



1
00:00:00,000 --> 00:00:12,910
(Roar of rocket engines)

2
00:00:12,930 --> 00:00:16,780
NARRATOR: Since before the Space Shuttle's first launch in 1981,

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00:00:16,800 --> 00:00:20,540
every astronaut flight crew has come to Ames Research Center to practice

4
00:00:20,560 --> 00:00:25,220
the final stage of a Shuttle mission: "landing and rollout."

5
00:00:25,240 --> 00:00:31,960
The crews fly the Vertical Motion Simulator, the world's largest and most realistic simulator of its kind.

6
00:00:31,980 --> 00:00:38,580
Also known as the VMS, it uses six degrees of freedom – up and down, side to side, tilt and spin –

7
00:00:38,600 --> 00:00:46,270
in a 60-foot high by 40-foot wide area to simulate the Shuttle landing's sequence with a high degree of accuracy.

8
00:00:46,290 --> 00:00:51,350
High-resolution out-the-window views, combined with a realistic sensation of flying,

9
00:00:51,370 --> 00:00:59,540
enable astronauts to practice a variety of emergency and non-emergency landing scenarios at almost any runway.

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00:00:59,560 --> 00:01:03,020
CHRIS FERGUSON: "There is nothing that comes close to what the VMS,

11
00:01:03,040 --> 00:01:05,600
the Vertical Motion Simulator, can do for us.

12
00:01:05,620 --> 00:01:10,430
It gives us the sense of dynamics, the accelerations, the various motions that you get,

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00:01:10,450 --> 00:01:14,680

the wallowing that the Shuttle does as soon as it lands on the runway,

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00:01:14,700 --> 00:01:21,100

the de-rotation when the nosegear hits the ground, you feel the thwack, the thump when the nosegear,

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00:01:21,120 --> 00:01:25,280

the tracking of the centerline maintenance task we have to do.

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00:01:25,300 --> 00:01:30,160

What you rely on is rote memorization and repetition and coming out here every year

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00:01:30,180 --> 00:01:35,090

and doing the VMS is the one tool that gives us that.

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00:01:35,110 --> 00:01:39,090

In my first landing, in STS-126, we landed at Edwards Air Force Base,

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00:01:39,110 --> 00:01:42,990

on one of the shorter and narrower runways the Shuttle has ever landed on.

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00:01:43,010 --> 00:01:49,260

We touched down, just about on condition, we did our de-rotation and one of my habits was,

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00:01:49,280 --> 00:01:54,720

as soon as the nose gear touches the ground, I look to the left or right and look for a runway remaining marker

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00:01:54,740 --> 00:01:58,990

That's the amount of runway that's left until the end...there is no more runway!

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00:01:59,010 --> 00:02:02,820

And typically, we see in the Space Shuttle, about eight to nine thousand feet.

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00:02:02,840 --> 00:02:08,020

Well, on my actual landing, we were at 5000-feet remaining and that is very unusual.

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00:02:08,040 --> 00:02:13,510

So, at that exact moment in time, I was back in the VMS and I knew what I had to do

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00:02:13,530 --> 00:02:19,660

in order to get the Shuttle stopped in the remaining runway and it was just an instantaneous flashback.

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00:02:19,680 --> 00:02:25,950

And that's exactly what you want in a good training tool: something for that moment in time, when you have to

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00:02:25,970 --> 00:02:31,820

you can't think, you can relay right back to some training that you had and actually put yourself in that position,

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00:02:31,840 --> 00:02:38,450

right then and there and it felt exactly like being in the VMS for remainder of the landing and rollout.

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00:02:38,470 --> 00:02:40,050

FERGUSON ON RADIO: Wheels stop, Houston.

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00:02:40,070 --> 00:02:46,790

MISSION CONTROL ON RADIO: Copy...wheels stop, Endeavour. Welcome back. That was a great way to fi

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00:02:46,810 --> 00:02:51,780

NARRATOR: As the Space Shuttle program comes to an end, the Vertical Motion Simulator will be continue to