



1
00:00:02,396 --> 00:00:04,806
>> Here we are at
Ellington Field which is just

2
00:00:04,806 --> 00:00:07,296
down the road from NASA's
Johnson Space Center

3
00:00:07,296 --> 00:00:10,456
and the place where we have our
aircraft operations including

4
00:00:11,106 --> 00:00:13,626
the landing ship
where we conduct

5
00:00:13,716 --> 00:00:16,166
or Zero-G gravity
flights for a test

6
00:00:16,166 --> 00:00:18,986
of different science experiments
and other things including

7
00:00:19,026 --> 00:00:21,956
as you can see space suits
as with out third guest here.

8
00:00:21,956 --> 00:00:25,846
Just tell-- say about the space
suits as we have Phillip Hooper

9
00:00:26,416 --> 00:00:29,796
who is a member of the
Crew Survival Team and one

10
00:00:29,796 --> 00:00:32,386
of the groups that's
working on the space suits

11
00:00:32,386 --> 00:00:33,126
with here in front us.

12
00:00:33,286 --> 00:00:34,616
So, thanks so much for
joining us, Phillip.

13
00:00:34,836 --> 00:00:35,236
>> You're welcome.

14
00:00:35,686 --> 00:00:37,356
>> So, this looks
a little familiar.

15
00:00:38,026 --> 00:00:41,696
Kind of like a shuttle launch
entry suit, is that correct?

16
00:00:41,936 --> 00:00:44,596
>> It looked-- it should
look very familiar to people.

17
00:00:44,826 --> 00:00:48,226
It's virtually the identical
suit that we flew on shuttle.

18
00:00:49,966 --> 00:00:53,376
We took some things and made
some architectural changes

19
00:00:53,436 --> 00:00:57,146
to it, to change it from
what we call open-loop system

20
00:00:57,146 --> 00:00:58,706
to a close-loop system.

21
00:00:58,706 --> 00:01:02,206
And on the current--

on the shuttle system,

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00:01:02,206 --> 00:01:05,206
there was a pressure controller
that would control the pressure

23

00:01:05,206 --> 00:01:07,326
of the suit and has
that vent it,

24

00:01:07,326 --> 00:01:09,676
it would dump everything
to the environment.

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00:01:10,236 --> 00:01:15,326
The shuttle had a huge supply of
consumer bolts that somethings

26

00:01:15,326 --> 00:01:18,166
that on with the modified
ACES flying on Orion,

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00:01:18,876 --> 00:01:20,196
it will not have those--

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00:01:20,586 --> 00:01:22,876
they won't have those huge
consumer bolts to them.

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00:01:22,876 --> 00:01:27,596
So, we've taken it and
made it a close-loop system

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00:01:27,596 --> 00:01:32,196
where you have a hose that comes
in and out and all that air gets

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00:01:33,156 --> 00:01:36,366
as it's controlling the pressure
by an onboard system that takes

32

00:01:36,446 --> 00:01:41,016
that and washes the CO2
out that the individual

33

00:01:41,016 --> 00:01:42,136
and the suit is breathing.

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00:01:42,576 --> 00:01:44,176
>> But it's-- it's
for use on Orion--

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00:01:44,176 --> 00:01:45,206
>> That is correct.

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00:01:45,206 --> 00:01:45,646
Yes, yes.

37

00:01:45,756 --> 00:01:46,896
>> The new vehicle
that we're working

38

00:01:46,896 --> 00:01:49,256
on take us eventually
into the deep space.

39

00:01:49,366 --> 00:01:49,586
>> Yes.

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00:01:49,936 --> 00:01:52,196
>> A little bit requirements
from this entry suit,

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00:01:52,196 --> 00:01:54,436
but we're able to kind of make
use with of what we already have

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00:01:54,776 --> 00:01:56,156
and save tax payers the money.

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00:01:56,206 --> 00:01:58,086

>> Yeah, that's absolutely correct.

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00:01:58,156 --> 00:02:00,146

The overwhelming majority

45

00:02:00,146 --> 00:02:03,596

of the suit is the hard goods are the more expensive.

46

00:02:03,596 --> 00:02:07,186

We replace the soft goods on a periodic basis anyway.

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00:02:07,306 --> 00:02:12,836

And so, being a flying challenge this time and we look at ways

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00:02:12,836 --> 00:02:15,526

that we could leverage off our existing designs

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00:02:15,736 --> 00:02:18,046

and make some simple modifications

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00:02:18,046 --> 00:02:24,986

and fly a good suit, hopefully, with some mobility changes

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00:02:24,986 --> 00:02:28,026

and stuff that we're looking and making later for something.

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00:02:28,076 --> 00:02:29,806

>> Sure. So, launch entry suits, you know,

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00:02:29,956 --> 00:02:32,356

that's not what we conduct
space walks and it's not

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00:02:32,386 --> 00:02:33,376

that kind of space suit, right?

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00:02:33,376 --> 00:02:36,316

Tell us a little bit
about what those do?

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00:02:36,316 --> 00:02:37,366

>> The launch and entry suits?

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00:02:37,586 --> 00:02:40,186

>> Well and this suit as well--

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00:02:40,386 --> 00:02:43,456

>> This suit is mainly
meant for IVA capability,

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00:02:43,456 --> 00:02:45,586

that's inside the cabin, okay.

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00:02:46,016 --> 00:02:50,806

On shuttle, it was actually
made for a bailout and here,

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00:02:50,806 --> 00:02:54,606

we're looking because they
aren't any EVA requirements

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00:02:54,756 --> 00:02:57,086

that we have been
identified yet.

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00:02:57,086 --> 00:03:00,496

It would mainly be an IVA
requirement and we want

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00:03:00,496 --> 00:03:03,536

to have some limited
mobility to it

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00:03:03,536 --> 00:03:06,806

such an event the cabin
depressurize that they're able

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00:03:06,806 --> 00:03:09,366

to do some basic things
such as ingress the seat

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00:03:10,156 --> 00:03:13,846

and some minimal mobility
requirements to climb around

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00:03:13,846 --> 00:03:17,596

and be able to strap
themselves into the seat.

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00:03:17,596 --> 00:03:19,066

>> Okay. But they wouldn't
wear this all the time

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00:03:19,066 --> 00:03:20,616

when they were inside, right?

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00:03:20,616 --> 00:03:25,686

>> They would-- they would wear
at pre-launch and just in case

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00:03:25,686 --> 00:03:26,946

if an emergency where--

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00:03:26,946 --> 00:03:27,946

>> Right. So, most of the time,

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00:03:27,946 --> 00:03:29,226

they can just wear
short sleeves.

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00:03:29,226 --> 00:03:29,746

>> Yes, yes.

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00:03:29,746 --> 00:03:30,056

That's right.

77

00:03:30,056 --> 00:03:32,366

>> But they would get this on it
if something happened unexpected

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00:03:32,366 --> 00:03:34,516

or when they were launching
or coming back to Earth?

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00:03:34,866 --> 00:03:36,616

>> That's correct or
if there's an emergency

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00:03:36,616 --> 00:03:40,206

where they might have-- where a
cabin depressurization occurred

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00:03:40,256 --> 00:03:43,636

where they would have to don
it quickly and then get ingress

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00:03:43,676 --> 00:03:47,536

into the seat and strap
in semi-safe manner.

83

00:03:47,686 --> 00:03:51,076

>> So, what does that mean
that this suit has to do?

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00:03:51,756 --> 00:03:53,886

>> The suit basically
protects you

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00:03:53,886 --> 00:03:57,666
against the lower atmospheric
pressure in an event

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00:03:57,666 --> 00:04:05,586
of a depressurization because
at an altitude that is very high

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00:04:05,586 --> 00:04:07,246
or low and barometric pressure,

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00:04:07,286 --> 00:04:09,826
your blood will actually
begin to boil.

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00:04:09,826 --> 00:04:10,236
[Laughs]

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00:04:10,236 --> 00:04:11,266
>> Which you want to avoid.

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00:04:11,266 --> 00:04:13,286
>> And that's what we're
trying to prevent--

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00:04:13,286 --> 00:04:14,536
>> Absolutely, okay.

93

00:04:14,806 --> 00:04:17,236
So, you know, we've say
a lot when were talking

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00:04:17,236 --> 00:04:20,276
about the space walking and
space suits that they're kind

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00:04:20,276 --> 00:04:21,656
of their space vehicle.

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00:04:21,656 --> 00:04:23,266

Is that true, was

it like this or--

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00:04:23,616 --> 00:04:27,146

>> The space walking suits

are very complicated suits

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00:04:27,146 --> 00:04:29,086

because of the mobility

requirements.

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00:04:29,086 --> 00:04:33,436

They have bearings and almost

all of the joints and this suit,

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00:04:33,516 --> 00:04:35,996

because it was mainly meant

to just to protect you

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00:04:35,996 --> 00:04:39,386

against the low pressure

environment, it has some,

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00:04:40,006 --> 00:04:43,376

you know, good mobility

in the legs, in the arms

103

00:04:43,376 --> 00:04:45,536

and you can see the bearings

here in the neck ring

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00:04:45,536 --> 00:04:50,696

and the helmet, but it wasn't

meant to do complex requirement.

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00:04:50,696 --> 00:04:55,356

And now for Orion, we are

looking at increasing with the--

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00:04:55,486 --> 00:04:56,306

some of the joints,

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00:04:57,696 --> 00:05:00,466

some increased mobility task
'cause there have been some

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00:05:00,466 --> 00:05:04,756

scenarios identified where they
might do a little bit more,

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00:05:04,756 --> 00:05:07,416

over and above than it was
a requirement for shuttle

110

00:05:07,546 --> 00:05:08,706

in terms of mobilities.

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00:05:09,036 --> 00:05:11,586

>> But for the most part, they
just need to be able to sit

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00:05:11,926 --> 00:05:14,986

in a seat and reach all of their
controls, things like that.

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00:05:15,086 --> 00:05:19,896

>> Get in the suit and then
hopefully make it a reasonably

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00:05:19,896 --> 00:05:26,566

comfortable event and do some
minimal mobility events, yes.

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00:05:26,636 --> 00:05:28,406

>> And that's which you are
testing this week, I think.

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00:05:28,446 --> 00:05:28,756

>> Yes, yes.

117

00:05:28,756 --> 00:05:29,706

>> How well it moves?

118

00:05:30,046 --> 00:05:30,836

>> Yes, that's correct.

119

00:05:31,006 --> 00:05:31,196

>> Okay.

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00:05:31,196 --> 00:05:32,156

>> And our main-- one

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00:05:32,156 --> 00:05:35,686

of our main objectives was
the seat ingress requirement

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00:05:35,856 --> 00:05:40,626

that I explained to you and
that is one of the things

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00:05:40,626 --> 00:05:44,246

that we verified that you
can in fact get in the seat.

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00:05:44,666 --> 00:05:46,436

Once you're in the
seat, it's challenged

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00:05:46,506 --> 00:05:48,866

where that you could actually
strap your self in, but--

126

00:05:48,866 --> 00:05:51,116

>> And you have a
seat here behinds us--

127

00:05:51,226 --> 00:05:53,826
to show you what they
have to get into, right?

128
00:05:53,996 --> 00:05:57,596
It's pretty narrow and this
kind of, you know, not as bulky

129
00:05:57,596 --> 00:05:59,306
as a space walking space suit,

130
00:05:59,376 --> 00:06:00,796
but not small either,
we have to--

131
00:06:01,246 --> 00:06:05,396
>> That is actually the current
baseline of the seat right now.

132
00:06:05,396 --> 00:06:07,366
So it's a very high-tech version

133
00:06:07,366 --> 00:06:09,266
of what we think it's
going to look on Orion.

134
00:06:09,576 --> 00:06:10,756
>> Okay. All right.

135
00:06:10,756 --> 00:06:11,556
Well, thank you so much.

136
00:06:11,556 --> 00:06:13,056
I think we're going
to have another chat

137
00:06:13,056 --> 00:06:15,376
with another team member later
and see some of the footage

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00:06:15,376 --> 00:06:18,206

from the zero-gravity test
that they conducted this week.