

1  
00:00:00,000 --> 00:00:12,320  
[music]

2  
00:00:13,099 --> 00:00:16,300  
>> Mary Estacion/Reporter: Because the Webb Telescope is too large to fit into a rocket,

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00:00:16,440 --> 00:00:22,100  
engineers have designed it to unfold in a kind of a origami-like fashion when it gets into orbit.

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00:00:22,199 --> 00:00:25,199  
That goes for the mirrors on the observatory, too.

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00:00:25,379 --> 00:00:28,199  
The primary mirror that collects light from the cosmos?

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00:00:28,320 --> 00:00:31,199  
Well that light then bounces up to the secondary mirror

7  
00:00:31,300 --> 00:00:33,700  
before making its way to other mirrors

8  
00:00:33,799 --> 00:00:36,699  
and eventually ending up into the cameras.

9  
00:00:36,840 --> 00:00:40,100  
We're here at NASA's Goddard Space Flight Center in Greenbelt, Maryland,

10  
00:00:40,240 --> 00:00:43,700  
because the deployment of the secondary mirror is about to happen.

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00:00:43,840 --> 00:00:47,700  
So Adam, how do you guys get the secondary mirror into position?

12  
00:00:47,820 --> 00:00:52,799  
>> Adam Carpenter/Mechanical Integration Engineer, Sierra Lobo Inc.: Well, we deploy three struts that are much like a tripod,

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00:00:52,960 --> 00:00:57,299  
and the secondary mirror will sit atop above the backplane.

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00:00:57,460 --> 00:00:59,600  
>> Mary: How important is this test?

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00:00:59,780 --> 00:01:04,799  
>> Adam: Well, this is the first time that we are deploying the tripod with a secondary mirror installed.

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00:01:04,980 --> 00:01:08,900  
As with anything on this project, every test builds upon another.

17  
00:01:09,060 --> 00:01:12,500  
So we want to be able to master this test

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00:01:12,640 --> 00:01:16,700  
and be able to perform it again when we get to the flight hardware.

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00:01:16,859 --> 00:01:19,900  
>> Mary: Well, can we take a closer look at what's going on down there?

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00:01:20,000 --> 00:01:23,400  
>>Adam: Absolutely, let's head into the cleanroom.

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00:01:23,560 --> 00:01:28,799  
You'll see the tripod come into place, just as I was saying upstairs.

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00:01:28,980 --> 00:01:32,600  
Now, two of the struts are the same but one is actually different

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00:01:32,700 --> 00:01:36,900  
in the sense that it has a hinge and it folds underneath when it's stowed.

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00:01:37,060 --> 00:01:43,500  
The entire observatory must be folded up so it fits into an Ariane 5.

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00:01:43,680 --> 00:01:45,800  
>> Mary: So, the way you're doing this test right now,

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00:01:45,920 --> 00:01:48,900  
this is not exactly the way it's going to be in space, right?

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00:01:49,000 --> 00:01:51,099  
>> Adam: Yes, absolutely.

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00:01:51,239 --> 00:01:55,299  
This yellow tower effectively creates a zero-G environment

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00:01:55,439 --> 00:02:02,399

in the sense that it doesn't allow the mid-hinge to close on its own when gravity takes over.

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00:02:02,560 --> 00:02:07,200

We want to be able to control every aspect of the operation and that closing of the hinge.

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00:02:07,340 --> 00:02:10,400

Well Mary, before the deployment is complete,

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00:02:10,500 --> 00:02:12,599

how about we go upstairs to get a different perspective,

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00:02:12,759 --> 00:02:14,799

but first we have to put these blue masks on

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00:02:14,900 --> 00:02:17,700

because we're going to be in such close proximity to the mirrors.

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00:02:17,860 --> 00:02:20,600

>> Mary: Ok... how big are these struts anyway?

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00:02:20,699 --> 00:02:28,599

>> Adam: The distance between the center of the backplane and the secondary mirror is about 25 feet.

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00:02:28,759 --> 00:02:30,799

>> Mary: So it's like a 2-story house or something.

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00:02:30,900 --> 00:02:32,700

>> Adam: That's probably a very good comparison.

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00:02:32,840 --> 00:02:34,900

>> Mary: How strong are these struts?

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00:02:35,000 --> 00:02:41,400

>> Adam: These struts are very strong to withstand the stresses of very, very cold temperatures of space.

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00:02:41,580 --> 00:02:47,900

They are hollow composite tubes, and the material is about 40,000ths of an inch thick.

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00:02:48,000 --> 00:02:49,099

>> Mary: So it's not very heavy.

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00:02:49,199 --> 00:02:52,699

>> Adam: No. They're extremely light, but they're also very strong.

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00:02:52,800 --> 00:02:56,920

>> Mary: So how precise do you have to be with the positioning of that secondary mirror?

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00:02:57,080 --> 00:03:03,140

>> Adam: Each time we deploy the secondary mirror into the same position that it'll be in space,

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00:03:03,439 --> 00:03:06,840

it is within one millimeter every time.

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00:03:07,039 --> 00:03:11,099

>> Mary: Well, thanks Adam for helping us understand more about how the secondary mirror will be deployed.

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00:03:11,259 --> 00:03:13,000

>> Adam: Thank you! It was my pleasure.

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00:03:13,060 --> 00:03:17,659

>> Mary: The deployment of the secondary mirror happens on the 11th day after launch

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00:03:17,759 --> 00:03:23,099

and is one of the last steps the Webb Telescope goes through before it's considered fully deployed.

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00:03:23,360 --> 00:03:27,240

Thanks for joining us for this edition of Behind the Webb.

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00:03:27,520 --> 00:03:31,360

[music]