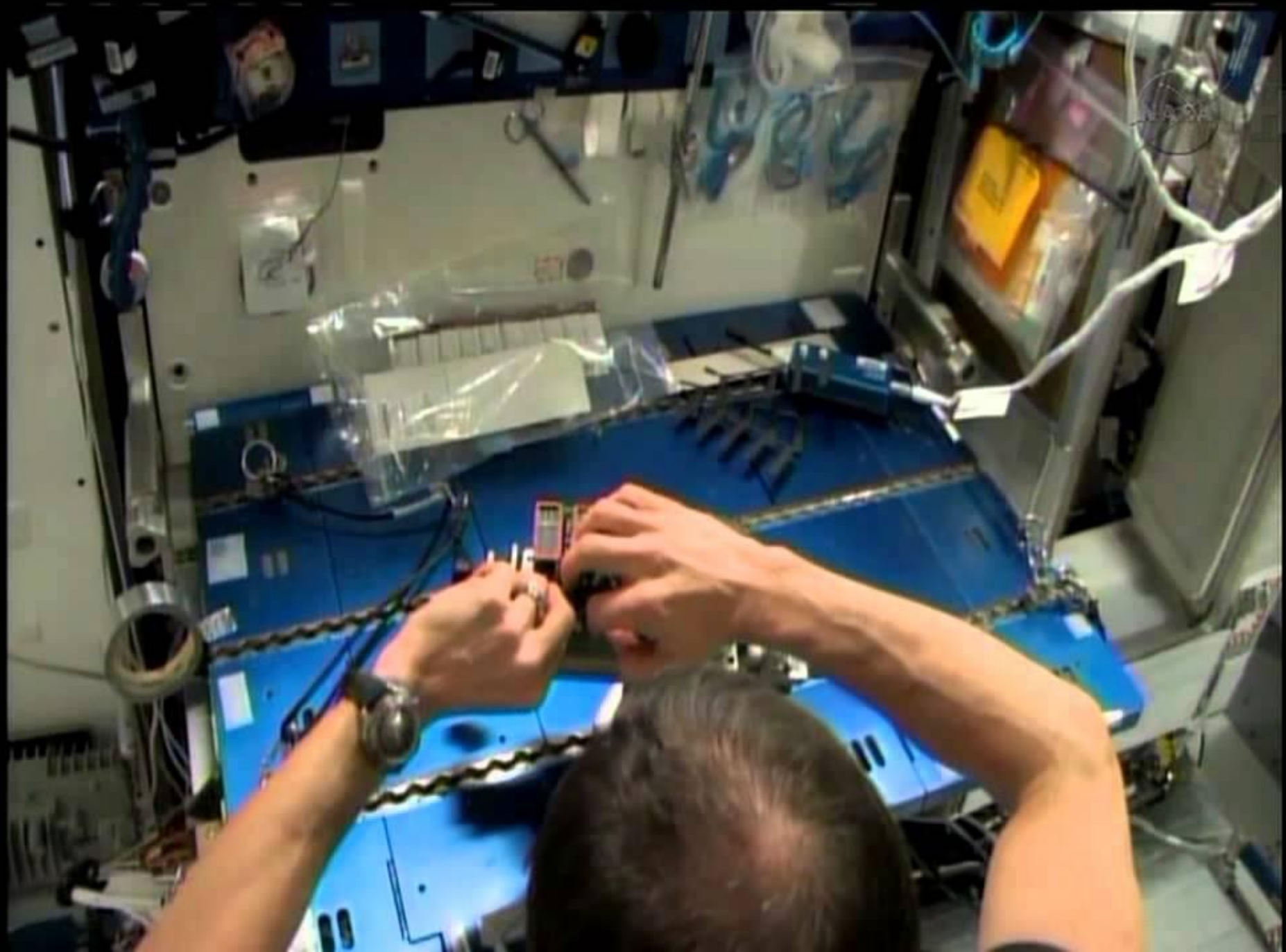

1
00:00:01,146 --> 00:00:03,376
>> Lori Meggs: Since the space
environment is not exactly the

2
00:00:03,376 --> 00:00:06,316
best for plant growth,
then it's important for us

3
00:00:06,316 --> 00:00:08,976
to understand how they
respond in microgravity.

4
00:00:08,976 --> 00:00:11,326
Now this latest experiment
is called Seedling Growth,

5
00:00:11,326 --> 00:00:16,426
and it uses the model plant
[inaudible] or commonly known,

6
00:00:16,606 --> 00:00:17,416
and I like to say, [inaudible].

7
00:00:17,486 --> 00:00:20,686
It studies the effects
of various gravity levels

8
00:00:20,686 --> 00:00:23,136
on the growth responses
of these plant seedlings.

9
00:00:23,666 --> 00:00:25,436
Images of the seedlings
are then captured

10
00:00:25,436 --> 00:00:26,976
and downlinked to Earth.

11
00:00:27,326 --> 00:00:29,976

Plant samples are harvested
and preserved on orbit

12
00:00:29,976 --> 00:00:31,116
for analysis on Earth.

13
00:00:31,456 --> 00:00:33,716
Now the results of this
experiment can link

14
00:00:33,716 --> 00:00:35,486
to information that
will aid researchers

15
00:00:35,486 --> 00:00:38,556
in food production studies
concerning future long-duration

16
00:00:38,556 --> 00:00:40,416
space missions as well as data

17
00:00:40,416 --> 00:00:42,556
that could improve
agricultural production

18
00:00:42,856 --> 00:00:44,526
and higher crop yields on Earth,

19
00:00:44,526 --> 00:00:47,156
and the Payroll Operations
Integration Center here

20
00:00:47,156 --> 00:00:50,466
in Huntsville is vital to the
success of this experiment,

21
00:00:50,466 --> 00:00:52,106
and joining me now
is Carol Jacobs.

22
00:00:52,506 --> 00:00:54,846
She is a payload
operations director

23
00:00:54,846 --> 00:00:57,066
in the Payload Operations
Center, and, Carol,

24
00:00:57,286 --> 00:01:00,136
you've been working with the
crew members and developers all

25
00:01:00,136 --> 00:01:02,126
around the world on this
seedling growth experiment.

26
00:01:02,386 --> 00:01:05,126
First of all, tell us how
the OPIC is involved in this.

27
00:01:05,676 --> 00:01:06,106
>> Carol Jacobs: Yes, Lori.

28
00:01:06,306 --> 00:01:08,876
The seedling growth
experiment takes place

29
00:01:08,876 --> 00:01:13,826
in a faculty called the European
Modular Cultivation System,

30
00:01:13,826 --> 00:01:15,416
EMCS as we like to call it -

31
00:01:15,416 --> 00:01:15,976
>> Lori Meggs: That's right -

32
00:01:15,976 --> 00:01:17,666
>> Carol Jacobs: And the

team on the ground works both

33
00:01:17,666 --> 00:01:19,276
with the science team in terms

34
00:01:19,276 --> 00:01:22,056
of controlling the
conditions inside the EMCS

35
00:01:22,056 --> 00:01:25,456
and with the crew when
they're working with us,

36
00:01:25,766 --> 00:01:27,106
taking the seeds in and out.

37
00:01:27,426 --> 00:01:30,636
And the first thing the crew
does is insert some little

38
00:01:30,696 --> 00:01:32,906
seedling cartridges
inside the EMCS,

39
00:01:33,546 --> 00:01:35,536
and we work with the
crew during this process

40
00:01:35,536 --> 00:01:38,466
in case they have any
questions with the procedure

41
00:01:38,466 --> 00:01:40,426
or they're uncertain
about what's going on,

42
00:01:40,816 --> 00:01:44,066
and the real-time critical
aspect of this experiment is

43
00:01:44,066 --> 00:01:46,886
when the seeds have germinated
to the right size, and it's time

44
00:01:46,886 --> 00:01:49,446
to take the little
cartridges out and freeze them.

45
00:01:50,026 --> 00:01:53,296
And I think we're probably going
to be, see some footage of this,

46
00:01:53,356 --> 00:01:57,516
but the crew members take the
seedlings, the little cartridges

47
00:01:57,516 --> 00:01:59,896
out of the EMCS, they
have to get them ready

48
00:02:00,336 --> 00:02:01,896
to freeze inside
Melphy [phonetic].

49
00:02:01,966 --> 00:02:04,836
Melphy is one of the freezers
we have on the Space Station,

50
00:02:04,836 --> 00:02:06,876
and that will stop
all of the chemical

51
00:02:06,876 --> 00:02:11,876
and biological processes inside
those seeds and freeze them

52
00:02:11,876 --> 00:02:13,616
until we can return
them to the ground

53
00:02:13,616 --> 00:02:14,996
and get them back
to the science team.

54
00:02:14,996 --> 00:02:17,436
So we work with both the
crew and the ground team,

55
00:02:17,966 --> 00:02:20,086
working towards a
successful mission.

56
00:02:20,636 --> 00:02:21,516
>> Lori Meggs: Tell
us a little bit more

57
00:02:21,516 --> 00:02:23,476
about the EMCS facility.

58
00:02:23,476 --> 00:02:24,946
It has a lot of capabilities,
right -

59
00:02:24,996 --> 00:02:25,856
>> Carol Jacobs: Yes, it does.

60
00:02:25,856 --> 00:02:27,316
Growing plants in
space, of course,

61
00:02:27,316 --> 00:02:28,396
is a little bit different
on ground.

62
00:02:28,396 --> 00:02:32,566
You don't have sun that's,
you've got 8 to 12 hours,

63
00:02:32,566 --> 00:02:33,976

and you also don't
have any gravity.

64
00:02:34,496 --> 00:02:37,256
So inside the EMCS,
we've got some rotors,

65
00:02:37,396 --> 00:02:39,476
and by rotating those
at different speeds,

66
00:02:39,476 --> 00:02:41,156
we can control the
gravity environment.

67
00:02:41,676 --> 00:02:43,546
Roots, of course,
like to grow down.

68
00:02:43,606 --> 00:02:45,046
On Space Station,
there's no down.

69
00:02:45,276 --> 00:02:49,736
So we have to, we start with
a one gravity environment,

70
00:02:50,196 --> 00:02:54,066
and once we get germination,
then we can change to zero g

71
00:02:54,066 --> 00:02:55,766
if that's what the
experiment wants.

72
00:02:55,866 --> 00:02:57,916
We can also control the lights.

73
00:02:57,916 --> 00:03:00,526
We have blue lights and

red lights inside EMCS,

74
00:03:00,526 --> 00:03:03,676
and the plants respond
differently, both the roots

75
00:03:03,676 --> 00:03:05,486
and the seedling part of the
plant respond differently

76
00:03:05,486 --> 00:03:07,586
to those lights, and the
scientists can decide what

77
00:03:07,586 --> 00:03:09,766
they'd like to provide.

78
00:03:10,036 --> 00:03:10,636
>> Lori Meggs: Very interesting.

79
00:03:10,636 --> 00:03:13,006
We can see the crew
working on it right now.

80
00:03:13,136 --> 00:03:15,806
You were actually on console
when a crew member was working

81
00:03:16,196 --> 00:03:17,876
with this experiment
and actually looked

82
00:03:17,876 --> 00:03:19,306
into the centrifuge, the EMCS

83
00:03:19,306 --> 00:03:21,776
and said something's
not right here.

84

00:03:22,096 --> 00:03:22,906
>> Carol Jacobs:
That's right, Lori.

85
00:03:22,906 --> 00:03:25,116
That's one of those calls you
really don't like to get is

86
00:03:25,116 --> 00:03:28,186
when the call crew, crew
calls down and says, you know,

87
00:03:28,186 --> 00:03:30,676
there's some little particles
floating around inside here,

88
00:03:31,236 --> 00:03:32,766
and our first concern,
of course,

89
00:03:32,816 --> 00:03:34,196
is the safety of
the crew member.

90
00:03:34,196 --> 00:03:36,466
We want to make sure they aren't
exposed to anything hazardous,

91
00:03:36,466 --> 00:03:38,566
and we pretty quickly determined

92
00:03:38,566 --> 00:03:40,206
that that wasn't
anything hazardous.

93
00:03:40,206 --> 00:03:41,126
It wasn't mold.

94
00:03:41,126 --> 00:03:42,536
It wasn't any sort of dirt

95
00:03:42,636 --> 00:03:45,256
because these little
seeds actually grow

96
00:03:45,256 --> 00:03:46,096
in a growth medium.

97
00:03:46,406 --> 00:03:47,786
But we're also concerned

98
00:03:47,826 --> 00:03:50,306
that the science itself
is not compromised,

99
00:03:50,306 --> 00:03:52,366
and that the facility
is healthy as well.

100
00:03:52,866 --> 00:03:56,006
Working with the science
team, the EMCS team,

101
00:03:56,006 --> 00:03:58,706
the team in Houston, we
pretty quickly determined

102
00:03:58,906 --> 00:04:02,726
that the crew was safe, hardware
was fine except we did have

103
00:04:02,756 --> 00:04:06,056
to do some R&R on
the Space Station.

104
00:04:06,286 --> 00:04:07,996
Turns out the belts
were degrading

105

00:04:08,316 --> 00:04:11,186
that help control the
rotors or the centrifuge.

106
00:04:11,646 --> 00:04:17,146
So crew on the ground provided
a new procedure for the crew.

107
00:04:17,146 --> 00:04:18,166
We sent that up.

108
00:04:18,256 --> 00:04:21,236
The crew was able to replace
those belts just fine,

109
00:04:21,236 --> 00:04:23,736
and since then, we've actually
grown some new seedlings.

110
00:04:23,776 --> 00:04:26,766
So we're back in a [inaudible]
configuration, and that sort

111
00:04:26,766 --> 00:04:28,736
of a perfect example of
a troubleshooting plan

112
00:04:28,736 --> 00:04:31,136
by everybody from the
ground to the crew -

113
00:04:31,226 --> 00:04:31,806
>> Lori Meggs: That's great.

114
00:04:31,806 --> 00:04:33,716
Kind of like your tractor
breaking [inaudible].

115
00:04:33,716 --> 00:04:34,536
>> Carol Jacobs: Absolutely.

116
00:04:34,536 --> 00:04:35,126
Absolutely.

117
00:04:35,236 --> 00:04:36,056
>> Lori Meggs: Does
it feel like to you

118
00:04:36,056 --> 00:04:37,736
that sometimes you're
growing a garden

119
00:04:37,736 --> 00:04:38,756
in space helping with this?

120
00:04:38,756 --> 00:04:40,126
>> Carol Jacobs:
You know, it does.

121
00:04:40,126 --> 00:04:42,136
It's not quite like the
garden I have in Huntsville

122
00:04:42,136 --> 00:04:44,086
with my big pea pods
and my big tomatoes.

123
00:04:44,086 --> 00:04:45,866
These are pretty
small little plants,

124
00:04:45,976 --> 00:04:49,866
but they're sure paving the way
for future growth of real plants

125
00:04:49,866 --> 00:04:52,056
that the crew can harvest
and enjoy on space -

126

00:04:52,276 --> 00:04:54,076
>> Lori Meggs: I know a lot
of interest in this when in,

127
00:04:54,076 --> 00:04:55,056
now let's take a look now

128
00:04:55,476 --> 00:04:57,276
in the Payload Operations
Integration Center,

129
00:04:57,276 --> 00:04:58,996
a live look where Carol works,

130
00:04:59,596 --> 00:05:01,706
and we're busy this
week, right, Carol.

131
00:05:01,916 --> 00:05:02,156
>> Carol Jacobs: Yeah.

132
00:05:02,276 --> 00:05:03,776
We have two new crew members.

133
00:05:03,776 --> 00:05:07,936
They're still living on Space
Station, and since they're sort

134
00:05:08,096 --> 00:05:09,966
of new up there, we're
really interested

135
00:05:09,966 --> 00:05:12,426
in how their bodies
are responding

136
00:05:12,456 --> 00:05:13,866
to the space environment.

137

00:05:13,916 --> 00:05:17,896
So this is a week with lots
of human research experiments

138
00:05:17,936 --> 00:05:23,736
from ultrasounds of their eyes,
ocular health, to collections

139
00:05:23,906 --> 00:05:27,896
to biological samples,
urine, blood, saliva -

140
00:05:27,896 --> 00:05:28,886
>> Lori Meggs: All
the fun stuff -

141
00:05:28,886 --> 00:05:29,986
>> Carol Jacobs: All
the fun stuff, yeah.

142
00:05:29,986 --> 00:05:32,296
So they're human guinea
pigs this week, and we also,

143
00:05:32,726 --> 00:05:35,256
always lots of science going on
that the crew doesn't help with.

144
00:05:35,666 --> 00:05:36,936
Some the experiments
we're working

145
00:05:36,936 --> 00:05:40,756
on this week are scan
test bed, STPH3, and SIR,

146
00:05:40,926 --> 00:05:43,166
but probably have to wait to
talk about those another day -

147

00:05:43,316 --> 00:05:43,796
>> Lori Meggs: Alright.

148
00:05:43,796 --> 00:05:45,806
We will do that, but if
you'd like more information

149
00:05:45,806 --> 00:05:47,256
about these experiments
and more,