



1
00:00:04,070 --> 00:00:02,310
so life on board the international space

2
00:00:05,670 --> 00:00:04,080
station very busy for the astronauts and

3
00:00:07,269 --> 00:00:05,680
there's a lot of things that they can't

4
00:00:09,910 --> 00:00:07,279
take with them when they're

5
00:00:11,669 --> 00:00:09,920
working in space a lot of amenities here

6
00:00:13,669 --> 00:00:11,679
on earth that we get to enjoy that they

7
00:00:16,710 --> 00:00:13,679
don't get while they're up there among

8
00:00:18,470 --> 00:00:16,720
them doing laundry i mean water is very

9
00:00:19,349 --> 00:00:18,480
precious resource when you're in space

10
00:00:21,029 --> 00:00:19,359
and

11
00:00:22,710 --> 00:00:21,039
you can't spare water for anything

12
00:00:25,109 --> 00:00:22,720
except for the essentials so the

13
00:00:26,710 --> 00:00:25,119

astronauts actually very limited in

14

00:00:28,950 --> 00:00:26,720

keeping clean

15

00:00:31,029 --> 00:00:28,960

here to talk today about what we do to

16

00:00:33,350 --> 00:00:31,039

help them cope with you know wearing

17

00:00:34,950 --> 00:00:33,360

clothes for long periods of time and not

18

00:00:36,709 --> 00:00:34,960

being able to clean them i have evelyn

19

00:00:38,310 --> 00:00:36,719

orndog she's with the crew and thermal

20

00:00:40,630 --> 00:00:38,320

systems division here at the johnson

21

00:00:42,950 --> 00:00:40,640

space center she's doing a study called

22

00:00:45,590 --> 00:00:42,960

the iva or intravehicular activity

23

00:00:47,110 --> 00:00:45,600

clothing study uh evelyn thank you so

24

00:00:49,029 --> 00:00:47,120

much for joining me today real quick

25

00:00:50,229 --> 00:00:49,039

what's the typical life cycle for these

26

00:00:51,750 --> 00:00:50,239

clothes that these astronauts are

27

00:00:55,270 --> 00:00:51,760

wearing

28

00:00:57,350 --> 00:00:55,280

well it's supposed to be one mission

29

00:00:59,830 --> 00:00:57,360

however this is not exactly the way

30

00:01:02,790 --> 00:00:59,840

things work there's a huge pantry with

31

00:01:05,270 --> 00:01:02,800

clothes that are being brought each time

32

00:01:08,390 --> 00:01:05,280

there's a cargo

33

00:01:11,429 --> 00:01:08,400

vehicle resupplying so

34

00:01:12,870 --> 00:01:11,439

there is a usage rate which we go by

35

00:01:17,510 --> 00:01:12,880

that's prescribed for each type of

36

00:01:19,910 --> 00:01:17,520

garment so basically that can be from uh

37

00:01:22,070 --> 00:01:19,920

two days to up to 30 days so that would

38

00:01:24,390 --> 00:01:22,080

be more specific and two days is for

39

00:01:27,670 --> 00:01:24,400

undergarments and 30 days would be like

40

00:01:29,429 --> 00:01:27,680

four cargo pants okay and what are what

41

00:01:30,950 --> 00:01:29,439

are some of the challenges i mean when

42

00:01:33,030 --> 00:01:30,960

you're wearing the same clothes for 30

43

00:01:35,030 --> 00:01:33,040

days that's got to get you know a little

44

00:01:36,069 --> 00:01:35,040

grimy especially they're exercising two

45

00:01:37,350 --> 00:01:36,079

hours every day what are some of the

46

00:01:39,429 --> 00:01:37,360

challenges that you guys are trying to

47

00:01:40,630 --> 00:01:39,439

overcome with this new study

48

00:01:43,830 --> 00:01:40,640

okay so

49

00:01:46,069 --> 00:01:43,840

our study is actually a task in the

50

00:01:47,190 --> 00:01:46,079

logistics reduction and repurposing

51
00:01:48,469 --> 00:01:47,200
project

52
00:01:51,030 --> 00:01:48,479
it's

53
00:01:52,710 --> 00:01:51,040
one of five tasks under that project

54
00:01:55,270 --> 00:01:52,720
which was funded by the advanced

55
00:01:58,230 --> 00:01:55,280
exploration systems program and the

56
00:02:01,030 --> 00:01:58,240
whole idea is actually to reduce the app

57
00:02:03,270 --> 00:02:01,040
mass of closing and the storage volume

58
00:02:04,069 --> 00:02:03,280
of closing uh was

59
00:02:05,990 --> 00:02:04,079
you know

60
00:02:06,950 --> 00:02:06,000
mostly uh

61
00:02:09,510 --> 00:02:06,960
for

62
00:02:10,389 --> 00:02:09,520
future long duration missions

63
00:02:12,710 --> 00:02:10,399

okay

64

00:02:14,309 --> 00:02:12,720

and so

65

00:02:15,990 --> 00:02:14,319

what are what are some of the

66

00:02:17,670 --> 00:02:16,000

um are there different clothes for

67

00:02:19,270 --> 00:02:17,680

different you know activities for the

68

00:02:21,990 --> 00:02:19,280

astronauts on board yeah they are

69

00:02:26,229 --> 00:02:22,000

actually uh you have you know a day

70

00:02:27,830 --> 00:02:26,239

where sleepwear exercise where so uh and

71

00:02:30,790 --> 00:02:27,840

right now uh

72

00:02:32,630 --> 00:02:30,800

the uh the cmc contract you have a

73

00:02:34,470 --> 00:02:32,640

provision for so many clothes that have

74

00:02:36,309 --> 00:02:34,480

been selected uh

75

00:02:39,990 --> 00:02:36,319

from past experience in a shuttle

76
00:02:42,550 --> 00:02:40,000
program also based on crew preference

77
00:02:44,790 --> 00:02:42,560
the clothes are using mostly cotton as

78
00:02:46,229 --> 00:02:44,800
the main fiber and

79
00:02:48,309 --> 00:02:46,239
there are a lot of reason why we like

80
00:02:50,070 --> 00:02:48,319
cotton but

81
00:02:51,830 --> 00:02:50,080
there's lots of new technology in the

82
00:02:54,710 --> 00:02:51,840
textile industry especially in

83
00:02:56,790 --> 00:02:54,720
performance closing and we're looking at

84
00:02:59,830 --> 00:02:56,800
commercially of the shelf available

85
00:03:02,470 --> 00:02:59,840
garments and see just from there if we

86
00:03:06,470 --> 00:03:02,480
can address those two

87
00:03:08,949 --> 00:03:06,480
criteria of a mass reduction and reduced

88
00:03:11,350 --> 00:03:08,959

volume and we think we can do that so

89

00:03:13,830 --> 00:03:11,360

one of the rational for the study is to

90

00:03:16,070 --> 00:03:13,840

look at those close and other attributes

91

00:03:18,710 --> 00:03:16,080

like if the antimicrobial

92

00:03:20,710 --> 00:03:18,720

agents added to the garments does it

93

00:03:22,550 --> 00:03:20,720

help pre-launch the uh

94

00:03:23,910 --> 00:03:22,560

period uh the crew member can wear the

95

00:03:26,309 --> 00:03:23,920

same garment

96

00:03:28,070 --> 00:03:26,319

and i know it's not just you know

97

00:03:30,710 --> 00:03:28,080

mass saving stuff like that there's also

98

00:03:32,390 --> 00:03:30,720

kind of a psychological component to to

99

00:03:34,229 --> 00:03:32,400

wearing these clothes i mean it's got to

100

00:03:35,509 --> 00:03:34,239

feel nice to you know put on a fresh

101

00:03:37,350 --> 00:03:35,519

shirt after wearing the same thing for

102

00:03:39,190 --> 00:03:37,360

30 days straight are you you guys are

103

00:03:41,750 --> 00:03:39,200

looking at some of those aspects as well

104

00:03:44,630 --> 00:03:41,760

correct absolutely actually uh

105

00:03:46,710 --> 00:03:44,640

we can provide the crew with the best

106

00:03:48,229 --> 00:03:46,720

technical garment and we have the

107

00:03:51,110 --> 00:03:48,239

technology to

108

00:03:52,949 --> 00:03:51,120

produce such a garment that requires

109

00:03:55,910 --> 00:03:52,959

that meets all our requirements for

110

00:03:57,030 --> 00:03:55,920

flammability toxicity

111

00:04:02,149 --> 00:03:57,040

and

112

00:04:06,229 --> 00:04:02,159

but if the crew they don't like it

113

00:04:07,910 --> 00:04:06,239

what's the point and that's the whole um

114

00:04:09,429 --> 00:04:07,920

challenge about

115

00:04:11,750 --> 00:04:09,439

you know apparel

116

00:04:13,509 --> 00:04:11,760

because for long duration mission

117

00:04:15,190 --> 00:04:13,519

whatever they will take with them is

118

00:04:16,789 --> 00:04:15,200

what they have for the

119

00:04:18,310 --> 00:04:16,799

even right now on the space station it's

120

00:04:20,150 --> 00:04:18,320

more like an expedition like going to

121

00:04:21,830 --> 00:04:20,160

the everest and coming back

122

00:04:23,510 --> 00:04:21,840

it's short duration but you're talking

123

00:04:25,590 --> 00:04:23,520

like a three-year mission you're taking

124

00:04:27,430 --> 00:04:25,600

your entire wardrobe with you and you

125

00:04:29,590 --> 00:04:27,440

live with it and it's part of your image

126
00:04:32,230 --> 00:04:29,600
and everything so we are very careful

127
00:04:34,629 --> 00:04:32,240
about getting that perception uh from

128
00:04:35,749 --> 00:04:34,639
the crew and other test subjects we uh

129
00:04:37,749 --> 00:04:35,759
also

130
00:04:39,909 --> 00:04:37,759
had participate in similar studies on

131
00:04:41,749 --> 00:04:39,919
the ground so this like so many things

132
00:04:43,830 --> 00:04:41,759
on station getting us ready for those

133
00:04:45,909 --> 00:04:43,840
next step missions the missions to mars

134
00:04:49,270 --> 00:04:45,919
things like that yes yeah the the

135
00:04:51,670 --> 00:04:49,280
ultimate goal is to design a wardrobe

136
00:04:54,230 --> 00:04:51,680
for long duration manned missions

137
00:04:55,430 --> 00:04:54,240
and how does the crew let you know kind

138
00:04:57,030 --> 00:04:55,440

of what they're thinking how they're

139

00:04:59,510 --> 00:04:57,040

feeling on orbit are they giving you

140

00:05:00,710 --> 00:04:59,520

direct feedback and no

141

00:05:06,390 --> 00:05:00,720

we

142

00:05:08,830 --> 00:05:06,400

from crew debrief some comments from

143

00:05:13,110 --> 00:05:08,840

past missions so before we started the

144

00:05:14,870 --> 00:05:13,120

study we gathered that information

145

00:05:15,830 --> 00:05:14,880

working

146

00:05:17,909 --> 00:05:15,840

with

147

00:05:21,909 --> 00:05:17,919

folks in sf

148

00:05:28,310 --> 00:05:24,790

this is what our study addresses is the

149

00:05:31,110 --> 00:05:28,320

perception of the crew of the

150

00:05:32,150 --> 00:05:31,120

people who wear the clothes and

151
00:05:34,469 --> 00:05:32,160
what's

152
00:05:37,189 --> 00:05:34,479
what is of the utmost importance to us

153
00:05:39,029 --> 00:05:37,199
in the study is that

154
00:05:41,909 --> 00:05:39,039
we haven't done already ground steady

155
00:05:44,310 --> 00:05:41,919
with 80 participants and the crew will

156
00:05:46,150 --> 00:05:44,320
wear the clothes uh at least the

157
00:05:47,990 --> 00:05:46,160
exercise clothes during their bdc

158
00:05:49,430 --> 00:05:48,000
baselight they tackle collection so they

159
00:05:51,670 --> 00:05:49,440
have a chance to try the clothes while

160
00:05:54,150 --> 00:05:51,680
they exercise here before the mission or

161
00:05:56,950 --> 00:05:54,160
after the mission and then of course

162
00:06:00,870 --> 00:05:56,960
there's the uh experiment we have on

163
00:06:02,950 --> 00:06:00,880

orbit and the crew is the only uh group

164

00:06:05,189 --> 00:06:02,960

that can tell us if there's a difference

165

00:06:07,749 --> 00:06:05,199

in perception of the garment in

166

00:06:09,670 --> 00:06:07,759

microgravity versus in earth's gravity

167

00:06:12,070 --> 00:06:09,680

that's very important because they go

168

00:06:14,230 --> 00:06:12,080

through so many physiological changes we

169

00:06:16,550 --> 00:06:14,240

need to understand we know there is uh

170

00:06:19,110 --> 00:06:16,560

and the skin sensitivity is a bit

171

00:06:20,710 --> 00:06:19,120

exacerbated so we need to understand if

172

00:06:22,469 --> 00:06:20,720

something that feels would feel

173

00:06:25,670 --> 00:06:22,479

comfortable here may not feel as

174

00:06:28,150 --> 00:06:25,680

comfortable uh and in the space station

175

00:06:30,710 --> 00:06:28,160

so that's why they're very important

176
00:06:32,870 --> 00:06:30,720
group and we're very excited about that

177
00:06:34,629 --> 00:06:32,880
experiment all right yeah and a lot of

178
00:06:36,629 --> 00:06:34,639
things you don't normally think about

179
00:06:38,230 --> 00:06:36,639
you can find out in space happens with

180
00:06:39,830 --> 00:06:38,240
every experiment we do it seems to

181
00:06:42,230 --> 00:06:39,840
happen with everything we do even you

182
00:06:44,550 --> 00:06:42,240
know developing some space age duds for

183
00:06:46,150 --> 00:06:44,560
our astronauts yes all right well again

184
00:06:47,749 --> 00:06:46,160
evelyn orndoff with the chrome thermal

185
00:06:50,070 --> 00:06:47,759
systems division here at the johnson

186
00:06:51,510 --> 00:06:50,080
space center talking about iva clothing

187
00:06:53,029 --> 00:06:51,520
thanks so much for joining us and

188
00:06:54,950 --> 00:06:53,039

hopefully we'll see some snazzy duds in