



1  
00:00:05,110 --> 00:00:02,869  
with the arrival of the dragon

2  
00:00:06,470 --> 00:00:05,120  
spacecraft that's now birthed to iss

3  
00:00:08,710 --> 00:00:06,480  
there's obviously plenty of new

4  
00:00:11,430 --> 00:00:08,720  
experiments to unload there's a new

5  
00:00:12,789 --> 00:00:11,440  
plant in investigation that is among all

6  
00:00:14,549 --> 00:00:12,799  
of the payloads

7  
00:00:16,950 --> 00:00:14,559  
launched and birthed to the station

8  
00:00:19,269 --> 00:00:16,960  
called seedling growth ii it's a

9  
00:00:21,910 --> 00:00:19,279  
collaboration between nasa ames research

10  
00:00:24,550 --> 00:00:21,920  
center and the european space agency the

11  
00:00:26,550 --> 00:00:24,560  
principal investigator john kiss is the

12  
00:00:29,269 --> 00:00:26,560  
dean of the graduate school at the

13  
00:00:31,349 --> 00:00:29,279

university of mississippi in oxford lori

14

00:00:33,430 --> 00:00:31,359

meigs my colleague at the marshall space

15

00:00:35,830 --> 00:00:33,440

flight center had a chance to speak with

16

00:00:38,950 --> 00:00:35,840

him recently at the kennedy space center

17

00:00:41,510 --> 00:00:38,960

before launch about the experiment

18

00:00:43,590 --> 00:00:41,520

so ceiling growth is an experiment that

19

00:00:46,950 --> 00:00:43,600

is in collaboration with the european

20

00:00:49,430 --> 00:00:46,960

space agency and we're interested in the

21

00:00:50,470 --> 00:00:49,440

growth and development of plants in

22

00:00:51,990 --> 00:00:50,480

space

23

00:00:54,869 --> 00:00:52,000

we're particularly interested in the

24

00:00:57,270 --> 00:00:54,879

role of gravity and light in plant

25

00:00:59,430 --> 00:00:57,280

growth and development we actually have

26

00:01:02,310 --> 00:00:59,440

three three different runs

27

00:01:05,509 --> 00:01:02,320

and um the runs are

28

00:01:08,149 --> 00:01:05,519

about six or seven days each

29

00:01:10,630 --> 00:01:08,159

so so the ceilings are about six days

30

00:01:12,469 --> 00:01:10,640

old when we do the experiments there's

31

00:01:14,550 --> 00:01:12,479

been research over the years right what

32

00:01:15,990 --> 00:01:14,560

makes yours different and what do you

33

00:01:17,910 --> 00:01:16,000

hope to learn

34

00:01:19,510 --> 00:01:17,920

well one of the things that makes our

35

00:01:21,590 --> 00:01:19,520

project different is we're actually in

36

00:01:23,749 --> 00:01:21,600

addition to microgravity we're looking

37

00:01:25,590 --> 00:01:23,759

at reduced gravity levels

38

00:01:28,390 --> 00:01:25,600

we're using a facility called the

39

00:01:30,230 --> 00:01:28,400

european modular cultivation system

40

00:01:32,230 --> 00:01:30,240

we have the ability to do the experiment

41

00:01:35,109 --> 00:01:32,240

in microgravity but also use a

42

00:01:37,830 --> 00:01:35,119

centrifuge to give it varying amounts of

43

00:01:40,310 --> 00:01:37,840

gravity so we actually could do the moon

44

00:01:42,310 --> 00:01:40,320

mars level of gravity and while there's

45

00:01:43,270 --> 00:01:42,320

a lot as you said known about plants

46

00:01:45,350 --> 00:01:43,280

grown

47

00:01:47,350 --> 00:01:45,360

in space and microgravity there's very

48

00:01:49,030 --> 00:01:47,360

little known about plant growth and

49

00:01:51,270 --> 00:01:49,040

development in reduced gravity

50

00:01:53,590 --> 00:01:51,280

environments

51

00:01:56,069 --> 00:01:53,600

what does it look like

52

00:01:57,990 --> 00:01:56,079

we're looking at tiny seedlings they're

53

00:01:59,990 --> 00:01:58,000

about

54

00:02:02,389 --> 00:02:00,000

an inch and a half of the plant

55

00:02:04,230 --> 00:02:02,399

arabidopsis thaliana it's called a

56

00:02:07,749 --> 00:02:04,240

mousier crest

57

00:02:10,150 --> 00:02:07,759

and we're sending up seeds and the seeds

58

00:02:12,869 --> 00:02:10,160

will be watered and they'll develop in

59

00:02:14,550 --> 00:02:12,879

the microgravity environment

60

00:02:16,949 --> 00:02:14,560

does the crew water them or how does

61

00:02:19,670 --> 00:02:16,959

that or is it it's a semi-automatic

62

00:02:21,030 --> 00:02:19,680

system the crew is involved in loading

63

00:02:23,270 --> 00:02:21,040

the containers

64

00:02:25,589 --> 00:02:23,280

into the european modular cultivation

65

00:02:27,430 --> 00:02:25,599

system and they're involved after the

66

00:02:30,949 --> 00:02:27,440

seedlings develop and we're done with

67

00:02:32,550 --> 00:02:30,959

the experiment we freeze the seedlings

68

00:02:34,470 --> 00:02:32,560

in the minus 80 freezer so they're

69

00:02:36,150 --> 00:02:34,480

involved in that process

70

00:02:38,309 --> 00:02:36,160

so you freeze and then return to earth

71

00:02:39,990 --> 00:02:38,319

yes they'll be returned on a future

72

00:02:42,150 --> 00:02:40,000

spacex mission

73

00:02:43,830 --> 00:02:42,160

what is your interest in having

74

00:02:45,589 --> 00:02:43,840

an experiment like this on the space

75

00:02:47,589 --> 00:02:45,599

station

76

00:02:49,670 --> 00:02:47,599

well this is first of all this is a

77

00:02:51,830 --> 00:02:49,680

series we had a seedling growth one this

78

00:02:54,470 --> 00:02:51,840

is seedling growth two

79

00:02:57,110 --> 00:02:54,480

i think that microgravity is a very

80

00:03:00,149 --> 00:02:57,120

unique environment in which to study

81

00:03:02,149 --> 00:03:00,159

very important basic problems in biology

82

00:03:04,790 --> 00:03:02,159

and plant biology and it gives us a

83

00:03:06,869 --> 00:03:04,800

really unique opportunity to study

84

00:03:09,509 --> 00:03:06,879

plants in microgravity and as i said

85

00:03:12,229 --> 00:03:09,519

with the emcs we also could study them

86

00:03:14,710 --> 00:03:12,239

in these reduced or fractional gravity

87

00:03:17,589 --> 00:03:14,720

environments that are like moon mars

88

00:03:21,589 --> 00:03:17,599

i'm the american pi there's a european

89

00:03:22,869 --> 00:03:21,599

pi um javier medina from madrid

90

00:03:24,869 --> 00:03:22,879

and

91

00:03:27,430 --> 00:03:24,879

we're sending up different types

92

00:03:29,270 --> 00:03:27,440

different strains and types of seeds and

93

00:03:31,190 --> 00:03:29,280

some of the types are the ones i'm

94

00:03:33,830 --> 00:03:31,200

interested in and there are some other

95

00:03:35,670 --> 00:03:33,840

ones that uh that he's interested in so

96

00:03:38,470 --> 00:03:35,680

we're going to be adding the european

97

00:03:40,949 --> 00:03:38,480

dimension to this flight

98

00:03:42,949 --> 00:03:40,959

what have we learned from the first one

99

00:03:45,430 --> 00:03:42,959

well we're still in the process of

100

00:03:46,630 --> 00:03:45,440

analyzing the data but what i could tell

101  
00:03:49,270 --> 00:03:46,640  
you from the

102  
00:03:50,149 --> 00:03:49,280  
preliminary data it actually looks like

103  
00:03:51,750 --> 00:03:50,159  
the

104  
00:03:53,990 --> 00:03:51,760  
gravity levels

105  
00:03:57,350 --> 00:03:54,000  
on the mar on mars are probably going to

106  
00:03:58,949 --> 00:03:57,360  
be adequate in terms of gravity for

107  
00:04:01,990 --> 00:03:58,959  
plant growth which was a really

108  
00:04:04,470 --> 00:04:02,000  
surprising finding the gravity level on

109  
00:04:06,550 --> 00:04:04,480  
on mars is 3 8

110  
00:04:08,470 --> 00:04:06,560  
g compared to

111  
00:04:10,869 --> 00:04:08,480  
the earth gravity levels

112  
00:04:12,710 --> 00:04:10,879  
so um it seems like

113  
00:04:14,630 --> 00:04:12,720

in our reduced gravity studies using the

114

00:04:16,789 --> 00:04:14,640

centrifuge that

115

00:04:18,870 --> 00:04:16,799

that gravity level will be adequate for

116

00:04:20,550 --> 00:04:18,880

plant development do they grow like

117

00:04:23,270 --> 00:04:20,560

normal seeds

118

00:04:25,670 --> 00:04:23,280

actually on at the what was remarkable

119

00:04:26,870 --> 00:04:25,680

is at the mars level of gravity they do

120

00:04:29,270 --> 00:04:26,880

grow

121

00:04:30,950 --> 00:04:29,280

pretty much like like the earth nominal

122

00:04:33,110 --> 00:04:30,960

or earth normal plants that was kind of

123

00:04:35,590 --> 00:04:33,120

a surprising finding and we're following

124

00:04:37,510 --> 00:04:35,600

up on that in the seedling growth too

125

00:04:38,870 --> 00:04:37,520

so we're doing basic science but i think

126

00:04:41,030 --> 00:04:38,880

the kinds of things that we're going to

127

00:04:43,430 --> 00:04:41,040

be learning from this project are going

128

00:04:45,830 --> 00:04:43,440

to be in the long term very applicable

129

00:04:50,070 --> 00:04:45,840

to growing plants on earth because the

130

00:04:52,230 --> 00:04:50,080

parameters of particularly light

131

00:04:54,390 --> 00:04:52,240

is a very important parameter obviously

132

00:04:55,670 --> 00:04:54,400

for plant growth and i think we'll be

133

00:04:57,590 --> 00:04:55,680

able to

134

00:05:00,150 --> 00:04:57,600

get some unique insights which will help

135

00:05:01,510 --> 00:05:00,160

us probably in the long term develop