
Grounding Harness
Test Harness
CAM
secondary structure
Cover
Corner Posts SWT
Field Stop Assembly
ASTRIUM
ASTRIUM
SPANNER

1
00:00:12,350 --> 00:00:17,800
Opening the door to let the light in is a
lot like how NIRSPEC does its job.

2
00:00:17,800 --> 00:00:23,880
Let's go inside the ASTRIUM clean room in
Ottobrunn, Germany to find out how.

3
00:00:23,880 --> 00:00:27,189
So, Ralf, does NIRSPEC involve the
opening of doors?

4
00:00:27,189 --> 00:00:32,349
Ralf Ehrenwinkler/NIRSPEC I&T Manager: That's correct. But our doors are very
small. If you have a look here, you see

5
00:00:32,349 --> 00:00:37,920
thousands of doors in this array. And it's
called micro shutters and if the doors are

6
00:00:37,920 --> 00:00:42,600
open, you can have a look to the universe.
Is there any way we can actually see the

7
00:00:42,600 --> 00:00:48,600
micro shutter array in NIRSPEC? Yes for
that we have to go into the cleanroom.

8
00:00:48,600 --> 00:00:55,860
Our arrays on NIRSPEC… we have four of them. They're here, within this black arc. Ok, so there's four of the

9
00:00:55,860 --> 00:01:01,110
So you see two by two. Is that the
spectrometer that it's in? This is the entrance of

10
00:01:01,110 --> 00:01:05,019
the spectrometer. My eyesight's pretty good
but it's not good enough to see

11

00:01:05,019 --> 00:01:09,049
thousands of little doors or thousands
of little micro shutters. How can I get a better look?

12
00:01:09,049 --> 00:01:15,100
If you really want to know how to
know how these doors are working, you should have to go to

13
00:01:15,100 --> 00:01:22,380
NASA Goddard Space Flight Center at Maryland. Sounds good. Thank you so much for showing us the micro shutters in NIRSPEC. You're welcome.

14
00:01:22,380 --> 00:01:26,670
So Harvey, Ralf from Astrium
just sent us from across the pond to

15
00:01:26,670 --> 00:01:31,399
find out more about how micro shutters work, but first I have a question. Why do we

16
00:01:31,399 --> 00:01:35,780
need micro shutters on NIRSPEC? Harvey Moseley/Astrophysicist, NASA Goddard: Well, in order to tell you about that I need to

17
00:01:35,780 --> 00:01:41,350
remind you the James Webb is supposed to
study the universe at a time when the

18
00:01:41,350 --> 00:01:46,259
first galaxies were forming. In order to
really tell if they are citizens of this

19
00:01:46,259 --> 00:01:51,369
very early phase of the universe we need
to do a spectroscopic study of those

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00:01:51,369 --> 00:01:56,679
galaxies. They'll be very very faint so
it's going to take us a very long time

21
00:01:56,679 --> 00:02:01,450

to do those measurements... and after
looking at the picture of the sky, we

22
00:02:01,450 --> 00:02:05,700
identify where these objects are and we
just open the shutters on each of these

23
00:02:05,700 --> 00:02:12,490
locations. So basically, it isolates parts
of the universe for you right? Exactly.

24
00:02:12,490 --> 00:02:17,860
It let's observe say a hundred objects at
one time rather than just one at a time,

25
00:02:18,420 --> 00:02:24,700
so it makes JWST a hundred
times as effective to explore the early universe.

26
00:02:25,200 --> 00:02:26,640
Can I take a look?

27
00:02:26,640 --> 00:02:36,709
Sure. Okay. So you're seeing the micro
shutters there. The array has two hundred and

28
00:02:36,709 --> 00:02:42,230
fifty thousand shutters in it. You're
seeing only a tiny fraction of what's on there.

29
00:02:43,000 --> 00:02:47,849
Now we can move in and see a
single door in greater detail the height

30
00:02:47,849 --> 00:02:54,019
of that door is only about twice the
diameter of a hair. What are the smaller

31
00:02:54,019 --> 00:03:00,100
rectangles on the shutter? These are

stripes of magnetic material to allow

32
00:03:00,100 --> 00:03:05,780
the magnet to open the shutter. Come on
in, Mary. In here, we have a micro shutter array

33
00:03:05,900 --> 00:03:12,330
set up where we can open it with a
magnet so you can see how the little

34
00:03:12,330 --> 00:03:18,140
shutters work. As we slide the magnet
across here it's open and you can see

35
00:03:18,140 --> 00:03:23,959
the NASA logo behind it and pull it back
and it's closed. When we combine that

36
00:03:23,959 --> 00:03:25,810
with our electronics

37
00:03:25,810 --> 00:03:31,290
we can actually open any single shutter
in the entire array. Well, Harvey, thank you so much

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00:03:31,290 --> 00:03:35,500
for helping us understand how micro shutters work on NIRSPEC. Well thank you

39
00:03:35,500 --> 00:03:40,910
very much opportunity to show them off.
While this new technology was developed

40
00:03:40,910 --> 00:03:45,200
specifically for Webb, the use of
micro shutters is being planned for