1
00:00:00,090 --> 00:00:04,290
James Webb is currently undergoing a cryogenci vacuum test in a very large chamber

2
00:00:04,290 --> 00:00:08,350
called Chamber A at NASA Johnson Space Center

3
00:00:08,350 --> 00:00:12,380
and the purpose of this test to make sure that all the components of the telescope

4
00:00:12,380 --> 00:00:15,880
are going to function in the cold vacuum environment of space

5
00:00:15,880 --> 00:00:17,220
Title: Nithin Abraham, NASA Coatings engineer.

6
00:00:17,220 --> 00:00:20,180
Abraham: I'm a coatings engineer and I'm working very closely

7
00:00:20,180 --> 00:00:23,300
with the James Webb Contamination Control team. Before we start the

8
00:00:23,360 --> 00:00:28,720
cryogenic test, the contamination control team works to clean the inside of the chamber so

9
00:00:28,730 --> 00:00:32,850
Webb can stay as contamination free as possible. It's not possible

10
00:00:32,850 --> 00:00:36,930
for anyone to access the chamber during the test so, we have to

11
00:00:36,930 --> 00:00:41,050
do all our contamination mitigation before the test starts.

12
00:00:41,050 --> 00:00:45,090
and my job specifically involves the development and testing of

13
00:00:45,090 --> 00:00:49,220

a new NASA coatings technology that can help mitigate

14
00:00:49,220 --> 00:00:53,340
molecular contamination concerns. So, the plenum is an area at the

15
00:00:53,340 --> 00:00:57,520
bottom of Chamber A, its the space directly below where Webb sits

16
00:00:57,520 --> 00:01:01,600
ready for testing. To get tot he plenum, we have to carefully walk

17
00:01:01,600 --> 00:01:05,690
in the space between the helium shroud, which is surrounding Webb,

18
00:01:05,690 --> 00:01:09,850
and the outer wall of Chamber A. There's no lights so we have to

19
00:01:09,850 --> 00:01:13,960
wear headlamps. The plenum is considered a confined space becuase

20
00:01:13,960 --> 00:01:18,140
there's only one way in, and only one way out. We have to wear oxygen

21
00:01:18,140 --> 00:01:22,330
sensors to make sure that it's safe to be down there. We have to

22
00:01:22,330 --> 00:01:26,460
take a ladder down to the plenum, that's the lowest level at the bottom of the chamber.

23
00:01:26,460 --> 00:01:30,660
And the floor, is actually the curved bottom of Chamber A.

24
00:01:30,660 --> 00:01:34,750
So there are molecular contaminants that exist in the plenum

25
00:01:34,750 --> 00:01:38,800
for example you have your hydrocarbons and your silcones and

26
00:01:38,800 --> 00:01:42,850
these are sometimes very difficult to remove almost completely,

27
00:01:42,850 --> 00:01:47,020
and the contamination team has done an amazing job of reducing the

28
00:01:47,020 --> 00:01:51,170
existing levels down to a very minimal amount and it's

29
00:01:51,170 --> 00:01:55,360
this residual contaminants that can essentially out-gas during

30
00:01:55,360 --> 00:01:59,440
vacuum testing, spread throughout the chamber, and perhaps even deposit on a

31
00:01:59,440 --> 00:02:03,570
very cold. sensitive surface such as James Webb. Graphic: Molecular Adsorber Coating is a highly pourous ma

32
00:02:03,570 --> 00:02:07,650
to passively capture molecular contaminants. Abraham: to tackle the problem at the source and

33
00:02:07,650 --> 00:02:11,720
that's why we placed the MAC samples in the plenum area.

34
00:02:11,720 --> 00:02:15,780
We do a thorough analysis on the types of contaminants that

35
00:02:15,780 --> 00:02:19,940
were collected and how much, the data is very useful and shows that

36
00:02:19,940 --> 00:02:24,010
we are protecting James Webb from molecular contamination

37
00:02:24,010 --> 00:02:28,110
I've devoted a lot of my early career developing and testing