



# SPACESTATION LIVE

1  
00:00:09,910 --> 00:00:08,230  
a big part of the mission of the

2  
00:00:12,709 --> 00:00:09,920  
international space station is to get

3  
00:00:15,030 --> 00:00:12,719  
humans uh ready to explore beyond low

4  
00:00:16,790 --> 00:00:15,040  
earth orbit and out into the cosmos

5  
00:00:18,310 --> 00:00:16,800  
when that happens those future explorers

6  
00:00:20,790 --> 00:00:18,320  
and their support teams on earth will

7  
00:00:22,470 --> 00:00:20,800  
have a communication issue to deal with

8  
00:00:24,310 --> 00:00:22,480  
because of the great distances between

9  
00:00:26,710 --> 00:00:24,320  
earth and mars or to an asteroid

10  
00:00:29,269 --> 00:00:26,720  
communications won't be instantaneous as

11  
00:00:31,349 --> 00:00:29,279  
they are now they'll have a delay of

12  
00:00:33,590 --> 00:00:31,359  
seconds or even several minutes before

13  
00:00:35,270 --> 00:00:33,600

the signal is sent from earth reaches

14

00:00:36,630 --> 00:00:35,280

its destination then those signals have

15

00:00:38,470 --> 00:00:36,640

to come back

16

00:00:40,709 --> 00:00:38,480

nasa teams have been working on this

17

00:00:42,229 --> 00:00:40,719

issue and one of the proposed solutions

18

00:00:43,590 --> 00:00:42,239

is being tested on the space station

19

00:00:45,830 --> 00:00:43,600

this week

20

00:00:48,150 --> 00:00:45,840

nasa commentator lori meigs is at the

21

00:00:49,830 --> 00:00:48,160

payload operations integration center in

22

00:00:54,950 --> 00:00:49,840

huntsville alabama where they are

23

00:00:58,950 --> 00:00:57,110

autonomous mission operations express

24

00:01:01,110 --> 00:00:58,960

2.0 is currently being tested on the

25

00:01:03,830 --> 00:01:01,120

space station angie haddock is the lead

26  
00:01:05,270 --> 00:01:03,840  
for the amo operations here at marshall

27  
00:01:07,109 --> 00:01:05,280  
and angie first of all let's talk about

28  
00:01:09,030 --> 00:01:07,119  
how we're using the space station to

29  
00:01:10,310 --> 00:01:09,040  
test communications between earth and

30  
00:01:12,390 --> 00:01:10,320  
mars

31  
00:01:14,710 --> 00:01:12,400  
one of the tests that we can do is have

32  
00:01:17,190 --> 00:01:14,720  
the astronauts be able to manage iss

33  
00:01:19,590 --> 00:01:17,200  
hardware like expressrack that is on

34  
00:01:21,830 --> 00:01:19,600  
orbit currently so what is an express

35  
00:01:24,149 --> 00:01:21,840  
route an express rack is a rack that's

36  
00:01:25,830 --> 00:01:24,159  
on orbit that houses the payloads and

37  
00:01:28,070 --> 00:01:25,840  
the express right provides the power

38  
00:01:29,350 --> 00:01:28,080

data and thermal for express rack

39

00:01:30,789 --> 00:01:29,360

operations

40

00:01:33,350 --> 00:01:30,799

so going back to the testing just how

41

00:01:36,230 --> 00:01:33,360

long does it take to send a signal from

42

00:01:37,990 --> 00:01:36,240

earth to mars um if the if earth and

43

00:01:39,510 --> 00:01:38,000

mars are currently lined up and as close

44

00:01:41,429 --> 00:01:39,520

as they are today

45

00:01:44,230 --> 00:01:41,439

it's about two and a half minutes but it

46

00:01:46,069 --> 00:01:44,240

could be up to 24 minutes if

47

00:01:49,510 --> 00:01:46,079

they're not as close as they are today

48

00:01:50,310 --> 00:01:49,520

so that can make communications between

49

00:01:54,789 --> 00:01:50,320

the

50

00:01:57,030 --> 00:01:54,799

very difficult it's a pretty long time

51  
00:01:59,030 --> 00:01:57,040  
yes it is so you guys are looking at

52  
00:02:00,630 --> 00:01:59,040  
forward thinking concepts

53  
00:02:02,630 --> 00:02:00,640  
yes we are we're looking at things that

54  
00:02:04,550 --> 00:02:02,640  
can help the crew

55  
00:02:06,230 --> 00:02:04,560  
and our spacecraft be able to operate

56  
00:02:07,510 --> 00:02:06,240  
without as much ground control as we

57  
00:02:09,510 --> 00:02:07,520  
have today

58  
00:02:12,070 --> 00:02:09,520  
so the delay that we're talking about is

59  
00:02:14,150 --> 00:02:12,080  
relevant for just more than just voice

60  
00:02:17,030 --> 00:02:14,160  
communications yes it is um it's not

61  
00:02:18,309 --> 00:02:17,040  
just voice we have um data and also file

62  
00:02:21,270 --> 00:02:18,319  
transfers

63  
00:02:23,589 --> 00:02:21,280

so that if things were if we were to to

64  
00:02:26,229 --> 00:02:23,599  
have a communication going along with um

65  
00:02:27,750 --> 00:02:26,239  
the crew that was that was in deep space

66  
00:02:29,190 --> 00:02:27,760  
and there was a long period of time like

67  
00:02:30,710 --> 00:02:29,200  
24 minutes

68  
00:02:32,710 --> 00:02:30,720  
then by the time that we got the

69  
00:02:34,470 --> 00:02:32,720  
information and be able to turn around

70  
00:02:36,790 --> 00:02:34,480  
to do like a ground commanding it would

71  
00:02:38,070 --> 00:02:36,800  
be another 24 minutes so there's a lot

72  
00:02:39,270 --> 00:02:38,080  
of things that could happen within a

73  
00:02:40,630 --> 00:02:39,280  
half hour

74  
00:02:41,750 --> 00:02:40,640  
you guys are looking to fix that tell me

75  
00:02:43,670 --> 00:02:41,760  
about some of the previous work we've

76

00:02:45,350 --> 00:02:43,680

done to look at these communications

77

00:02:47,350 --> 00:02:45,360

issues yes some of the things that we've

78

00:02:48,309 --> 00:02:47,360

done here on the ground is is that we've

79

00:02:50,949 --> 00:02:48,319

had

80

00:02:53,030 --> 00:02:50,959

like doing robotic

81

00:02:54,869 --> 00:02:53,040

things out in the arizona desert as well

82

00:02:57,830 --> 00:02:54,879

as like you know having the

83

00:02:59,509 --> 00:02:57,840

aquanauts live in underwater habitats

84

00:03:01,910 --> 00:02:59,519

but those things are not they're not

85

00:03:03,509 --> 00:03:01,920

high fidelity they they don't have like

86

00:03:05,750 --> 00:03:03,519

the space hardware so we're trying to

87

00:03:08,790 --> 00:03:05,760

use the international space station to

88

00:03:10,869 --> 00:03:08,800

get better fidelity so what types of

89

00:03:12,229 --> 00:03:10,879

things are the are the crew commanding i

90

00:03:15,509 --> 00:03:12,239

mean what do they command it's just a

91

00:03:16,790 --> 00:03:15,519

single single button right yes that we

92

00:03:18,470 --> 00:03:16,800

have

93

00:03:20,790 --> 00:03:18,480

tried to automate where it's just like

94

00:03:22,710 --> 00:03:20,800

everything is automated for the crew

95

00:03:23,750 --> 00:03:22,720

for them to be able to use in deep space

96

00:03:26,309 --> 00:03:23,760

missions

97

00:03:28,789 --> 00:03:26,319

so they can do their own activities they

98

00:03:31,110 --> 00:03:28,799

could plan their own activities um they

99

00:03:33,430 --> 00:03:31,120

could operate you know like say payload

100

00:03:35,030 --> 00:03:33,440

racks they could operate medical devices

101  
00:03:36,789 --> 00:03:35,040  
things that now we are

102  
00:03:40,309 --> 00:03:36,799  
they rely upon the ground controllers to

103  
00:03:41,589 --> 00:03:40,319  
do so amo express 2.0 i love that name

104  
00:03:43,670 --> 00:03:41,599  
is the next step

105  
00:03:45,830 --> 00:03:43,680  
what is the plan for this experiment

106  
00:03:47,910 --> 00:03:45,840  
well um within the past two weeks we had

107  
00:03:50,710 --> 00:03:47,920  
the iss crew to

108  
00:03:53,030 --> 00:03:50,720  
execute amo express two and they've been

109  
00:03:56,789 --> 00:03:53,040  
able to activate and deactivate express

110  
00:03:58,550 --> 00:03:56,799  
rock seven on orbit and it's is

111  
00:04:00,949 --> 00:03:58,560  
they've done it via the timeline or

112  
00:04:02,869 --> 00:04:00,959  
automated procedures and those will

113  
00:04:05,110 --> 00:04:02,879

resided

114

00:04:07,670 --> 00:04:05,120

via an application that was on one of

115

00:04:09,110 --> 00:04:07,680

the laptops that was on orbit so they

116

00:04:10,470 --> 00:04:09,120

were able just to do just a single

117

00:04:12,390 --> 00:04:10,480

button function

118

00:04:15,110 --> 00:04:12,400

and it executed like the

119

00:04:17,430 --> 00:04:15,120

all of the commanding for deactivation

120

00:04:18,629 --> 00:04:17,440

and activation of express rack and then

121

00:04:21,349 --> 00:04:18,639

today

122

00:04:23,270 --> 00:04:21,359

normally the the pro here at marshall

123

00:04:25,430 --> 00:04:23,280

they're the ones who do the activation

124

00:04:28,310 --> 00:04:25,440

deactivation of the rack but there's

125

00:04:29,909 --> 00:04:28,320

also a lot of synchronization between

126

00:04:31,990 --> 00:04:29,919

marshall and houston

127

00:04:33,909 --> 00:04:32,000

so that they can because

128

00:04:35,830 --> 00:04:33,919

some of the things that houston are like

129

00:04:38,310 --> 00:04:35,840

the the power and the thermal that

130

00:04:40,310 --> 00:04:38,320

they're controlled over but we were able

131

00:04:41,510 --> 00:04:40,320

to put all of those the core and the

132

00:04:44,469 --> 00:04:41,520

commanding

133

00:04:46,230 --> 00:04:44,479

all together into a automated procedure

134

00:04:47,990 --> 00:04:46,240

and so the crew was able just to use one

135

00:04:49,909 --> 00:04:48,000

button function i'm sure they like

136

00:04:51,590 --> 00:04:49,919

having that control yes

137

00:04:52,629 --> 00:04:51,600

they like it a whole lot because in case

138

00:04:54,870 --> 00:04:52,639

that um

139

00:04:57,510 --> 00:04:54,880

like right now the the ground is the one

140

00:04:59,749 --> 00:04:57,520

who who's in control of it but if they

141

00:05:02,070 --> 00:04:59,759

needed it then they're able to know that

142

00:05:03,350 --> 00:05:02,080

they could you know control the rack

143

00:05:05,909 --> 00:05:03,360

and so where do you see this going

144

00:05:08,150 --> 00:05:05,919

what's the next step and areas we need

145

00:05:09,830 --> 00:05:08,160

to look at for for future communication

146

00:05:11,830 --> 00:05:09,840

delays

147

00:05:14,870 --> 00:05:11,840

well we're looking at doing a we're

148

00:05:16,390 --> 00:05:14,880

collaborating between marshall jsc and

149

00:05:18,469 --> 00:05:16,400

ames

150

00:05:20,310 --> 00:05:18,479

academia and like other commercial

151

00:05:23,029 --> 00:05:20,320

businesses we're looking at trying to

152

00:05:24,950 --> 00:05:23,039

develop different operations concepts of

153

00:05:27,990 --> 00:05:24,960

trying to do demonstrations on board the

154

00:05:30,469 --> 00:05:28,000

iss things that will help the crew for

155

00:05:31,990 --> 00:05:30,479

deep space missions not to have to rely

156

00:05:33,110 --> 00:05:32,000

on the ground controllers as they do

157

00:05:35,270 --> 00:05:33,120

today

158

00:05:37,029 --> 00:05:35,280

so we've already had a few runs so far

159

00:05:39,029 --> 00:05:37,039

so good right yes they've all been

160

00:05:40,950 --> 00:05:39,039

successful and we've been very pleased

161

00:05:42,950 --> 00:05:40,960

with the success that we've had and

162

00:05:44,790 --> 00:05:42,960

we've got another run that that will

163

00:05:46,710 --> 00:05:44,800

occur next week all right good luck with

164

00:05:48,710 --> 00:05:46,720

that a lot of work ahead angie thank you

165

00:05:50,150 --> 00:05:48,720

thank you for joining us that will do it

166

00:05:52,070 --> 00:05:50,160

for us from the payload operations