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00:00:13,290 --> 00:00:16,530

Mary Estacion/Reporter: The primary mirror on the Webb telescope will have a diameter

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00:00:16,530 --> 00:00:18,880

of more than 21 feet.

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00:00:18,880 --> 00:00:20,700

That's 4 times my height.

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00:00:20,700 --> 00:00:25,150

Now that's too big to fit into a rocket so engineers have had to design a structure that

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00:00:25,150 --> 00:00:30,770

will not only hold all 18 segments of the primary mirror in place, but also fold up

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00:00:30,770 --> 00:00:32,189

during launch.

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00:00:32,189 --> 00:00:36,940

That's why we've come to ATK in Magna, Utah where they're building the wings of the backplane.

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00:00:36,940 --> 00:00:41,180

Brian Jahne (Lead Design Engineer/ ATK): There's three deliverables that ATK provides.

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00:00:41,180 --> 00:00:45,750

There's a left hand side wing, a right hand side wing and then a large center section

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00:00:45,750 --> 00:00:46,750

portion.

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00:00:46,750 --> 00:00:49,620

This design right here shows the wings in the deployed condition.

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00:00:49,620 --> 00:00:53,870

When it's on top of the spacecraft prior to launch, they're folded back.

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00:00:53,870 --> 00:00:56,830

There's 4 launch locks on the outboard corners of the wings.

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00:00:56,830 --> 00:00:57,830

Mary: Ooo...

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00:00:57,830 --> 00:00:58,830

what's a launch lock?

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00:00:58,830 --> 00:01:03,890

Brian: A launch lock is what is used to hold the wing in its tight packed position.

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00:01:03,890 --> 00:01:06,410

Mary: Oh, okay, so it keeps it in place during the launch.

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00:01:06,410 --> 00:01:07,410

Brian: That's right.

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00:01:07,410 --> 00:01:11,810

So, once it's out through the launch environment, the launch locks are released, the mirror

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00:01:11,810 --> 00:01:13,409

can be deployed into the final position.

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00:01:13,409 --> 00:01:16,920

Mary: So how far along are you in making these wings?

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00:01:16,920 --> 00:01:19,310

Brian: We've very far along actually.

23  
00:01:19,310 --> 00:01:23,560  
You can go out and see the progress in the clean room with Ed Graul.

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00:01:23,560 --> 00:01:27,550  
He'll take you on a little tour of the manufacturing facility and show you the wings.

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00:01:27,550 --> 00:01:28,830  
Mary: Hey Ed.

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00:01:28,830 --> 00:01:33,030  
Brian just showed us the computer models of the backplane but he said that the wings of

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00:01:33,030 --> 00:01:35,090  
the backplane are actually almost done.

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00:01:35,090 --> 00:01:36,630  
Ed Graul (Manufacturing IPT Lead /ATK): That's really true.

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00:01:36,630 --> 00:01:41,540  
We've been quite a while on the wings and we're very close to having them being completed.

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00:01:41,540 --> 00:01:45,000  
You can see them working on them here in the background.

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00:01:45,000 --> 00:01:50,000  
Each of these wings goes on center section of the support structure.

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00:01:50,000 --> 00:01:53,390  
Each of the wings holds three of the mirror segments.

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00:01:53,390 --> 00:01:55,010

Then they will fold up during launch.

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00:01:55,010 --> 00:01:56,820

Mary: Any chance we can sneak in there?

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00:01:56,820 --> 00:01:58,730

Ed: Well, I would love to show you.

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00:01:58,730 --> 00:02:03,460

Let's get our clean garb on and we will be able to go in and have a closer look.

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00:02:03,460 --> 00:02:04,460

Mary: Sounds good!

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00:02:04,460 --> 00:02:06,720

Mary: So what are these guys doing now?

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00:02:06,720 --> 00:02:13,510

Ed: They are bonding together different pieces that will make up the overall assembled structure.

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00:02:13,510 --> 00:02:20,490

The thickness of the adhesive they are currently injecting in at very specific points has to

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00:02:20,490 --> 00:02:25,549

be held very precisely because if there's too much adhesive, it'll want to pull itself

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00:02:25,549 --> 00:02:28,040

apart at very cold temperatures.

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00:02:28,040 --> 00:02:32,889

If there's too little adhesive, then it won't be able to withstand the forces of launch.

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00:02:32,889 --> 00:02:34,959

Ed: Let's come around to the far side...

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00:02:34,959 --> 00:02:37,409

Mary: Ok

Ed: Now these wings... you can see first,

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00:02:37,409 --> 00:02:41,230

as you look at it.. that the wings are not flat.

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00:02:41,230 --> 00:02:46,989

They have a curve shape and that curved shape matches the parabolic shape of the overall

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00:02:46,989 --> 00:02:47,989

mirror.

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00:02:47,989 --> 00:02:51,299

Mary: So visually, each of the primary mirror segments would be facing down right now as

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00:02:51,299 --> 00:02:53,680

opposed to be right on top here.

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00:02:53,680 --> 00:02:55,040

Ed: That is correct.

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00:02:55,040 --> 00:03:01,780

And you can see all along as you're in closer, that we have additional sheer panels that

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00:03:01,780 --> 00:03:06,049

distribute and balance the loads that are experienced during launch.

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00:03:06,049 --> 00:03:07,049

Mary: Great!

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00:03:07,049 --> 00:03:09,969

Well, thank you so much for showing us the wings of the backplane.

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00:03:09,969 --> 00:03:12,079

Ed: It's certainly my pleasure.

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00:03:12,079 --> 00:03:13,459

Thank you for being here today.

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00:03:13,459 --> 00:03:19,010

Mary: As you can see the backplane and its wings have to be very very strong because

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00:03:19,010 --> 00:03:24,120

the mirror segments collectively weigh about three quarters of a ton.