

1
00:00:12,990 --> 00:00:17,579
the 18 segments making up the primary

2
00:00:16,089 --> 00:00:19,929
mirror on the James Webb Space Telescope

3
00:00:17,579 --> 00:00:23,139
will be held in place by something

4
00:00:19,929 --> 00:00:25,420
called a backplane since each hexagonal

5
00:00:23,140 --> 00:00:27,640
mirror is about three feet tall you can

6
00:00:25,420 --> 00:00:30,429
imagine this backplane is really huge

7
00:00:27,640 --> 00:00:32,529
and very complicated to make to find out

8
00:00:30,429 --> 00:00:35,560
more about how this is being assembled

9
00:00:32,529 --> 00:00:37,870
we're here at ATK in magna Utah and were

10
00:00:35,560 --> 00:00:39,880
happy to have with us bob hellicksen

11
00:00:37,869 --> 00:00:41,320
he's the project manager for the James

12
00:00:39,880 --> 00:00:43,120
Webb Space Telescope thanks for having

13
00:00:41,320 --> 00:00:46,570
us over thank you for coming to visit us

14
00:00:43,119 --> 00:00:48,369
Mary first of all how tough a job is it

15
00:00:46,570 --> 00:00:49,990
to make a backplane for the James Webb

16
00:00:48,369 --> 00:00:52,329
Space Telescope well what we're standing

17
00:00:49,990 --> 00:00:54,789
in front of right here is three of the

18
00:00:52,329 --> 00:00:57,339
full-scale hexes or the backplane and

19
00:00:54,789 --> 00:00:59,079
this was manufactured out of wood that

20
00:00:57,340 --> 00:01:00,910
established both the tooling approach

21
00:00:59,079 --> 00:01:03,429
and the assembly approach that we'll use

22
00:01:00,909 --> 00:01:05,170
for the flight article now you didn't

23
00:01:03,429 --> 00:01:05,438
just go from this to the real thing did

24
00:01:05,170 --> 00:01:07,450
you

25
00:01:05,438 --> 00:01:09,399
no we did not as a matter of fact this

26
00:01:07,450 --> 00:01:12,850
structure was the first made out of wood

27
00:01:09,400 --> 00:01:14,618
then this same size three hexes was made

28
00:01:12,849 --> 00:01:17,709
out of the graphite composite material

29

00:01:14,618 --> 00:01:20,828
whose taken down to the 30 Kelvin level

30
00:01:17,709 --> 00:01:23,019
or minus 405 degrees Fahrenheit and it

31
00:01:20,828 --> 00:01:25,449
was measured for its performance on

32
00:01:23,019 --> 00:01:27,789
stability meaning it had to stay very

33
00:01:25,450 --> 00:01:30,189
stable through that entire temperature

34
00:01:27,789 --> 00:01:32,530
regime so Bob I understand the real

35
00:01:30,188 --> 00:01:34,748
backplane is here at ATK now oh

36
00:01:32,530 --> 00:01:36,399
absolutely I we can show you that and

37
00:01:34,748 --> 00:01:38,408
we'll have to go in the cleanroom next I

38
00:01:36,399 --> 00:01:41,200
want to show you some electronic

39
00:01:38,409 --> 00:01:44,139
measuring equipment to make sure that

40
00:01:41,200 --> 00:01:47,289
everything meets its final dimensional

41
00:01:44,138 --> 00:01:49,509
performance before we deliver so is it

42
00:01:47,289 --> 00:01:51,939
like a GPS where the text where that

43
00:01:49,509 --> 00:01:53,618

ball is located at any given time yeah

44

00:01:51,938 --> 00:01:56,589
that's exactly right that ball

45

00:01:53,618 --> 00:01:58,778
coordinates back on its surface to where

46

00:01:56,590 --> 00:02:01,149
the model is for the corresponding

47

00:01:58,778 --> 00:02:02,030
feature this is very interesting stuff

48

00:02:01,149 --> 00:02:03,560
but this is

49

00:02:02,030 --> 00:02:05,510
killing me can we go see the back way

50

00:02:03,560 --> 00:02:07,659
now absolutely let's step around this

51

00:02:05,510 --> 00:02:10,099
side we'll show you the rest of it great

52

00:02:07,659 --> 00:02:12,859
this is the center section of the back

53

00:02:10,099 --> 00:02:14,539
plane and it will house 12 of the

54

00:02:12,860 --> 00:02:17,240
primary mirror segments

55

00:02:14,539 --> 00:02:17,750
you said center section it's not the

56

00:02:17,240 --> 00:02:21,350
whole thing

57

00:02:17,750 --> 00:02:24,169
correct the full-size mirror will have

58
00:02:21,349 --> 00:02:26,030
18 segments and what's missing here

59
00:02:24,169 --> 00:02:28,039
they'll come later are two wings each

60
00:02:26,030 --> 00:02:30,620
holding three segments or three mirrors

61
00:02:28,039 --> 00:02:33,139
and why break it out into a center and

62
00:02:30,620 --> 00:02:35,090
two wings the launch vehicles don't have

63
00:02:33,139 --> 00:02:37,458
the dimensions to accept the entire

64
00:02:35,090 --> 00:02:39,170
width so it has to fold up and that's

65
00:02:37,459 --> 00:02:42,530
another unique feature here is we're

66
00:02:39,169 --> 00:02:45,949
deploying three of the hexes on each

67
00:02:42,530 --> 00:02:48,229
side or both wings this is not exactly a

68
00:02:45,949 --> 00:02:50,329
flat structure it looks like it's got a

69
00:02:48,229 --> 00:02:52,189
little bit of a curve that's correct

70
00:02:50,330 --> 00:02:53,630
that the back plane matches the

71
00:02:52,189 --> 00:02:56,000
parabolic shape that they want the

72
00:02:53,629 --> 00:02:58,729
primary mirror to end up with besides

73
00:02:56,000 --> 00:03:00,229
holding the mirrors in place once James

74
00:02:58,729 --> 00:03:02,419
Webb is in operation what else is the

75
00:03:00,229 --> 00:03:04,719
back point for the back plane also

76
00:03:02,419 --> 00:03:06,889
provides stability to the entire

77
00:03:04,719 --> 00:03:09,019
observatory so what's missing here

78
00:03:06,889 --> 00:03:11,059
you'll see later is a backplane

79
00:03:09,019 --> 00:03:13,939
stability frame that reaches up about

80
00:03:11,060 --> 00:03:16,340
eight feet off of this section it will

81
00:03:13,939 --> 00:03:19,069
house the instruments for the

82
00:03:16,340 --> 00:03:22,069
observatory and provides a lot of the

83
00:03:19,069 --> 00:03:24,109
strength for the launch well thanks for

84
00:03:22,069 --> 00:03:25,459
showing us ATK's backplane well thank

85
00:03:24,110 --> 00:03:28,970
you very much for coming to visit us

86

00:03:25,459 --> 00:03:30,979
Mary so as you can see this backplane

87
00:03:28,969 --> 00:03:33,500
will be ultimately thermally and

88
00:03:30,979 --> 00:03:36,169
structurally stable important for the

89
00:03:33,500 --> 00:03:38,000
eighteen segment primary mirror to stay

90
00:03:36,169 --> 00:03:40,518
still so that the James Webb Space

91
00:03:38,000 --> 00:03:42,859
Telescope can take its wonderful images

92
00:03:40,519 --> 00:03:46,780
of the universe thanks for joining us

93
00:03:42,859 --> 00:03:46,780
for this edition of behind the Webb

94
00:03:54,270 --> 00:03:56,330
you