
Expedition 65 Flight Engineer Shane Kimbrough
Discusses IROSAs Spacewalk

1
00:00:05,190 --> 00:00:02,950
we're with uh expedition 65 flight

2
00:00:07,590 --> 00:00:05,200
engineer shane kimbrough of nasa aboard

3
00:00:10,310 --> 00:00:07,600
the international space station shane

4
00:00:12,470 --> 00:00:10,320
good day to you a big

5
00:00:15,350 --> 00:00:12,480
amount of work on the docket uh for you

6
00:00:18,070 --> 00:00:15,360
and tomah pesquet in the days ahead

7
00:00:21,189 --> 00:00:18,080
as you head out the quest airlock for a

8
00:00:23,109 --> 00:00:21,199
pair of spacewalks to begin upgrading

9
00:00:25,109 --> 00:00:23,119
and augmenting the station's power

10
00:00:27,670 --> 00:00:25,119
supply

11
00:00:30,470 --> 00:00:27,680
it they're called irosas iss roll up

12
00:00:33,030 --> 00:00:30,480
solar arrays give us a little preview of

13
00:00:34,790 --> 00:00:33,040

what these arrays are all about and what

14
00:00:38,310 --> 00:00:34,800
these space walks coming up are all

15
00:00:41,350 --> 00:00:39,990
yeah thanks rob taman and i are really

16
00:00:42,790 --> 00:00:41,360
looking forward to going outside of

17
00:00:44,549 --> 00:00:42,800
course there's a whole team of people

18
00:00:46,150 --> 00:00:44,559
here on board as well as on the ground

19
00:00:48,229 --> 00:00:46,160
that are going to take care of us and

20
00:00:50,310 --> 00:00:48,239
make sure we're doing the right thing

21
00:00:53,830 --> 00:00:50,320
these iroses as you mentioned the the

22
00:00:55,910 --> 00:00:53,840
new iss rollout solar arrays are pretty

23
00:00:57,430 --> 00:00:55,920
fantastic we got a chance to see them

24
00:01:00,389 --> 00:00:57,440
when we were at kennedy just before we

25
00:01:01,270 --> 00:01:00,399
launched a little over uh six weeks ago

26
00:01:03,430 --> 00:01:01,280
or so

27
00:01:05,509 --> 00:01:03,440
and it's pretty incredible to see the

28
00:01:07,350 --> 00:01:05,519
material they're made out of for one so

29
00:01:09,750 --> 00:01:07,360
they're this lightweight flexible

30
00:01:11,910 --> 00:01:09,760
composite blanket material

31
00:01:15,830 --> 00:01:11,920
that can get stowed very compactly but

32
00:01:17,749 --> 00:01:15,840
when it's rolled out and deployed it can

33
00:01:19,429 --> 00:01:17,759
bring in a lot of sunlight which in in

34
00:01:21,030 --> 00:01:19,439
our case will give us a lot of power on

35
00:01:22,550 --> 00:01:21,040
the space station

36
00:01:24,149 --> 00:01:22,560
we'll talk a little bit more about the

37
00:01:27,030 --> 00:01:24,159
arrays here in just a second you and

38
00:01:28,870 --> 00:01:27,040

tomah are in a very unique position

39
00:01:32,550 --> 00:01:28,880
you conducted a pair of spacewalks

40
00:01:34,950 --> 00:01:32,560
together back in 2017 to upgrade station

41
00:01:36,710 --> 00:01:34,960
batteries the power supply at that time

42
00:01:38,469 --> 00:01:36,720
and the replacement of batteries and

43
00:01:40,390 --> 00:01:38,479
also to

44
00:01:43,270 --> 00:01:40,400
set the stage for the installation

45
00:01:45,830 --> 00:01:43,280
of the docking port on the zenith or

46
00:01:47,910 --> 00:01:45,840
space-facing side of the harmony module

47
00:01:49,749 --> 00:01:47,920
so you and tomah really know each

48
00:01:50,630 --> 00:01:49,759
other's moves pretty well

49
00:01:51,510 --> 00:01:50,640
how

50
00:01:53,830 --> 00:01:51,520
uh

51
00:01:55,990 --> 00:01:53,840
important is all of that in creating the

52
00:02:01,190 --> 00:01:56,000
efficiencies you will need for these

53
00:02:04,709 --> 00:02:02,870
yeah that's a great point i was very

54
00:02:06,389 --> 00:02:04,719
fortunate to go out with tomah two other

55
00:02:08,229 --> 00:02:06,399
times like you mentioned and the

56
00:02:09,910 --> 00:02:08,239
choreography that you're that you're

57
00:02:13,110 --> 00:02:09,920
alluding to there is very important

58
00:02:15,750 --> 00:02:13,120
outside of course um this this one this

59
00:02:17,830 --> 00:02:15,760
these arose um evas are going to be very

60
00:02:18,790 --> 00:02:17,840
challenging very complex so we've got to

61
00:02:20,550 --> 00:02:18,800
make sure

62
00:02:22,390 --> 00:02:20,560
that we're both on the same page for

63
00:02:24,309 --> 00:02:22,400

every movement that we do

64
00:02:26,070 --> 00:02:24,319
whether that's to protect the solar

65
00:02:28,790 --> 00:02:26,080
arrays or to just protect the pallet

66
00:02:30,470 --> 00:02:28,800
that we're on or to connect you know one

67
00:02:32,309 --> 00:02:30,480
of the electrical connectors

68
00:02:33,750 --> 00:02:32,319
we've got to make sure we're step in

69
00:02:34,790 --> 00:02:33,760
step and make sure we know what we're

70
00:02:36,470 --> 00:02:34,800
doing

71
00:02:37,910 --> 00:02:36,480
and also make sure that we're tied into

72
00:02:39,110 --> 00:02:37,920
the ground so they know what we're doing

73
00:02:41,589 --> 00:02:39,120
so it's going to be

74
00:02:43,750 --> 00:02:41,599
a huge effort um jenny said he's going

75
00:02:46,309 --> 00:02:43,760
to be our capcom and our i mean our

76
00:02:47,750 --> 00:02:46,319
ground iv and she'll be you know leading

77
00:02:49,430 --> 00:02:47,760
us through the spacewalk so we're going

78
00:02:51,589 --> 00:02:49,440
to make sure we're in step with her as

79
00:02:53,350 --> 00:02:51,599
well so that we get these things

80
00:02:55,270 --> 00:02:53,360
installed and as long as the hardware

81
00:02:56,869 --> 00:02:55,280
behaves and get all the connections made

82
00:02:59,430 --> 00:02:56,879
we're going to have a lot a bigger new

83
00:03:01,509 --> 00:02:59,440
power source once we get done

84
00:03:04,229 --> 00:03:01,519
in all when it's all said and done there

85
00:03:07,270 --> 00:03:04,239
will be three pairs of these arrays six

86
00:03:08,790 --> 00:03:07,280
in all that will upgrade and augment six

87
00:03:09,750 --> 00:03:08,800
of the eight power channels on the

88
00:03:10,790 --> 00:03:09,760

station

89
00:03:15,509 --> 00:03:10,800
what

90
00:03:17,750 --> 00:03:15,519
arrays that are important to bringing

91
00:03:20,070 --> 00:03:17,760
the station back to its original power

92
00:03:24,869 --> 00:03:20,080
output capability for the rest of the

93
00:03:28,869 --> 00:03:27,110
well these solar rays are

94
00:03:31,350 --> 00:03:28,879
the density on them is very high which

95
00:03:33,910 --> 00:03:31,360
is you know just an upgrade so to speak

96
00:03:36,309 --> 00:03:33,920
just like all things even on earth as

97
00:03:39,190 --> 00:03:36,319
the years go by things get uh more

98
00:03:41,030 --> 00:03:39,200
efficient and smaller and and this is no

99
00:03:42,710 --> 00:03:41,040
exception to that because these arrays

100
00:03:44,949 --> 00:03:42,720
are much smaller than the original rays

101
00:03:46,390 --> 00:03:44,959
that we're going to go put these next to

102
00:03:49,670 --> 00:03:46,400
these arrays that we're going to put out

103
00:03:51,270 --> 00:03:49,680
there about 60 feet by 15 feet

104
00:03:53,670 --> 00:03:51,280
we're going to place them on the inboard

105
00:03:54,789 --> 00:03:53,680
side of an existing solar ray and of

106
00:03:56,070 --> 00:03:54,799
course they're not going to hit each

107
00:03:57,830 --> 00:03:56,080
other when they're going around so all

108
00:03:59,110 --> 00:03:57,840
that geometry has been worked out by the

109
00:04:00,869 --> 00:03:59,120
engineers

110
00:04:02,070 --> 00:04:00,879
but we're looking forward again to

111
00:04:04,949 --> 00:04:02,080
installing you know we're going to get a

112
00:04:06,949 --> 00:04:04,959
chance to do two of these arrays here

113
00:04:08,229 --> 00:04:06,959

in about a week and a half or so and

114
00:04:11,270 --> 00:04:08,239
looking forward to doing that to help

115
00:04:13,110 --> 00:04:11,280
the space station's power supply

116
00:04:16,550 --> 00:04:13,120
one social media question that we

117
00:04:18,949 --> 00:04:16,560
received asks how efficient are these

118
00:04:20,789 --> 00:04:18,959
new solar arrays and

119
00:04:22,550 --> 00:04:20,799
the temperature what temperature do they

120
00:04:27,350 --> 00:04:22,560
reach when they're exposed to direct

121
00:04:31,110 --> 00:04:29,909
yeah they're around 20 to 30 percent uh

122
00:04:32,390 --> 00:04:31,120
at least that's the boost we're gonna

123
00:04:34,310 --> 00:04:32,400
get on the space station when we get

124
00:04:37,189 --> 00:04:34,320
these installed and each one produces

125
00:04:38,710 --> 00:04:37,199
about 20 kilowatts of power and so once

126
00:04:41,270 --> 00:04:38,720
all six are installed we're gonna have

127
00:04:42,550 --> 00:04:41,280
about 120 kilowatts more of power for

128
00:04:43,909 --> 00:04:42,560
the space station so that's pretty

129
00:04:45,030 --> 00:04:43,919
amazing

130
00:04:46,469 --> 00:04:45,040
in itself

131
00:04:48,150 --> 00:04:46,479
and i forgot the last part of that

132
00:04:50,710 --> 00:04:48,160
question rob what was it

133
00:04:52,550 --> 00:04:50,720
uh it asks what temperature do they

134
00:04:56,310 --> 00:04:52,560
reach when they're exposed to direct

135
00:04:59,110 --> 00:04:57,510
yeah i assume they're going to reach the

136
00:05:01,749 --> 00:04:59,120
same temperature that everything outside

137
00:05:03,110 --> 00:05:01,759
does that's around 200 degrees c uh

138
00:05:04,870 --> 00:05:03,120

we're going to experience that same

139
00:05:06,790 --> 00:05:04,880
temperature in the spacesuits of course

140
00:05:08,469 --> 00:05:06,800
the spacesuits protect us

141
00:05:11,110 --> 00:05:08,479
but everything outside when the sun's

142
00:05:13,350 --> 00:05:11,120
out it's around 200 c

143
00:05:16,230 --> 00:05:13,360
now a larger version of these arrays are

144
00:05:19,270 --> 00:05:16,240
contemplated for the gateway program

145
00:05:21,749 --> 00:05:19,280
for deep space exploration application

146
00:05:22,629 --> 00:05:21,759
so how important not only for the

147
00:05:24,950 --> 00:05:22,639
current

148
00:05:27,909 --> 00:05:24,960
augmentation of power on the station but

149
00:05:30,310 --> 00:05:27,919
the future application to nasa's future

150
00:05:32,150 --> 00:05:30,320
space exploration efforts are these

151
00:05:36,310 --> 00:05:32,160
spacewalks that you and tomah will be

152
00:05:39,029 --> 00:05:37,830
well like i said we're the first two and

153
00:05:40,710 --> 00:05:39,039
there's gonna be several more of the

154
00:05:43,110 --> 00:05:40,720
next couple years to get all six

155
00:05:45,430 --> 00:05:43,120
installed and then that system you know

156
00:05:48,710 --> 00:05:45,440
hopefully it'll get proven uh before we

157
00:05:50,870 --> 00:05:48,720
take it to the lunar uh gateway uh which

158
00:05:53,189 --> 00:05:50,880
is where this you know similar design

159
00:05:55,990 --> 00:05:53,199
only bigger on the gateway but a similar

160
00:05:58,150 --> 00:05:56,000
irosa or excuse me a rosa

161
00:05:59,749 --> 00:05:58,160
will get installed on the gateway

162
00:06:01,029 --> 00:05:59,759
we're going to install them manually as

163
00:06:01,909 --> 00:06:01,039

you know and we're going to roll them

164
00:06:04,150 --> 00:06:01,919
out

165
00:06:05,990 --> 00:06:04,160
manually but the ones on the gateway

166
00:06:08,870 --> 00:06:06,000
will actually be automatic once they get

167
00:06:10,710 --> 00:06:08,880
onto orbit so a few differences there

168
00:06:14,309 --> 00:06:10,720
the the size for one and the way they're

169
00:06:16,469 --> 00:06:14,319
getting deployed but the same technology

170
00:06:19,830 --> 00:06:16,479
shane uh looking at the procedures

171
00:06:21,749 --> 00:06:19,840
timeline this is a tricky eva from a

172
00:06:23,830 --> 00:06:21,759
timing standpoint

173
00:06:26,070 --> 00:06:23,840
there's an eclipse issue that you have

174
00:06:27,749 --> 00:06:26,080
to be conscious of there's a certain

175
00:06:29,029 --> 00:06:27,759
inhibits that the ground controllers

176
00:06:32,309 --> 00:06:29,039
will be

177
00:06:34,790 --> 00:06:32,319
watching the clock very carefully as you

178
00:06:37,189 --> 00:06:34,800
and tomorrow go through your procedures

179
00:06:39,510 --> 00:06:37,199
if there's a pinch point something that

180
00:06:41,270 --> 00:06:39,520
concerns you the most about being able

181
00:06:46,070 --> 00:06:41,280
to execute the spacewalk what do you

182
00:06:49,990 --> 00:06:47,909
well there are a lot of complexities to

183
00:06:51,749 --> 00:06:50,000
this one like you mentioned um to me

184
00:06:53,990 --> 00:06:51,759
it's it's the hardware it's just if it

185
00:06:55,990 --> 00:06:54,000
behaves and this is on any spacewalk

186
00:06:57,670 --> 00:06:56,000
this is no different but this has got a

187
00:06:59,350 --> 00:06:57,680
few more complexities just due to the

188
00:07:01,110 --> 00:06:59,360

nature of what's going on

189
00:07:03,670 --> 00:07:01,120
um so as long as the hardware behaves

190
00:07:05,830 --> 00:07:03,680
you know it could be any bolt as we're

191
00:07:07,909 --> 00:07:05,840
taking the roses off the pallet if those

192
00:07:09,350 --> 00:07:07,919
don't work that's a problem right if

193
00:07:12,230 --> 00:07:09,360
we're installing it on the mounting

194
00:07:13,670 --> 00:07:12,240
brackets out on p6 if those don't go in

195
00:07:15,749 --> 00:07:13,680
then we have a problem so there's a

196
00:07:17,749 --> 00:07:15,759
bunch of little pinch points and i can't

197
00:07:20,309 --> 00:07:17,759
really nail down one that we're

198
00:07:22,469 --> 00:07:20,319
specifically concerned about uh maybe

199
00:07:24,870 --> 00:07:22,479
the ones during the eclipse i think

200
00:07:26,230 --> 00:07:24,880
definitely are on our radar so like you

201
00:07:28,309 --> 00:07:26,240
mentioned we have some actions during

202
00:07:31,189 --> 00:07:28,319
the eclipse where we hook up uh the

203
00:07:33,430 --> 00:07:31,199
power from these new solar arrays to the

204
00:07:35,990 --> 00:07:33,440
panels of the old solar rays and those

205
00:07:38,150 --> 00:07:36,000
it's not tricky we hope but again if we

206
00:07:39,670 --> 00:07:38,160
have some complications there due to the

207
00:07:41,830 --> 00:07:39,680
connectors or whatever then that's going

208
00:07:43,830 --> 00:07:41,840
to be a big deal and then if we can't

209
00:07:45,350 --> 00:07:43,840
get it done during the eclipse we'll

210
00:07:47,510 --> 00:07:45,360
have to wait till the next eclipse so

211
00:07:48,869 --> 00:07:47,520
another 45 or 15 minutes later so the

212
00:07:50,869 --> 00:07:48,879
timing like you mentioned is going to be

213
00:07:53,029 --> 00:07:50,879

very tricky

214
00:07:56,230 --> 00:07:53,039
and a final question shane uh these will

215
00:07:58,150 --> 00:07:56,240
be the seventh and eighth spacewalks of

216
00:08:00,230 --> 00:07:58,160
your career

217
00:08:02,790 --> 00:08:00,240
did you ever envision that you would

218
00:08:05,350 --> 00:08:02,800
have the opportunity to go outside

219
00:08:07,350 --> 00:08:05,360
that many times and do the variety of

220
00:08:11,670 --> 00:08:07,360
important work that you and tomorrow are

221
00:08:15,110 --> 00:08:13,350
yeah thanks for that question rob i

222
00:08:17,110 --> 00:08:15,120
never of course never envisioned that i

223
00:08:18,869 --> 00:08:17,120
was you know when i flew on shuttle many

224
00:08:21,110 --> 00:08:18,879
years ago and and got a chance to do a

225
00:08:22,390 --> 00:08:21,120
couple spacewalks i really thought that

226
00:08:23,749 --> 00:08:22,400
was probably going to be the only times

227
00:08:25,909 --> 00:08:23,759
i got outside

228
00:08:27,189 --> 00:08:25,919
and uh you know things have played out

229
00:08:28,710 --> 00:08:27,199
differently so that i've gotten the

230
00:08:31,110 --> 00:08:28,720
chance to do many more and i'm very

231
00:08:32,310 --> 00:08:31,120
blessed i feel very lucky and fortunate

232
00:08:33,750 --> 00:08:32,320
to do that

233
00:08:34,870 --> 00:08:33,760
and uh this time tamar is going to be

234
00:08:36,230 --> 00:08:34,880
leading the way on both of these

235
00:08:38,469 --> 00:08:36,240
spacewalks and i look forward to him

236
00:08:40,070 --> 00:08:38,479
being in that role and meet us being a

237
00:08:41,589 --> 00:08:40,080
good support person out there with them

238
00:08:43,110 --> 00:08:41,599

and we're just going to work together

239
00:08:46,150 --> 00:08:43,120
closely with the ground teams to make

240
00:08:48,230 --> 00:08:46,160
sure we get this job done

241
00:08:49,990 --> 00:08:48,240
well shane uh all the best of luck to

242
00:08:51,350 --> 00:08:50,000
you and tomah during these spacewalks

243
00:08:53,350 --> 00:08:51,360
and the rest of your mission aboard the