Hubble Memorable Moments

1
00:00:00,190 --> 00:00:04,240
[mysterious music]

2
00:00:04,240 --> 00:00:08,430
>>KATRINA: Hubble's Space Telescope Imaging Spectrograph, or STIS, has capabilities

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00:00:08,430 --> 00:00:12,480
like searching for black holes, and looking at the atmospheres of planets orbiting other stars.

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00:00:12,480 --> 00:00:16,650
After STIS had a power failure in 2004, the Hubble team was

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00:00:16,650 --> 00:00:20,670
tasked with replacing STIS' damaged electronics boards on the final servicing mission

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00:00:20,670 --> 00:00:24,720
in 2009, which would turn out to be a memorable day for

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00:00:24,720 --> 00:00:28,900
everyone involved. [mysterious music]

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00:00:28,900 --> 00:00:33,080
[shimmering music] >>CHRISTY: So for about two

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00:00:33,080 --> 00:00:37,090
years, I spent almost every day with the EVA team, the four crew members.

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00:00:37,090 --> 00:00:41,260
>>MIKE: We practiced that repair many many times. We had practiced it in the water

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00:00:41,260 --> 00:00:45,290
start to finish in the pool many times. >>CHRISTY: We spent hours and days and weeks and months

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00:00:45,290 --> 00:00:49,450
going through, "What if this bolt fails? What if the cable doesn't mate?" So I felt

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00:00:49,450 --> 00:00:53,620

that we had covered as much as we could have thought of going into this

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00:00:53,620 --> 00:00:57,650
EVA. [music transitions] [electronic beeping]

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00:00:57,650 --> 00:01:01,810
[electronic beeping] >>JAMES: So we came in

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00:01:01,810 --> 00:01:06,000
to work here at the Space Telescope Operations Control Center at Goddard.

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00:01:06,000 --> 00:01:10,030
>>JEFF: And our mechanical response team was watching the EVA in a

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00:01:10,030 --> 00:01:14,180
conference room in building 29. >>JIM: I was located down at Johnson Space Center, along

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00:01:14,180 --> 00:01:18,200
with the Servicing Mission Manager. >>MIKE: The day started out really well, you know I was

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00:01:18,200 --> 00:01:22,300
trying to make it a perfect day, no problems. >>CHRISTY: So they get to the section where they

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00:01:22,300 --> 00:01:26,470
have to remove the handrail on STIS. And you have to remove this handrail that was designed actually

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00:01:26,470 --> 00:01:30,510
to help remove and install the entire instrument, in order to access

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00:01:30,510 --> 00:01:34,640
the electronics board underneath. >>JEFF: And we watched Mike Massimino

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00:01:34,640 --> 00:01:38,820
attempt to do a rather simple task. All he had to do was remove four screws

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00:01:38,820 --> 00:01:42,890
from a handrail. >>MIKE: And so the two screws at the top of the handrail came off fine,

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00:01:42,890 --> 00:01:47,060
the one on the bottom left comes out fine, I go to the bottom right. >>JAMES: We could see

27
00:01:47,060 --> 00:01:51,240
the pistol grip tool spinning in the bolt head,

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00:01:51,240 --> 00:01:55,280
and the bolt wasn't coming out. >>MIKE (in space): I don't want to strip the thing.

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00:01:55,280 --> 00:01:59,470
>>JIM: Oh my god. That was the first thing, you know it's "What are we going

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00:01:59,470 --> 00:02:03,500
to do?" because this is a show-stopper right here. >>MIKE: For a while,

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00:02:03,500 --> 00:02:07,530
probably about an hour or so, we were trying different bits on the end of the power tool,

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00:02:07,530 --> 00:02:11,700
we were trying all kinds of things. >>JIM: You know and one thing

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00:02:11,700 --> 00:02:15,720
that crossed my mind was, "What would you do? What would you do at home? You know, what

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00:02:15,720 --> 00:02:19,870
would you do in your garage?" And I was thinking back to my garage you know, and sometimes what would I d

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00:02:19,870 --> 00:02:24,050
And I'd just kinda use the brute force you know. So I thought, what about just trying to break it?

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00:02:24,050 --> 00:02:28,080
>>CHRISTY: It didn't even occur to a lot of us, just because it's something that you're not really ever trained to

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00:02:28,080 --> 00:02:32,250
or think of. >>JIM: So one of the things that I did was I called back to James Cooper back here at Goddard.

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00:02:32,250 --> 00:02:36,260

>>JEFF: James Cooper called us on the speaker phone and said, "Hey guys, you're watching

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00:02:36,260 --> 00:02:40,350
this right?" And we said, "Yeah yeah of course." >>JAMES: We found out we did have a mock-up

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00:02:40,350 --> 00:02:44,520
of the STIS front panel with the handrail on it. >>JEFF: We came up with a quick plan.

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00:02:44,520 --> 00:02:48,560
Bill Mitchell said, "I've got two handrails inside the clean room."

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00:02:48,560 --> 00:02:52,680
And Ken Dickinson and I came up with a plan for how to rig up the test.

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00:02:52,680 --> 00:02:56,860
So we scattered into the building to get all of the materials that we were going to need.

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00:02:56,860 --> 00:03:00,950
Well it was a Sunday, no one was around. So I'm literally running

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00:03:00,950 --> 00:03:05,130
through the halls, and I run to where the techs would be, and I find a guy, Gene McAlicher,

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00:03:05,130 --> 00:03:09,300
who happened to be in the building working on another project. So he said, "Whadoyou need?!"

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00:03:09,300 --> 00:03:13,350
He seemed to pick up on my body language before I even asked my question.

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00:03:13,350 --> 00:03:17,530
And I told him, "I need a torque wrench, and I need a

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00:03:17,530 --> 00:03:21,560
digital fish scale." He takes off to go get it, I go to 190.

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00:03:21,560 --> 00:03:25,670
Ken Dickinson's already in there, and within minutes, Bill Mitchell comes

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00:03:25,670 --> 00:03:29,840
busting through the door, carrying the handrail, still in his bunny suit

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00:03:29,840 --> 00:03:33,930
and his clean room garment. We get the handrail all set up, everything's ready to go,

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00:03:33,930 --> 00:03:38,080
we text a couple pictures back and forth, James gives us the green light.

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00:03:38,080 --> 00:03:42,260
And Gene stands up on the table and starts pulling the handrail. And right when he got to

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00:03:42,260 --> 00:03:46,360
60 pounds, it snapped. Actually the bolt went flying. >>JAMES: Once we had

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00:03:46,360 --> 00:03:50,390
done that test, then I got on our communication loops and

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00:03:50,390 --> 00:03:54,410
called it to Jim Corbo. >>JIM: So ultimately, James came back

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00:03:54,410 --> 00:03:58,560
and said you know it would take about 60 pounds of force for them to break it off.

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00:03:58,560 --> 00:04:02,740
>>CHRISTY: So Goddard had done the task, fed the information to us. We talked to the flight director about it

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00:04:02,740 --> 00:04:06,800
to get him comfortable. >>DREW FEUSTEL (in space): Okay Mass, do you copy that? 60 pounds linear at the

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00:04:06,800 --> 00:04:10,980
top of the handrail to bust off that bottom bolt. I think you got that in you.

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00:04:10,980 --> 00:04:15,170
>>MIKE (in space): I could try. >>MIKE: I knew I could do that. >>CHRISTY: What if he pulls it off and there's

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00:04:15,170 --> 00:04:19,280

What if he pulls off the handrail and there's a sharp edge? What if he, it takes a lot of force

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00:04:19,280 --> 00:04:23,450
and it comes back and hits him? >>JAMES: Mike Massimino was able to put some tape over

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00:04:23,450 --> 00:04:27,470
the head of the bolt to contain debris that might go flying. >>MIKE: And so

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00:04:27,470 --> 00:04:31,560
I taped it as best I could, and Bueno was with me helping me to tape that thing, and then...

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00:04:31,560 --> 00:04:35,740
>>HOUSTON OPERATOR: Houston, we don't have video right now, but we're ready. >>DREW (in space): Oka

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00:04:35,740 --> 00:04:39,790
[dramatic music] [the handrail breaks]

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00:04:39,790 --> 00:04:43,830
>>MIKE (in space): Pull! Disposal bag please.

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00:04:43,830 --> 00:04:48,010
>>CHRISTY: Everyone erupted in cheers. Because when he

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00:04:48,010 --> 00:04:52,090
pulled it off, he didn't see any debris, and he knew not to touch the potential sharp edges,

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00:04:52,090 --> 00:04:56,260
and then we could just put that fastener capture plate on and complete the STIS task.

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00:04:56,260 --> 00:05:00,430
>>MIKE: The rest of the repair went fairly well, STIS- I mean it was fine, actually. And

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00:05:00,430 --> 00:05:04,520
STIS is working. >>JEFF: That one or two hours that I worked on

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00:05:04,520 --> 00:05:08,690
breaking the handrail, that task, that very well could go down as the highlight

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00:05:08,690 --> 00:05:12,720
of my career. >>MIKE: So the Goddard team did a great job,

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00:05:12,720 --> 00:05:16,880
and I'm forever in their debt.

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00:05:16,880 --> 00:05:21,050
>>KATRINA: That day, the Hubble team really showcased

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00:05:21,050 --> 00:05:25,150
their teamwork and problem-solving skills. But the past 25 years of Hubble

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00:05:25,150 --> 00:05:29,330
operations are full of individuals stepping up to tackle seemingly

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00:05:29,330 --> 00:05:33,510
insurmountable obstacles. So stay tuned for more Hubble Memorable Moments.

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00:05:33,510 --> 00:05:37,690
[music ends] [satellite whooshes by]