



1

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

Constructing the James Webb Space Telescope, a mission led by

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00:00:04,270 --> 00:00:08,460

NASA with its partners the European Space Agency

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00:00:08,460 --> 00:00:12,610

and the Canadian Space Agency, requires the collaboration of thousands

4

00:00:12,610 --> 00:00:16,280

of people from across the United States, Canada and Europe.

5

00:00:18,400 --> 00:00:20,960

GREG ROBINSON: The James Webb Space Telescope is the most ambitious

6

00:00:20,960 --> 00:00:24,100

and complex space science mission humanity has ever undertaken.

7

00:00:25,140 --> 00:00:27,820

Webb is NASA's highest priority science mission.

8

00:00:29,760 --> 00:00:33,260

NAR: This is the optical and science segment of the Webb

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00:00:33,260 --> 00:00:37,350

space telescope in one of the largest cleanrooms in the world

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00:00:37,350 --> 00:00:40,860

at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

11

00:00:43,180 --> 00:00:45,560

This half of the observatory element successfully

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00:00:45,560 --> 00:00:48,580

passed a series of rigorous vibration,

13

00:00:51,860 --> 00:00:53,340

and acoustic tests,

14

00:00:55,840 --> 00:01:00,380

to ensure Webb's optics and science instruments can handle the stresses of launch.

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00:01:01,860 --> 00:01:06,060

This element was packed and transported to the Johnson Space Center

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00:01:06,060 --> 00:01:10,120

in Houston, Texas, for cryogenic testing inside its massive

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00:01:10,120 --> 00:01:14,140

test facility, simply called Chamber A

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00:01:15,100 --> 00:01:19,100

a national historic landmark for it's work during the Apollo missions.

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00:01:19,100 --> 00:01:22,480

GREG ROBINSON: Successfully completing the optical telescope element

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00:01:22,480 --> 00:01:26,660

was a significant milestone. Now, we look forward to completing final tests

21

00:01:26,660 --> 00:01:30,700

on the spacecraft element. And then, integrating both halves

22

00:01:30,700 --> 00:01:34,890

into the observatory. NAR: To give you a sense of where we are in the mission,

23

00:01:34,890 --> 00:01:39,060

the Webb Space Telescope consists of two main segments

24

00:01:39,060 --> 00:01:43,130

the spacecraft bus and sunshield, called the Spacecraft Element

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00:01:43,130 --> 00:01:47,760

and, the iconic 6.5-meter telescope and science instruments

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00:01:47,760 --> 00:01:49,840

called the Optical Telescope Element.

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00:01:51,960 --> 00:01:55,320

Today, both halves of the Webb Space Telescope are

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00:01:55,320 --> 00:01:58,380

are at Northrop Grumman in Redondo Beach, California.

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00:01:58,380 --> 00:02:02,800

Here, the most advanced space telescope optical element

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00:02:02,800 --> 00:02:07,700

will be integrated with the spacecraft element—which includes the tennis court-sized

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00:02:07,700 --> 00:02:11,820

5-layer, deployable sunshield and the spacecraft bus

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00:02:11,820 --> 00:02:15,240

where the Webb's data and attitude control systems reside.

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00:02:15,240 --> 00:02:20,080

The sunshield protects the telescope's optics and science instruments from infrared

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00:02:20,080 --> 00:02:23,220

radiation, or what we feel as heat,

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00:02:23,220 --> 00:02:28,460

emitted by the Sun, Earth, and Moon. Each thin, sunshield layer

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00:02:28,460 --> 00:02:32,650

is about one-one-thousandth of an inch thick and coated

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00:02:32,650 --> 00:02:38,560

with reflective aluminum and protective silicon to provide Sun protection of SPF 1-million.

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00:02:38,560 --> 00:02:42,340

Webb is a testament to innovation.

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00:02:42,340 --> 00:02:45,080

Intricate and advanced technological

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00:02:45,090 --> 00:02:49,280

systems were developed to enable awesome science discoveries.

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00:02:49,280 --> 00:02:53,480

ERIC SMITH: The James Webb Space Telescope is the most technologically challenging space science obser

42

00:02:53,480 --> 00:02:56,940

observatory we've ever built. No one's ever done anything like this before

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00:02:56,940 --> 00:03:01,660

but the science is worth the wait.

AMBER STRAUGHN: Webb will conduct a breath-taking array

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00:03:01,660 --> 00:03:05,770

of science of investigations across the history of the universe ranging from

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00:03:05,770 --> 00:03:09,950

searching for the first distant galaxies to light up after the big bang,

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00:03:09,950 --> 00:03:14,110

to searching for the building blocks of life in atmospheres of exo-planets.