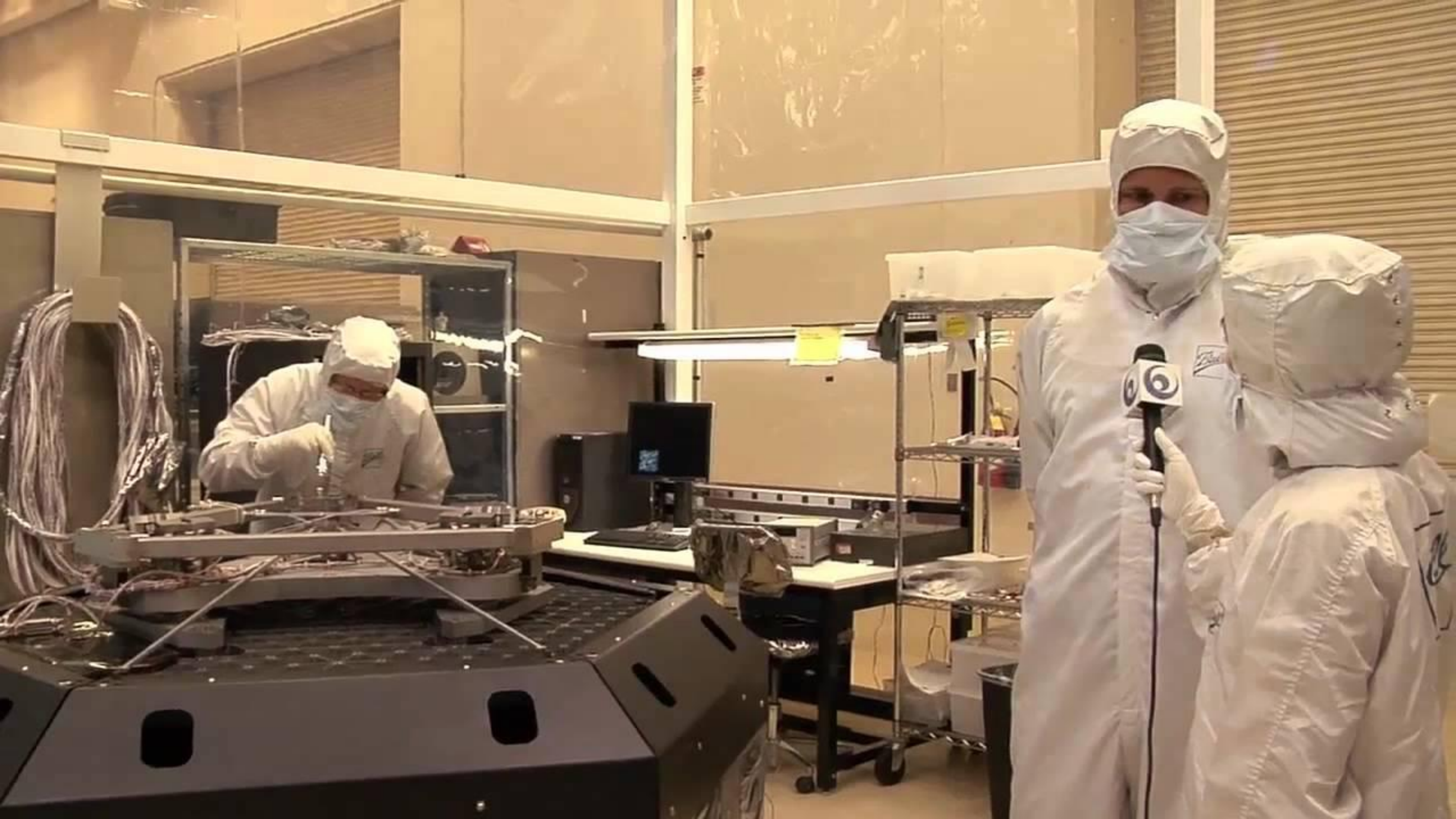

1
00:00:16,870 --> 00:00:14,629
the mirrors on the james webb space

2
00:00:19,189 --> 00:00:16,880
telescope have components attached to

3
00:00:21,510 --> 00:00:19,199
the back of each of them what exactly

4
00:00:23,029 --> 00:00:21,520
are these and what do they do well we're

5
00:00:26,070 --> 00:00:23,039
here at ball aerospace in boulder

6
00:00:27,990 --> 00:00:26,080
colorado to find out

7
00:00:29,750 --> 00:00:28,000
so brad what's going on over here now

8
00:00:31,509 --> 00:00:29,760
well we are bonding items to the back of

9
00:00:32,950 --> 00:00:31,519
the mirror and that is to distribute the

10
00:00:35,430 --> 00:00:32,960
loads during launch as well as to

11
00:00:38,470 --> 00:00:35,440
distribute the lows during the mission

12
00:00:40,310 --> 00:00:38,480
and this is a precursor to more items

13
00:00:41,430 --> 00:00:40,320

being attached to the mirror right yeah

14
00:00:43,430 --> 00:00:41,440
that's correct

15
00:00:45,029 --> 00:00:43,440
the next step is when we attach the

16
00:00:47,029 --> 00:00:45,039
hexapod assembly and the radius of

17
00:00:48,869 --> 00:00:47,039
curvature subsystem onto the back of the

18
00:00:50,630 --> 00:00:48,879
mirror sounds like a mouthful i think

19
00:00:52,630 --> 00:00:50,640
it'd be better understood if we actually

20
00:00:55,189 --> 00:00:52,640
see one sure

21
00:00:58,549 --> 00:00:55,199
the hexapod assembly has the six rigid

22
00:01:00,150 --> 00:00:58,559
body actuators its job is to manipulate

23
00:01:02,709 --> 00:01:00,160
the mirror

24
00:01:04,710 --> 00:01:02,719
in six degrees of motion

25
00:01:07,190 --> 00:01:04,720
the radius the curvature subsystem it's

26
00:01:08,950 --> 00:01:07,200
one of the six struts and there is a

27
00:01:10,070 --> 00:01:08,960
an actuator that goes to the center of

28
00:01:12,870 --> 00:01:10,080
the mirror

29
00:01:15,350 --> 00:01:12,880
it can very precisely change the radius

30
00:01:17,910 --> 00:01:15,360
of curvature of the primary mirror

31
00:01:19,749 --> 00:01:17,920
because the mirror consists of 18

32
00:01:21,670 --> 00:01:19,759
primary mirror segment assemblies those

33
00:01:24,950 --> 00:01:21,680
18 primary mirror segment assemblies

34
00:01:27,190 --> 00:01:24,960
must be adjusted while on orbit to mimic

35
00:01:28,950 --> 00:01:27,200
a perfect primary mirror

36
00:01:31,590 --> 00:01:28,960
so brad can we take a closer look at

37
00:01:33,350 --> 00:01:31,600
these actuators talk to jake lewis and

38
00:01:35,109 --> 00:01:33,360

he will bring you up to speed with the

39
00:01:36,230 --> 00:01:35,119
actuators

40
00:01:38,550 --> 00:01:36,240
jake

41
00:01:40,630 --> 00:01:38,560
yes yeah brad brad told me that you are

42
00:01:49,749 --> 00:01:40,640
the man with the actuators absolutely

43
00:01:53,670 --> 00:01:51,429
so here we have the hexapod and we're

44
00:01:55,910 --> 00:01:53,680
aligning the actuators onto it a

45
00:01:58,789 --> 00:01:55,920
precision alignment fixture allows us to

46
00:02:00,789 --> 00:01:58,799
build each hexapod identically now that

47
00:02:02,469 --> 00:02:00,799
they've positioned the actuators on here

48
00:02:04,870 --> 00:02:02,479
they've got to verify that it's

49
00:02:06,389 --> 00:02:04,880
intolerance so they're measuring it to

50
00:02:08,070 --> 00:02:06,399
make sure that it's in the exact

51
00:02:09,430 --> 00:02:08,080
position that it needs to be you have

52
00:02:11,670 --> 00:02:09,440
different actuators for the different

53
00:02:13,830 --> 00:02:11,680
mirrors are they all the same no one of

54
00:02:15,510 --> 00:02:13,840
the things that we've done is that all

55
00:02:17,910 --> 00:02:15,520
of the mirrors have exactly the same

56
00:02:19,750 --> 00:02:17,920
actuators on them secondary tertiary all

57
00:02:21,270 --> 00:02:19,760
those just the secondary and primary

58
00:02:22,949 --> 00:02:21,280
mirrors have actuators the tertiary

59
00:02:25,589 --> 00:02:22,959
doesn't have any actuators on it it

60
00:02:27,910 --> 00:02:25,599
stays fixed but the only difference

61
00:02:30,470 --> 00:02:27,920
between the primary and secondary mirror

62
00:02:32,710 --> 00:02:30,480
hexapods is the size of the frame the

63
00:02:34,790 --> 00:02:32,720

actuator assembly all remains identical

64
00:02:36,790 --> 00:02:34,800
and that's a cost savings and a great

65
00:02:39,430 --> 00:02:36,800
simplification for us well thanks for

66
00:02:41,430 --> 00:02:39,440
giving us a sense of what actuators are

67
00:02:44,309 --> 00:02:41,440
on the james webb space telescope and

68
00:02:46,710 --> 00:02:44,319
the hexapod assembly you're welcome

69
00:02:48,710 --> 00:02:46,720
as you can see these actuators with the

70
00:02:51,030 --> 00:02:48,720
hexapod assembly make these mirrors on

71
00:02:53,910 --> 00:02:51,040
the james webb space telescope much more

72
00:02:56,470 --> 00:02:53,920
complex than the ones that say you might

73
00:02:58,869 --> 00:02:56,480
have in your bathroom but these mirrors

74
00:03:01,030 --> 00:02:58,879
have a job to do to look at a universe

75
00:03:02,470 --> 00:03:01,040
billions of light years away