

1  
00:00:12,359 --> 00:00:17,859  
the primary mirror on the Webb telescope

2  
00:00:14,769 --> 00:00:20,710  
will have a diameter of more than 21

3  
00:00:17,859 --> 00:00:22,778  
feet that's four times my height now

4  
00:00:20,710 --> 00:00:24,550  
that's too big to fit into a rocket so

5  
00:00:22,778 --> 00:00:27,550  
engineers have had to design a structure

6  
00:00:24,550 --> 00:00:29,920  
that will not only hold all 18 segments

7  
00:00:27,550 --> 00:00:32,529  
of the primary mirror in place but also

8  
00:00:29,920 --> 00:00:35,350  
fold up during launch that's why we've

9  
00:00:32,529 --> 00:00:37,360  
come to ATK in magna Utah where they're

10  
00:00:35,350 --> 00:00:39,340  
building the wings of the backplane

11  
00:00:37,359 --> 00:00:42,609  
there's three deliverables at ATK

12  
00:00:39,340 --> 00:00:44,379  
provides it there's a left-hand side

13  
00:00:42,609 --> 00:00:47,049  
wing right-hand side wing and then a

14  
00:00:44,378 --> 00:00:48,579  
large center section portion this design

15  
00:00:47,049 --> 00:00:50,738  
right here shows the wings in the

16  
00:00:48,579 --> 00:00:52,539  
deployed condition when it's on top of

17  
00:00:50,738 --> 00:00:54,640  
the spacecraft prior to launch

18  
00:00:52,539 --> 00:00:56,439  
they're folded back there's four launch

19  
00:00:54,640 --> 00:00:58,838  
locks on the outboard corners of the

20  
00:00:56,439 --> 00:01:01,628  
wings so what's a launch lock a launch

21  
00:00:58,838 --> 00:01:05,228  
lock is what is used to hold the wing in

22  
00:01:01,628 --> 00:01:06,728  
its tight pack position okay so it keeps

23  
00:01:05,228 --> 00:01:08,200  
it in place during the launch that's

24  
00:01:06,728 --> 00:01:09,819  
right and then once it's through the

25  
00:01:08,200 --> 00:01:11,978  
launch environment the launch locks are

26  
00:01:09,819 --> 00:01:13,809  
released and then the wings can be

27  
00:01:11,978 --> 00:01:16,359  
deployed into their final position so

28  
00:01:13,810 --> 00:01:19,329  
how far along are you in making these

29

00:01:16,359 --> 00:01:22,030  
wings we're very far along actually you

30  
00:01:19,329 --> 00:01:24,310  
can go out and see the progress in the

31  
00:01:22,030 --> 00:01:26,140  
cleanroom with Edgar all he'll take you

32  
00:01:24,310 --> 00:01:28,719  
on a little tour of the manufacturing

33  
00:01:26,140 --> 00:01:30,700  
facility and show you the wings hey ed

34  
00:01:28,719 --> 00:01:32,709  
Brian just showed us the computer models

35  
00:01:30,700 --> 00:01:34,180  
of the backplane but he said that the

36  
00:01:32,709 --> 00:01:36,789  
wings of the backplane are actually

37  
00:01:34,180 --> 00:01:38,320  
almost done that's really truly been

38  
00:01:36,790 --> 00:01:40,540  
working for quite a while on the wings

39  
00:01:38,319 --> 00:01:42,009  
and we're very close to being able to

40  
00:01:40,540 --> 00:01:43,840  
have them completed you can see them

41  
00:01:42,010 --> 00:01:46,270  
working on them here in the background

42  
00:01:43,840 --> 00:01:48,460  
mm-hmm each of these wings goes on

43  
00:01:46,269 --> 00:01:50,590

either side of the center section of the

44

00:01:48,459 --> 00:01:52,839

support structure each of the wings

45

00:01:50,590 --> 00:01:55,480

holds three of the mirror segments and

46

00:01:52,840 --> 00:01:56,980

then they will fold up during launch any

47

00:01:55,480 --> 00:01:59,049

chance we can sneak in there well I

48

00:01:56,980 --> 00:02:01,659

would love to show you let's let's get

49

00:01:59,049 --> 00:02:05,250

our clean garb on yeah we'll be able to

50

00:02:01,659 --> 00:02:05,250

go in and have a closer look

51

00:02:05,569 --> 00:02:09,669

what are these guys doing now they are

52

00:02:07,219 --> 00:02:12,469

bonding together different pieces that

53

00:02:09,669 --> 00:02:15,919

will make up the overall assembled

54

00:02:12,469 --> 00:02:18,020

structure the thickness of the adhesive

55

00:02:15,919 --> 00:02:21,259

that they are currently injecting in at

56

00:02:18,020 --> 00:02:23,480

very specific points has to be held very

57

00:02:21,259 --> 00:02:26,000

precisely because if there's too much

58  
00:02:23,479 --> 00:02:28,489  
adhesive it'll want to pull itself apart

59  
00:02:26,000 --> 00:02:31,370  
at very cold temperatures if there's too

60  
00:02:28,490 --> 00:02:33,830  
little adhesive then it won't be able to

61  
00:02:31,370 --> 00:02:36,650  
withstand the forces of launch let's

62  
00:02:33,830 --> 00:02:38,719  
come to the far side and these wings you

63  
00:02:36,650 --> 00:02:41,599  
can see the first as you look at it then

64  
00:02:38,719 --> 00:02:43,789  
the wings are not flat they have a

65  
00:02:41,599 --> 00:02:46,400  
curved shape and that curved shape

66  
00:02:43,789 --> 00:02:48,889  
matches the parabolic shape of the

67  
00:02:46,400 --> 00:02:50,420  
overall mirror so each of the primary

68  
00:02:48,889 --> 00:02:52,369  
mirror segments would be facing down

69  
00:02:50,419 --> 00:02:54,530  
right now as opposed to being on top

70  
00:02:52,370 --> 00:02:57,830  
here that is correct let's come over

71  
00:02:54,530 --> 00:03:00,620  
this way you can see all along as you're

72  
00:02:57,830 --> 00:03:03,680  
in closer that we have additional shear

73  
00:03:00,620 --> 00:03:05,930  
panels that distribute and balance the

74  
00:03:03,680 --> 00:03:08,269  
loads that are experienced during launch

75  
00:03:05,930 --> 00:03:10,670  
great well thank you so much for showing

76  
00:03:08,269 --> 00:03:12,379  
us the wings of of the backline it's

77  
00:03:10,669 --> 00:03:14,958  
certainly my pleasure thank you for

78  
00:03:12,379 --> 00:03:17,269  
being here today as you can see the

79  
00:03:14,959 --> 00:03:20,000  
backplane and its wings have to be very

80  
00:03:17,269 --> 00:03:23,360  
very strong because the mirror segments

81  
00:03:20,000 --> 00:03:25,250  
collectively weigh about 3/4 of a ton

82  
00:03:23,360 --> 00:03:28,750  
thanks for joining us for this edition

83  
00:03:25,250 --> 00:03:28,750  
of behind the Webb

84  
00:03:33,199 --> 00:03:35,259  
you