,340 --> 00:03:14,010

Jim Irons, LDCM Project Scientist, GSFC: In 2008, they made the decision to begin distributing data at

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00:03:14,010 --> 00:03:21,070

no cost -- for free -- to anybody who requested a seam. It enables people to do studies over time,

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00:03:21,070 --> 00:03:27,020

over the 40-year history of the Landsat program, and over larger geographic areas.

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00:03:27,020 --> 00:03:32,610

Narrator: To keep Landsat over water during the critical period of liftoff and ascent,

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00:03:32,610 --> 00:03:37,090

managers selected Vandenberg Air Force Base as the mission's launch site.

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00:03:37,090 --> 00:03:42,610

LDCM will be the first NASA mission launched at Space Launch Complex 3 since the agency's

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00:03:42,610 --> 00:03:46,770

Terra satellite launched more than a dozen years ago.

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00:03:46,770 --> 00:03:51,010

The two-stage Atlas V rocket was built by United Launch Alliance.

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00:03:51,010 --> 00:03:54,930

It's a perfect fit for NASA's need for the LDCM Mission.

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00:03:54,930 --> 00:03:59,260

Omar Baez, Senior Launch Director, Launch Services Program: So we're taking this object that's 6,000 pounds

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00:03:59,260 --> 00:04:09,210

about the size of an SUV, and punching it into an orbit that's 350 miles up. So the Atlas is very capable of

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00:04:09,210 --> 00:04:14,270

doing just that role, and that is why that vehicle was picked.

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00:04:14,270 --> 00:04:19,110

Narrator: Like all missions, LDCM brought with it some special requirements to be considered

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00:04:19,110 --> 00:04:21,060

during launch planning.

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00:04:21,060 --> 00:04:25,870

Bruce Reid, Mission Manager, Launch Services Program: The LDCM spacecraft has a very stringent tip-off

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00:04:25,870 --> 00:04:32,220

requirement. It can only be rotating so much when we separate, so the launch vehicle's going to do a

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00:04:32,220 --> 00:04:35,920

compensation maneuver prior to that event.

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00:04:35,920 --> 00:04:40,210

Narrator: And there was another challenge: The spacecraft has an onboard battery that needs to

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00:04:40,210 --> 00:04:44,260

be charged before it separates from the Centaur.

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00:04:44,260 --> 00:04:50,830

Bruce Reid, Mission Manager, Launch Services Program: We're going to go around the Earth an additional

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00:04:50,830 --> 00:04:52,620

time and then separate them. So they'll have their 60 minutes of sunlight on their solar array

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00:04:52,620 --> 00:04:54,510

to charge their battery.

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00:04:54,510 --> 00:04:57,490

Narrator: The spacecraft will have to go through a three-month testing period before it's

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00:04:57,490 --> 00:05:02,020

ready to begin normal mission operations. Then it will be renamed Landsat 8.

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00:05:02,020 --> 00:05:03,780

Del Jenstrom, Deputy Project Manager, Goddard Space Flight Center: And then after checkout,

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00:05:03,780 --> 00:05:08,160

we accept the observatory, and then we, in effect, hand over the keys to the

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00:05:08,160 --> 00:05:13,570

U.S. Geological Survey to operate the observatory for the five-year mission life.

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00:05:13,570 --> 00:05:18,720

Narrator: Launch and mission teams have gathered at Vandenberg Air Force Base for final preparations

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00:05:18,720 --> 00:05:21,230

leading up to liftoff.

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00:05:21,230 --> 00:05:24,940

Omar Baez, Senior Launch Director, Launch Services Program: You've got a lot of years of work put into that,

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00:05:24,940 --> 00:05:32,620

those last two or three minutes. Although quiescent and very still, it's kind of ominous.

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00:05:32,620 --> 00:05:36,530

You can't wait to get there. And the happiest moment is at T-zero when you see the fire and

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00:05:36,530 --> 00:05:38,980

smoke under the rocket, and off it goes.

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00:05:38,980 --> 00:05:45,390

Narrator: The wait is almost over. NASA's newest Earth-observing spacecraft soon will be in orbit,

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00:05:45,390 --> 00:05:51,200

high overhead, ready to send back vital information about our own planet.

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00:05:51,200 --> 00:05:54,990

Del Jenstrom, Deputy Project Manager, Goddard Space Flight Center: The data is used by thousands of users