



Canister

19-M-2100-00

005

E



1

4

5

3

6

1
00:00:04,550 --> 00:00:02,790
experiment work taking up the vast

2
00:00:06,309 --> 00:00:04,560
majority of the work for the astronauts

3
00:00:08,470 --> 00:00:06,319
on board the station and several new

4
00:00:10,549 --> 00:00:08,480
experiments studying bacteria were

5
00:00:12,470 --> 00:00:10,559
actually launched in return earlier this

6
00:00:14,150 --> 00:00:12,480
spring on spacex 3.

7
00:00:15,669 --> 00:00:14,160
why don't we now go find out a little

8
00:00:17,830 --> 00:00:15,679
bit more about a couple of these from

9
00:00:19,510 --> 00:00:17,840
lori meigs out at the payload operations

10
00:00:22,070 --> 00:00:19,520
integration center at the marshall space

11
00:00:23,590 --> 00:00:22,080
flight center in huntsville alabama lori

12
00:00:25,269 --> 00:00:23,600
i understand results of these

13
00:00:27,670 --> 00:00:25,279

experiments could actually help us on

14

00:00:29,269 --> 00:00:27,680

future flights to mars

15

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

past studies have shown that bacteria

16

00:00:32,870 --> 00:00:31,359

becomes more virulent in space that's

17

00:00:35,670 --> 00:00:32,880

why we need further research to

18

00:00:37,910 --> 00:00:35,680

understand why as we travel to farther

19

00:00:39,110 --> 00:00:37,920

places out like mars the experiments

20

00:00:41,990 --> 00:00:39,120

we're talking about today are called

21

00:00:43,750 --> 00:00:42,000

brick 18. i spoke with david reed the

22

00:00:45,350 --> 00:00:43,760

lead payload engineer at the kennedy

23

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

space center to find out more about

24

00:00:48,950 --> 00:00:47,360

these investigations and how the brick

25

00:00:51,590 --> 00:00:48,960

canisters work

26

00:00:54,310 --> 00:00:51,600

brick 18 consists of two

27

00:00:56,470 --> 00:00:54,320

investigations one investigation

28

00:00:59,270 --> 00:00:56,480

is looking at

29

00:01:01,110 --> 00:00:59,280

the effects of flying bacteria in in

30

00:01:01,990 --> 00:01:01,120

microgravity specifically looking at

31

00:01:06,870 --> 00:01:02,000

their

32

00:01:08,710 --> 00:01:06,880

antibiotics there's a lot of concern

33

00:01:10,710 --> 00:01:08,720

right now in the in the space flight

34

00:01:13,109 --> 00:01:10,720

community uh there's been other research

35

00:01:14,789 --> 00:01:13,119

done that shows that some organisms

36

00:01:17,350 --> 00:01:14,799

become more virulent

37

00:01:19,830 --> 00:01:17,360

more able to cause disease when

38

00:01:21,830 --> 00:01:19,840

they go into space and

39

00:01:23,670 --> 00:01:21,840

part of that equation is understanding

40

00:01:25,429 --> 00:01:23,680

how they might become more resistant to

41

00:01:27,270 --> 00:01:25,439

antibiotics as well which could be a

42

00:01:29,190 --> 00:01:27,280

real problem on a long-term space flight

43

00:01:31,990 --> 00:01:29,200

in some place like mars

44

00:01:35,510 --> 00:01:32,000

so this investigator has got two kind of

45

00:01:37,749 --> 00:01:35,520

common bacteria and he's applying

46

00:01:39,749 --> 00:01:37,759

antibiotics to two different antibiotics

47

00:01:41,510 --> 00:01:39,759

to them to see they each have different

48

00:01:43,429 --> 00:01:41,520

slightly different genetics in them to

49

00:01:46,710 --> 00:01:43,439

see how they respond to that treatment

50

00:01:48,950 --> 00:01:46,720

the second investigator is using a small

51
00:01:52,069 --> 00:01:48,960
plant called arabidopsis it's in the

52
00:01:54,069 --> 00:01:52,079
mustard family it's a it's a very small

53
00:01:56,310 --> 00:01:54,079
plant it only grows about this big

54
00:01:58,389 --> 00:01:56,320
typically before we

55
00:01:59,270 --> 00:01:58,399
halt these kind of investigations

56
00:02:01,270 --> 00:01:59,280
and

57
00:02:03,350 --> 00:02:01,280
it's a so-called model organism because

58
00:02:05,590 --> 00:02:03,360
a lot of work has been done on the plan

59
00:02:06,789 --> 00:02:05,600
its whole genome is sequenced but in any

60
00:02:08,550 --> 00:02:06,799
event

61
00:02:09,350 --> 00:02:08,560
this particular investigator is looking

62
00:02:11,750 --> 00:02:09,360
to

63
00:02:14,869 --> 00:02:11,760

understand the effects of space flight

64

00:02:17,030 --> 00:02:14,879

stress on how that plant

65

00:02:17,830 --> 00:02:17,040

expresses its genes so

66

00:02:22,550 --> 00:02:17,840

when

67

00:02:24,550 --> 00:02:22,560

like a heat stress or a water stress it

68

00:02:27,030 --> 00:02:24,560

it expresses certain genes that makes

69

00:02:28,390 --> 00:02:27,040

certain proteins in its body and then

70

00:02:30,229 --> 00:02:28,400

we can

71

00:02:31,509 --> 00:02:30,239

arrest its development which in plant

72

00:02:33,750 --> 00:02:31,519

terms means we

73

00:02:35,030 --> 00:02:33,760

we fix them and bring them back home

74

00:02:36,949 --> 00:02:35,040

and then afterwards we can do

75

00:02:39,110 --> 00:02:36,959

biochemical analysis to understand how

76

00:02:41,910 --> 00:02:39,120

those genes were turned on and off

77

00:02:44,150 --> 00:02:41,920

so six of these guys fit inside of a

78

00:02:46,070 --> 00:02:44,160

much larger canister that looks like

79

00:02:48,949 --> 00:02:46,080

this and

80

00:02:50,630 --> 00:02:48,959

this is called the brick pdfu canister

81

00:02:52,470 --> 00:02:50,640

and you can see there's six positions

82

00:02:53,670 --> 00:02:52,480

that are each identify with numbers one

83

00:02:55,350 --> 00:02:53,680

through six

84

00:02:57,030 --> 00:02:55,360

and that's because

85

00:02:59,750 --> 00:02:57,040

the crew member may be asked to

86

00:03:01,670 --> 00:02:59,760

chemically preserve individual positions

87

00:03:04,070 --> 00:03:01,680

at different points in time

88

00:03:06,550 --> 00:03:04,080

he does that by taking a another device

89

00:03:09,589 --> 00:03:06,560

that looks and acts a whole lot like a

90

00:03:11,270 --> 00:03:09,599

fancy caulking gun and so the way the

91

00:03:14,470 --> 00:03:11,280

fancy caulking gun called an actuator

92

00:03:16,309 --> 00:03:14,480

tool works is you pull back the

93

00:03:19,670 --> 00:03:16,319

the pommel on it again just like a

94

00:03:20,630 --> 00:03:19,680

caulking gun and then

95

00:03:22,070 --> 00:03:20,640

this

96

00:03:24,070 --> 00:03:22,080

mates with the top surface of the

97

00:03:26,789 --> 00:03:24,080

canister

98

00:03:30,710 --> 00:03:28,789

in the process of crew member depressing

99

00:03:32,710 --> 00:03:30,720

the actuator then you can see that this

100

00:03:34,470 --> 00:03:32,720

this piston travels down

101
00:03:36,229 --> 00:03:34,480
in doing so there's a little bit of

102
00:03:37,990 --> 00:03:36,239
engineering magic that goes on inside

103
00:03:40,070 --> 00:03:38,000
here there's a there's a steel rod that

104
00:03:41,990 --> 00:03:40,080
gets driven down through some septas

105
00:03:43,910 --> 00:03:42,000
that steel rod is what actually pushes

106
00:03:46,630 --> 00:03:43,920
that piston then inside that i already

107
00:03:48,630 --> 00:03:46,640
explained is within the individual pdfu

108
00:03:50,550 --> 00:03:48,640
and that forces the liquid on there when

109
00:03:52,309 --> 00:03:50,560
the crew member takes this off

110
00:03:54,390 --> 00:03:52,319
at all points in time

111
00:03:57,429 --> 00:03:54,400
this device maintains three levels of

112
00:03:59,429 --> 00:03:57,439
containment so containment and

113
00:04:00,789 --> 00:03:59,439

keeping the crew safe is of course

114

00:04:02,229 --> 00:04:00,799

paramount importance when we fly in

115

00:04:03,350 --> 00:04:02,239

space

116

00:04:05,190 --> 00:04:03,360

the sort of thing that you could do

117

00:04:07,429 --> 00:04:05,200

easily on the ground by simply pouring

118

00:04:09,030 --> 00:04:07,439

something from a beaker on top of a

119

00:04:10,949 --> 00:04:09,040

of biology is a little more challenging

120

00:04:12,789 --> 00:04:10,959

in space so there there is some

121

00:04:14,470 --> 00:04:12,799

sophistication even though it's

122

00:04:16,229 --> 00:04:14,480

something that we call a brick and it

123

00:04:17,670 --> 00:04:16,239

even looks like a brick you could almost

124

00:04:19,030 --> 00:04:17,680

build yourself a fort out of these if

125

00:04:21,509 --> 00:04:19,040

you wanted to

126

00:04:23,270 --> 00:04:21,519

now these experiments and several others

127

00:04:25,749 --> 00:04:23,280

that came back on space x3 are now at