
WELCOME
STS-135

1
00:00:02,586 --> 00:00:03,606
>> We're back at Ellington.

2
00:00:03,606 --> 00:00:05,056
[phonetic] We talked
earlier about the suit

3
00:00:05,056 --> 00:00:06,826
that they're testing
this week, the modified,

4
00:00:06,826 --> 00:00:09,266
what's called the ACES suit
for the Space Shuttle Program

5
00:00:09,266 --> 00:00:11,586
that they're now getting
ready for the Orion Program

6
00:00:11,936 --> 00:00:14,556
and here we have Dustin Gohmert
here to tell us a little bit

7
00:00:14,616 --> 00:00:16,966
about the tests that they're
actually doing with that suit

8
00:00:17,006 --> 00:00:19,546
so one of the things
involves this seat, right?

9
00:00:19,716 --> 00:00:20,176
>> Dustin Gohmert: That's right.

10
00:00:20,176 --> 00:00:22,596
The seat was essentially
designed around the suit.

11
00:00:22,676 --> 00:00:24,716

We knew that that suit,
or a very similar version

12
00:00:24,716 --> 00:00:26,786
of that suit, would be
ultimately used in Orion

13
00:00:27,196 --> 00:00:30,526
and so we built it around the
suit but what we did additional

14
00:00:30,526 --> 00:00:33,096
to that is that was we built it
so it's adjustable to fit people

15
00:00:33,096 --> 00:00:37,216
who range from heights of say
4 foot 9 to 6 1/2 feet tall.

16
00:00:37,216 --> 00:00:39,166
And so there's a huge
range of adjustability.

17
00:00:39,206 --> 00:00:41,986
But by doing that to make
the Orion operable we had

18
00:00:41,986 --> 00:00:43,566
to put everyone so
that they would fit

19
00:00:43,826 --> 00:00:45,266
with basically the
same eye point

20
00:00:45,426 --> 00:00:47,676
so when they laid their
head in there they looked

21
00:00:47,676 --> 00:00:50,566

at the display the same no
matter what height you are.

22
00:00:50,966 --> 00:00:53,796
Well to do that we make
this seat, the seat pan

23
00:00:53,796 --> 00:00:55,836
that you actually
sit in, adjustable up

24
00:00:55,836 --> 00:00:57,176
and down the access
of their body.

25
00:00:57,176 --> 00:01:00,726
Well the testing we needed to
do was show that if we were

26
00:01:01,336 --> 00:01:04,546
in orbit and had a
depressed cabin contingency,

27
00:01:04,546 --> 00:01:08,056
well the first thing we do
is we'd get into our suit.

28
00:01:08,056 --> 00:01:09,596
Obviously that's the
most important thing.

29
00:01:09,596 --> 00:01:12,526
And then after that you have to
get into the seat to come home,

30
00:01:12,526 --> 00:01:14,066
because that's the next
most important thing.

31
00:01:14,566 --> 00:01:18,166

Well the suit gets large, it
grows quite a bit around you

32
00:01:18,166 --> 00:01:20,666
as it inflates so
to ingress the seat

33
00:01:20,966 --> 00:01:24,206
and the stiff enlarged suit, we
are testing different options

34
00:01:24,206 --> 00:01:25,916
for how to make this
seat more maneuverable

35
00:01:26,096 --> 00:01:27,396
on orbit [background
noise] so one of the things

36
00:01:27,396 --> 00:01:29,526
that we did was look
at different levels

37
00:01:29,526 --> 00:01:32,786
of adjustability so that we
could translate our bodies

38
00:01:32,786 --> 00:01:34,486
into the seat in
the pressurized suit

39
00:01:34,746 --> 00:01:36,716
and buckle ourselves
in for the ride home.

40
00:01:37,026 --> 00:01:39,106
>> Okay and I think we
actually have some footing

41
00:01:39,106 --> 00:01:40,776

of those tests taking place

42
00:01:41,156 --> 00:01:43,816
on the zero gravity
fly so we can show you.

43
00:01:43,896 --> 00:01:47,046
But the idea is that there
will be four of these seats

44
00:01:47,136 --> 00:01:48,236
in the Orion, correct?

45
00:01:48,496 --> 00:01:49,186
>> Dustin Gohmert:
That's correct.

46
00:01:49,186 --> 00:01:52,866
So this is just, this would
actually be seat two of four,

47
00:01:52,866 --> 00:01:54,616
the way it's set up with
the displays above it

48
00:01:54,616 --> 00:01:57,586
but you can imagine another
seat directly to the left of it

49
00:01:57,636 --> 00:01:59,636
and then two more
positioned directly below it

50
00:01:59,686 --> 00:02:01,356
so there's a grid work
of seats that are laid

51
00:02:01,356 --> 00:02:04,336
out in the vehicle, one
mirroring this one exactly.

52
00:02:04,676 --> 00:02:07,166
And then if you can imagine,
the folks who are below it,

53
00:02:07,386 --> 00:02:10,296
their heads are actually below
the feet of the pilot commander

54
00:02:10,296 --> 00:02:12,446
who are flying above them.

55
00:02:12,476 --> 00:02:14,666
>> So you know the Orion
is reasonably large

56
00:02:14,666 --> 00:02:17,526
for a spacecraft but still
a pretty small space,

57
00:02:17,626 --> 00:02:19,886
a lot of difficulty
maneuvering around,

58
00:02:19,886 --> 00:02:21,266
especially when you've
got the bulk suits on.

59
00:02:21,416 --> 00:02:21,996
>> Dustin Gohmert:
That's correct.

60
00:02:21,996 --> 00:02:25,146
A large spacecraft is still
relatively compact compared

61
00:02:25,146 --> 00:02:27,086
to what we're used to in and
the free volume that we have

62
00:02:27,086 --> 00:02:28,296
with the luxury of
being in here.

63
00:02:28,706 --> 00:02:31,366
And when the suit inflates
around the person, each person,

64
00:02:31,366 --> 00:02:33,656
you can imagine, expands
almost double their volume

65
00:02:33,656 --> 00:02:36,616
and so it gets tight
very quickly.

66
00:02:36,616 --> 00:02:39,196
And so we have to make the
most creative use of this space

67
00:02:39,196 --> 00:02:40,306
as possible to allow them

68
00:02:40,306 --> 00:02:42,226
to ingress the seats
for a safe trip home.

69
00:02:42,626 --> 00:02:44,906
>> And I guess you know we can
do that a lot here on the ground

70
00:02:45,616 --> 00:02:48,526
but having the microgravity
simulation is probably a

71
00:02:48,526 --> 00:02:48,906
big help.

72
00:02:48,906 --> 00:02:50,326

>> Dustin Gohmert: It's a
huge help for us because one

73
00:02:50,326 --> 00:02:52,856
of the things we get
in 1G environment,

74
00:02:52,976 --> 00:02:55,066
the earth's gravity
environment we're in right now,

75
00:02:55,066 --> 00:02:56,726
is we get the affects
of stability.

76
00:02:57,186 --> 00:02:58,736
We can't spin out of control.

77
00:02:58,736 --> 00:03:01,036
We can't lose our
grip and fly off.

78
00:03:01,416 --> 00:03:02,896
And so the zero gravity
environment,

79
00:03:02,896 --> 00:03:06,406
it gives us that real true sense
of how the suit will perform

80
00:03:06,406 --> 00:03:08,496
when we have that instability
and we have to fight

81
00:03:09,006 --> 00:03:11,606
to put ourselves in the
proper position and lay

82
00:03:11,606 --> 00:03:12,426
in the seat to get home.

83
00:03:12,646 --> 00:03:14,036
>> Okay it's probably worthwhile

84
00:03:14,036 --> 00:03:16,196
to explain how we
simulate that zero gravity.

85
00:03:16,196 --> 00:03:19,076
We get the suit and the
subjects in an airplane

86
00:03:19,076 --> 00:03:21,496
and they fly in parabolas.

87
00:03:21,636 --> 00:03:22,176
>> Dustin Gohmert:
That's correct.

88
00:03:22,256 --> 00:03:25,336
>> So you get a few seconds
of zero gravity floating

89
00:03:25,536 --> 00:03:29,066
as you go down, similar to how
you, when you go down a hill

90
00:03:29,066 --> 00:03:29,816
in a rollercoaster, right?

91
00:03:29,816 --> 00:03:30,256
>> Dustin Gohmert: That's right.

92
00:03:30,256 --> 00:03:32,696
So the plane will pull
up at extreme angle.

93
00:03:32,876 --> 00:03:35,706
During that time the gravity

is actually relatively intense.

94
00:03:35,746 --> 00:03:37,416
It's about 1.8 times
what we're feeling

95
00:03:37,416 --> 00:03:39,096
so you're very heavy
during that period.

96
00:03:39,096 --> 00:03:40,406
But when it gets to the top,
to the apex of that parabola,

97
00:03:40,436 --> 00:03:41,786
it dives down and it dives
at such a controlled rate

98
00:03:41,816 --> 00:03:43,046
that you fall inside the
aircraft at the same rate

99
00:03:43,076 --> 00:03:44,366
that the aircraft is diving
so you essentially float,

100
00:03:44,396 --> 00:03:45,626
free falling but you're
floating inside the aircraft

101
00:03:45,656 --> 00:03:47,036
so very similar to what
a zero G environment is.

102
00:03:47,066 --> 00:03:48,086
>> Okay and how did
the tests go this week?

103
00:03:48,116 --> 00:03:49,106
>> Dustin Gohmert: It went,

actually it went very well.

104
00:03:49,136 --> 00:03:50,606
We had great luck in proving
out the theory's that we had

105
00:03:50,636 --> 00:03:51,896
on how the person in the
suit would ingress the seat.

106
00:03:51,926 --> 00:03:53,396
And we learned quite a bit
about the mobility of the suit

107
00:03:53,426 --> 00:03:54,656
for non-seated but
translation like operations

108
00:03:54,686 --> 00:03:56,126
for perhaps contingency
tasks so we would look at it

109
00:03:56,156 --> 00:03:57,176
in future scenarios
and future missions.

110
00:03:57,206 --> 00:03:58,496
>> Okay do you need to do
these again before you're ready

111
00:03:58,526 --> 00:03:58,796
to fly or?

112
00:03:58,826 --> 00:03:59,006
>> Dustin Gohmert: I think

113
00:03:59,036 --> 00:04:00,446
from what we learned we'll
probably do a few iterations

114
00:04:00,476 --> 00:04:01,346
of design work before
we get there

115
00:04:01,376 --> 00:04:02,216
but this gave us the capability

116
00:04:02,246 --> 00:04:03,146
to learn what the
baseline performance

117
00:04:03,176 --> 00:04:04,166
of this suit is relatively
unmodified

118
00:04:04,196 --> 00:04:05,936
from a shuttle variant and also
give us an idea of what we need

119
00:04:05,966 --> 00:04:07,106
to do to tweak it to
make it really perfect

120
00:04:07,136 --> 00:04:07,706
for the Orion capsule.

121
00:04:07,736 --> 00:04:08,606
>> And I know you
have some other tests

122
00:04:08,636 --> 00:04:09,806
that you'll be performing
as the work progresses?

123
00:04:09,836 --> 00:04:10,136
>> Dustin Gohmert:
That's correct.

124
00:04:10,166 --> 00:04:11,816

We started in TSC in building
nine in the ARGOS Environment,

125
00:04:11,846 --> 00:04:13,046
Adaptive Response
Gravity Offload Simulator.

126
00:04:13,076 --> 00:04:13,166
>> Right.

127
00:04:13,196 --> 00:04:13,856
>> Dustin Gohmert: And
so you essentially hang

128
00:04:13,886 --> 00:04:15,356
from your belly very similar
to Mission Impossible style.

129
00:04:15,386 --> 00:04:15,476
>> Okay.

130
00:04:15,506 --> 00:04:15,956
>> Dustin Gohmert:
And you can float

131
00:04:15,986 --> 00:04:16,946
around in a frictionless
environment.

132
00:04:16,976 --> 00:04:18,566
But what we don't have is the
full degrees of freedom you get

133
00:04:18,596 --> 00:04:20,156
in true weightlessness and so
we use that as a starting point

134
00:04:20,186 --> 00:04:20,936
to get to this environment.

135
00:04:20,966 --> 00:04:22,376
And then we used this
environment to give us a feel

136
00:04:22,406 --> 00:04:23,126
for how realistic that was.

137
00:04:23,156 --> 00:04:24,716
That being a much more benign
environment we can test over

138
00:04:24,746 --> 00:04:25,916
and over again rapidly
and we plan to use

139
00:04:25,946 --> 00:04:27,386
that for our development
cycle and then use the flight

140
00:04:27,416 --> 00:04:28,646
for some more of our
validations of performance

141
00:04:28,676 --> 00:04:29,966
and more high tech or more
realistic environment.

142
00:04:29,996 --> 00:04:31,316
>> Alright well hopefully we'll
see more of that coming up.

143
00:04:31,346 --> 00:04:31,616
>> Dustin Gohmert: We hope so.

144
00:04:31,646 --> 00:04:32,726
>> Thanks so much for
talking with us, Dustin.

145
00:04:32,756 --> 00:04:32,966

>> Dustin Gohmert: Thank you.

146
00:04:32,996 --> 00:04:33,896
>> We'll go back now
to Mission Control

147
00:04:33,926 --> 00:04:34,796
and live coverage
of Life in Space.