



1
00:00:00,006 --> 00:00:01,046
[Background sounds]

2
00:00:01,046 --> 00:00:03,346
>> Everybody, Dan Huot here
at the Johnson Space Center.

3
00:00:03,416 --> 00:00:05,976
I'm in the Space Vehicle
Mock-Up Facility over by some

4
00:00:05,976 --> 00:00:07,666
of the Orion capsules
that we have.

5
00:00:07,946 --> 00:00:10,576
Orion, of course, NASA's
next generation spacecraft.

6
00:00:10,886 --> 00:00:13,966
I'm here with Jeff Fox, the
Orion cockpit lead engineer.

7
00:00:14,346 --> 00:00:18,306
And we're standing by as they're
doing some Orion cockpit egress

8
00:00:18,906 --> 00:00:21,706
evaluations with a
fully suited crew.

9
00:00:21,706 --> 00:00:23,766
First off, Jeff, thanks so
much for being here today.

10
00:00:23,766 --> 00:00:24,906
Give us a little background.

11
00:00:24,906 --> 00:00:26,156

Why are you guys
doing this test today?

12

00:00:26,666 --> 00:00:26,876

>> All right.

13

00:00:26,936 --> 00:00:30,216

The current design with the
Orion capsule is a set up --

14

00:00:30,556 --> 00:00:32,866

think of when you land
under the parachutes.

15

00:00:32,866 --> 00:00:33,716

A hard landing.

16

00:00:34,066 --> 00:00:36,286

You need to attenuate
or to dampen that load.

17

00:00:36,686 --> 00:00:38,506

So in your car you've
got shock absorbers.

18

00:00:38,506 --> 00:00:41,876

And in the current design,
we have very large struts

19

00:00:41,876 --> 00:00:44,216

that attach to the
ceiling, if you will,

20

00:00:44,216 --> 00:00:45,196

in the mock-up behind us.

21

00:00:45,406 --> 00:00:46,456

>> Probably very heavy too.

22

00:00:46,576 --> 00:00:47,576
>> Heavy. Large.

23

00:00:47,576 --> 00:00:49,726
We also have several that
are in different directions.

24

00:00:49,726 --> 00:00:52,206
So in X, Y and Z
directions, if you will.

25

00:00:52,236 --> 00:00:52,456
>> Okay.

26

00:00:52,566 --> 00:00:54,426
>> Attached to that
is a large pallet.

27

00:00:54,966 --> 00:00:57,206
And then the seats
that the crew sits in.

28

00:00:57,206 --> 00:00:59,776
There's four crew in
a kind of a rectangle.

29

00:01:00,186 --> 00:01:01,896
Are all part of that one system.

30

00:01:02,046 --> 00:01:03,916
So the whole system,
when it hits the ground,

31

00:01:04,746 --> 00:01:08,966
can stroke in a hard or hard
landing all at the same time.

32

00:01:08,966 --> 00:01:11,416
But there's some
challenges, some pros and cons

33

00:01:11,416 --> 00:01:12,236
with that kind of system.

34

00:01:12,236 --> 00:01:13,306
Obviously, it's heavy.

35

00:01:13,726 --> 00:01:14,936
It takes up a lot of volume.

36

00:01:15,246 --> 00:01:17,646
So as the years went by
we got a little smarter

37

00:01:17,646 --> 00:01:18,906
and the landing loads.

38

00:01:19,646 --> 00:01:22,556
We also have some very big
challenges with scrubbing

39

00:01:22,556 --> 00:01:23,686
out as much mass of
the vehicle as we can.

40

00:01:23,686 --> 00:01:23,976
That's always.

41

00:01:23,976 --> 00:01:24,426
[Multiple speakers]

42

00:01:24,426 --> 00:01:24,826
>> Yes.

43

00:01:24,826 --> 00:01:25,646
>> A challenge.

44

00:01:25,646 --> 00:01:25,736

>> Yes.

45

00:01:25,736 --> 00:01:26,486

>> With a space vehicle.

46

00:01:27,076 --> 00:01:29,456

So we came up on another concept

47

00:01:29,646 --> 00:01:32,686

where we could just have
individual seat frames.

48

00:01:33,136 --> 00:01:34,636

And have those just have --

49

00:01:34,696 --> 00:01:38,496

provide the option to provide
some of that stroke that we call

50

00:01:38,496 --> 00:01:40,056

or that dampening just

51

00:01:40,056 --> 00:01:42,096

in one direction along
the spinal access.

52

00:01:42,396 --> 00:01:44,216

If we were to need it
in a real hard landing.

53

00:01:44,616 --> 00:01:47,996

So instead of having all these
large pallets and struts,

54

00:01:47,996 --> 00:01:50,886

you've got just an individual
seat frame for these four seats.

55

00:01:51,196 --> 00:01:53,416

With a little bit of
stroke built in to each one

56
00:01:53,416 --> 00:01:54,446
of those, if necessary.

57
00:01:54,446 --> 00:01:56,016
That opens the cockpit up.

58
00:01:56,466 --> 00:01:59,226
But you still got to convince
yourself, hey, you know.

59
00:01:59,226 --> 00:02:00,946
There's a -- the
layout's changed.

60
00:02:01,376 --> 00:02:04,576
I got to get in here and
assess some different aspects

61
00:02:04,576 --> 00:02:06,516
of it now, like, with the crew.

62
00:02:06,516 --> 00:02:08,076
Which we're doing
behind us right now.

63
00:02:08,506 --> 00:02:10,996
Can they get out of the
vehicle, you know, easily?

64
00:02:11,096 --> 00:02:13,076
Quickly? Do they have
the right hand holds?

65
00:02:13,076 --> 00:02:14,086
Are there obstructions?

66

00:02:14,086 --> 00:02:14,976
>> Could be very important.

67
00:02:15,536 --> 00:02:16,986
>> Yeah. Think of if
you're on the pad.

68
00:02:17,096 --> 00:02:18,166
You need to get on in a hurry.

69
00:02:18,576 --> 00:02:18,666
>> Yeah.

70
00:02:18,666 --> 00:02:20,176
>> So have I done anything

71
00:02:20,176 --> 00:02:21,906
with this change
that's made that harder?

72
00:02:22,596 --> 00:02:24,546
And that's -- that's
the key area

73
00:02:24,546 --> 00:02:28,566
where also the seats
sit in a kind of a two.

74
00:02:28,706 --> 00:02:29,626
Think -- think like that.

75
00:02:29,626 --> 00:02:29,776
>> Okay.

76
00:02:29,776 --> 00:02:30,436
>> Two by two.

77
00:02:31,016 --> 00:02:33,696
We're looking at relocating

one of those seats kind

78

00:02:33,696 --> 00:02:36,906

of in an off-axis
symmetrical config.

79

00:02:37,296 --> 00:02:40,186

So what does that do to us, you
know, if we were to do that?

80

00:02:40,186 --> 00:02:42,686

And the reason we would do
that is because the hatch

81

00:02:42,686 --> 00:02:44,256

on one side weighs a lot.

82

00:02:44,746 --> 00:02:47,126

And right now we have to put
ballasts on the other side

83

00:02:47,126 --> 00:02:48,746

of the vehicle to offset that.

84

00:02:48,746 --> 00:02:50,106

Well, that's weight
-- wasted weight.

85

00:02:50,106 --> 00:02:50,173

>> Yeah.

86

00:02:50,173 --> 00:02:51,026

>> We don't want to carry.

87

00:02:51,326 --> 00:02:53,836

So if we can have a seat
in a crew take the place

88

00:02:53,836 --> 00:02:54,836

of that, that's a good thing.

89

00:02:55,216 --> 00:02:57,046

But again, that egress path,

90

00:02:57,106 --> 00:02:58,976

getting out of the mock-up

may have challenges.

91

00:02:58,976 --> 00:03:00,336

And we want to know,

are there any?

92

00:03:00,476 --> 00:03:02,016

Get feedback from

the crew on that.

93

00:03:02,616 --> 00:03:04,826

In addition, there's other

areas that this affects.

94

00:03:04,826 --> 00:03:07,126

For instance, access to stowage.

95

00:03:07,266 --> 00:03:09,666

Which is underneath the

seats in this vehicle so.

96

00:03:09,666 --> 00:03:11,636

>> So it's -- it's not as

easy as just moving a seat.

97

00:03:11,716 --> 00:03:13,516

You've got to think of all

the other systems you're going

98

00:03:13,586 --> 00:03:13,916

to affect.

99

00:03:14,056 --> 00:03:14,936
>> That's exactly right.

100
00:03:14,936 --> 00:03:17,226
And other areas are, you
know, just using the potty,

101
00:03:17,226 --> 00:03:18,036
for example, you know.

102
00:03:18,036 --> 00:03:18,976
We have a system similar like.

103
00:03:18,976 --> 00:03:19,046
[Multiple speakers]

104
00:03:19,046 --> 00:03:19,896
>> Another very important.

105
00:03:19,896 --> 00:03:20,536
>> A shower station.

106
00:03:20,806 --> 00:03:22,386
Right. You don't
want to mess that up.

107
00:03:22,386 --> 00:03:22,536
>> Yeah.

108
00:03:22,816 --> 00:03:26,636
>> And that happens to be in a
plane that's below the seats.

109
00:03:27,056 --> 00:03:29,866
And this -- this seat
frame is overneath that.

110
00:03:29,976 --> 00:03:33,896
So did we do something that

made that harder to work

111

00:03:33,896 --> 00:03:35,036
in that volume underneath?

112

00:03:35,036 --> 00:03:35,996
We want to know that.

113

00:03:36,076 --> 00:03:37,486
So we're doing those
kinds of things.

114

00:03:37,486 --> 00:03:39,016
So several aspects.

115

00:03:39,366 --> 00:03:40,666
>> Okay. And like
we had mentioned,

116

00:03:40,666 --> 00:03:43,456
you're using fully
suited crew members today.

117

00:03:43,526 --> 00:03:44,826
>> That's right.

118

00:03:45,056 --> 00:03:46,316
You know, previous to this,

119

00:03:46,366 --> 00:03:48,436
we did with the shirtsleeve,
you know.

120

00:03:48,436 --> 00:03:49,796
Non-crew subjects.

121

00:03:49,796 --> 00:03:52,106
Because we wanted to
learn about, you know,

122

00:03:52,106 --> 00:03:53,906
any difficulties or things

123

00:03:53,906 --> 00:03:56,076
that could make this test
faster and more efficient.

124

00:03:56,126 --> 00:03:57,896
Because the crew time's
obviously very precious.

125

00:03:57,966 --> 00:03:58,106
>> Yes.

126

00:03:58,446 --> 00:04:00,756
>> But getting the crew in the
suits adds another element.

127

00:04:00,756 --> 00:04:01,666
You've got a helmet on.

128

00:04:01,746 --> 00:04:02,436
That's clunky.

129

00:04:02,436 --> 00:04:03,616
It limits visibility.

130

00:04:04,096 --> 00:04:05,116
You've got gloves.

131

00:04:05,116 --> 00:04:06,296
You've got big boots.

132

00:04:06,576 --> 00:04:07,976
You've got a looser suit.

133

00:04:07,976 --> 00:04:08,046

[Multiple speakers]

134

00:04:08,046 --> 00:04:10,326

>> A lot more things to snag on.

135

00:04:10,326 --> 00:04:10,916

>> With other things
hanging off.

136

00:04:10,916 --> 00:04:11,036

>> Yeah.

137

00:04:11,036 --> 00:04:11,516

>> Exactly right.

138

00:04:11,576 --> 00:04:13,346

So did that introduce anything?

139

00:04:13,696 --> 00:04:13,976

>> Yeah.

140

00:04:13,976 --> 00:04:15,986

>> So, you know, that's
what we're finding out,

141

00:04:15,986 --> 00:04:16,986

literally, as we're speaking.

142

00:04:17,186 --> 00:04:18,546

So we'll look at the data.

143

00:04:19,016 --> 00:04:21,416

You know, we'll -- we'll
make some, you know,

144

00:04:21,476 --> 00:04:22,696

summary recommendations.

145

00:04:22,876 --> 00:04:24,366

You know, we found
this and that.

146

00:04:24,646 --> 00:04:27,816

And ultimately, to inform
the program that, you know.

147

00:04:28,236 --> 00:04:29,766

Yay, nay, are we good
with this change?

148

00:04:30,126 --> 00:04:33,096

You know, so that's
the test in a nutshell.

149

00:04:33,386 --> 00:04:34,626

>> And I know you're
really excited

150

00:04:34,706 --> 00:04:36,796

because this is the first time
we've really been doing this

151

00:04:36,796 --> 00:04:38,866

kind of suited testing
in a long time; correct?

152

00:04:39,286 --> 00:04:40,986

>> Yeah. You know, as you
know, we've had, you know,

153

00:04:41,196 --> 00:04:43,596

quite a few changes
in the program.

154

00:04:43,596 --> 00:04:45,096

And you know, Orion
has continued on.

155

00:04:45,096 --> 00:04:48,536

But it's been over three years
since we've done any kind

156

00:04:48,536 --> 00:04:49,876

of suited crew evaluations.

157

00:04:49,956 --> 00:04:52,206

So obviously, there's
some excitement and buzz.

158

00:04:52,206 --> 00:04:52,326

>> Yeah.

159

00:04:52,326 --> 00:04:53,546

>> It's the first
time, you know, you --

160

00:04:54,076 --> 00:04:55,086

you're doing this in a while.

161

00:04:55,086 --> 00:04:58,386

And plus, the team's relearning
and refreshing itself.

162

00:04:58,386 --> 00:05:00,896

And putting all those
processes back together.

163

00:05:01,016 --> 00:05:02,826

So you know, it's
been a joy to work on.

164

00:05:03,256 --> 00:05:05,566

>> I'm sure the astronauts
are having some fun too.

165

00:05:05,566 --> 00:05:06,546

>> Oh, yeah, absolutely.

166

00:05:06,866 --> 00:05:07,196

>> All right.

167

00:05:07,196 --> 00:05:08,836

Well, Jeff, thanks so much.

168

00:05:08,916 --> 00:05:10,816

We're going to check out
a lot of great footage

169

00:05:10,816 --> 00:05:12,666

from this test and follow along.