
PAO

1
00:00:02,990 --> 00:00:06,020
>> Hi welcome inside the
International Space Station

2
00:00:06,020 --> 00:00:06,970
Flight Control Room.

3
00:00:06,970 --> 00:00:08,930
We're doing this
digital learning network

4
00:00:08,930 --> 00:00:10,450
and we're talking
to, I understand,

5
00:00:10,450 --> 00:00:14,430
second to ninth grade
students out at Space Camp

6
00:00:14,430 --> 00:00:16,300
at Kennedy Space Center.

7
00:00:16,300 --> 00:00:17,220
Space Camp is cool.

8
00:00:17,220 --> 00:00:18,290
This guy knows because he's been

9
00:00:18,290 --> 00:00:20,550
to Space Camp [laughter]
a few times.

10
00:00:20,550 --> 00:00:23,300
Our guest today is NASA
Astronaut Mike Fossum.

11
00:00:23,300 --> 00:00:25,010
He's been to space three times,

12
00:00:25,010 --> 00:00:27,710
twice aboard the
space shuttle 121,

13
00:00:27,710 --> 00:00:31,690
124 and then once aboard the
International Space Station most

14
00:00:31,690 --> 00:00:36,770
recently where he spent 167 days
in space aboard Expedition 28

15
00:00:36,770 --> 00:00:39,380
and he was the commander
of Expedition 29.

16
00:00:39,380 --> 00:00:42,710
And he has conducted
seven spacewalks.

17
00:00:42,710 --> 00:00:43,190
>> Mike Fossum: Right.

18
00:00:43,190 --> 00:00:45,830
>> And so he knows it all
so you guys, we're ready.

19
00:00:45,830 --> 00:00:47,250
Welcome, Mike, and
thanks for coming.

20
00:00:47,250 --> 00:00:48,850
>> Mike Fossum: Thanks
so it's great to be here.

21
00:00:48,850 --> 00:00:49,920
It's hard for me to believe

22
00:00:49,920 --> 00:00:53,060

that one year ago right now I
was living on the space station

23
00:00:53,060 --> 00:00:56,740
for almost half a year so a
great experience doing that

24
00:00:56,740 --> 00:00:59,140
and it's great to
be home now too.

25
00:00:59,140 --> 00:01:01,510
>> Okay so we're ready
for your questions.

26
00:01:01,510 --> 00:01:07,040
[Noise]

27
00:01:07,040 --> 00:01:10,670
>> My name is Ally
and I'm from Korea.

28
00:01:10,670 --> 00:01:14,590
My most memorable moment
was riding the multiple

29
00:01:14,590 --> 00:01:17,390
access trainer.

30
00:01:17,390 --> 00:01:19,380
>> What's your question?

31
00:01:19,380 --> 00:01:28,390
>> And my question was that
what was my memorable moment?

32
00:01:28,390 --> 00:01:30,860
>> Mike Fossum: Okay so
your most memorable moment

33
00:01:30,860 --> 00:01:34,360
at space camp was riding
the multiple access trainer.

34
00:01:34,360 --> 00:01:36,540
That thing is kind of crazy.

35
00:01:36,540 --> 00:01:39,890
I've ridden that
multiple access trainer

36
00:01:39,890 --> 00:01:42,020
down there at space camp.

37
00:01:42,020 --> 00:01:45,850
For me my most memorable moment
probably, there's a lot of them,

38
00:01:45,850 --> 00:01:49,050
but probably it was kind
of similar to what you had

39
00:01:49,050 --> 00:01:50,290
and it was coming home

40
00:01:50,290 --> 00:01:52,660
in the Soyuz spacecraft,
very different.

41
00:01:52,660 --> 00:01:54,770
The Space Shuttle
came in and landed

42
00:01:54,770 --> 00:01:57,310
like a great big
airliner, very smooth.

43
00:01:57,310 --> 00:02:00,010
Coming home in the Soyuz

was a lot more exciting.

44
00:02:00,010 --> 00:02:02,890
It got you kind of twisted and
tumbled around like you did

45
00:02:02,890 --> 00:02:06,350
on the trainer there, as
the parachutes are opening

46
00:02:06,350 --> 00:02:08,550
and it's kind of like
whipping it around like a ball

47
00:02:08,550 --> 00:02:11,160
on the end of a string.

48
00:02:11,160 --> 00:02:13,250
And so the multiple
access trainer

49
00:02:13,250 --> 00:02:17,900
that you used actually was
very realistic kind of training

50
00:02:17,900 --> 00:02:20,020
for the dynamics that we felt

51
00:02:20,020 --> 00:02:23,060
when I came home just
before Thanksgiving.

52
00:02:24,460 --> 00:02:26,470
>> Great question, next?

53
00:02:27,950 --> 00:02:28,570
>> You're up.

54
00:02:28,570 --> 00:02:33,200

>> Hi, my name is Caleb and
my question is how do you feel

55
00:02:33,200 --> 00:02:39,500
about your job and how long
did it take to be an astronaut?

56
00:02:39,500 --> 00:02:40,810
>> Mike Fossum: Oh that's great.

57
00:02:40,810 --> 00:02:44,290
I love my job and it
has been a dream of mine

58
00:02:44,290 --> 00:02:46,290
since I was probably
about your age.

59
00:02:46,290 --> 00:02:49,660
I was 12 years old when I
really was laying on a hillside

60
00:02:49,660 --> 00:02:51,530
at night looking up at
the stars and I felt

61
00:02:51,530 --> 00:02:53,220
like we're not just
looking at the stars

62
00:02:53,220 --> 00:02:54,920
but we're in the stars.

63
00:02:54,920 --> 00:02:58,610
And that's when we were landing
on the moon right at that time

64
00:02:58,610 --> 00:02:59,920
and I said you know what?

65
00:02:59,920 --> 00:03:01,220
I want to do that.

66
00:03:01,220 --> 00:03:02,810
And I would dream
about doing that.

67
00:03:02,810 --> 00:03:06,210
And I never completely gave up
on that dream as I continued

68
00:03:06,210 --> 00:03:11,070
through my high school
and college education

69
00:03:11,070 --> 00:03:12,660
and then different
jobs along the way.

70
00:03:12,660 --> 00:03:14,560
So it did take me
a lot of years.

71
00:03:14,560 --> 00:03:18,050
I applied multiple
times, more than once,

72
00:03:18,050 --> 00:03:20,500
to be an astronaut
before I was selected

73
00:03:20,500 --> 00:03:23,330
but it was absolutely worth
the hard work along the way

74
00:03:23,330 --> 00:03:24,600
and I wasn't waiting.

75
00:03:24,600 --> 00:03:25,900

I didn't get selected the first,

76
00:03:25,900 --> 00:03:29,810
second or even third time
but I wasn't waiting.

77
00:03:29,810 --> 00:03:32,660
I was working hard at the
different jobs that I had

78
00:03:32,660 --> 00:03:37,550
and trying to contribute to the
space program in different ways

79
00:03:37,550 --> 00:03:39,360
until I was finally selected.

80
00:03:39,360 --> 00:03:41,410
And now I've really
enjoyed it a lot.

81
00:03:41,410 --> 00:03:44,660
I'm very fortunate to have
gone into space three times

82
00:03:44,660 --> 00:03:48,760
and now I'm helping the people
that are going into space,

83
00:03:48,760 --> 00:03:50,530
that are flying on
the space station.

84
00:03:50,530 --> 00:03:54,050
Right now we have two
Americans, one Japanese

85
00:03:54,050 --> 00:03:57,700
and three Russian living on
the space station right now

86
00:03:57,700 --> 00:03:59,490
so I'm helping them
out with their mission

87
00:03:59,490 --> 00:04:01,090
and getting the next
crews ready to go

88
00:04:01,090 --> 00:04:03,470
so I'm still enjoying
my job a lot.

89
00:04:03,470 --> 00:04:04,190
>> Great question.

90
00:04:04,190 --> 00:04:07,060
And so hard work
and a little bit

91
00:04:07,060 --> 00:04:09,790
of patience pays
off, next question.

92
00:04:12,290 --> 00:04:13,750
>> I'm Caleb.

93
00:04:13,750 --> 00:04:21,150
I'm from Roseburg, Oregon and
my question is, are you glad

94
00:04:21,150 --> 00:04:25,230
that you did all the training
so you could be an astronaut?

95
00:04:25,230 --> 00:04:26,290
>> Mike Fossum: Oh sure, Caleb.

96
00:04:26,290 --> 00:04:29,440

Training is a lot of work
and we call it a lot of work

97
00:04:29,440 --> 00:04:31,360
but there's parts of it
that are a lot of fun too.

98
00:04:31,360 --> 00:04:33,240
Now part of it is
sitting in school,

99
00:04:33,240 --> 00:04:35,450
sitting in astronaut
school, literally,

100
00:04:35,450 --> 00:04:37,420
where we have teachers
that come in and teach us

101
00:04:37,420 --> 00:04:40,320
about the detailed,
technical details

102
00:04:40,320 --> 00:04:43,200
in different systems,
spacecraft systems.

103
00:04:43,200 --> 00:04:47,000
But then you get to not just
learn about it, book learning,

104
00:04:47,000 --> 00:04:51,600
but you get to go and actually
operate it and trainers

105
00:04:51,600 --> 00:04:55,820
and maybe you study
in the classroom

106
00:04:55,820 --> 00:04:59,700

about how the robotics system
works and then you go work

107
00:04:59,700 --> 00:05:03,470
on trainers where you're moving
you know simulated robotic arms.

108
00:05:03,470 --> 00:05:05,120
And then you go out into space

109
00:05:05,120 --> 00:05:08,420
where you're actually moving the
robot arm to do different tasks

110
00:05:08,420 --> 00:05:12,550
so it's great experience and
it definitely is worthwhile.

111
00:05:12,550 --> 00:05:15,770
And the training itself is a lot
of fun too because there's a lot

112
00:05:15,770 --> 00:05:17,530
of different things
associated with it.

113
00:05:17,530 --> 00:05:18,810
I like to learn new things.

114
00:05:18,810 --> 00:05:20,600
I like to do new things.

115
00:05:20,600 --> 00:05:25,930
And so there's a lot of
new things to learn and do.

116
00:05:25,930 --> 00:05:27,550
>> Another good question.

117

00:05:27,550 --> 00:05:28,630
We're ready for the next one.

118
00:05:28,630 --> 00:05:33,200
>> My name is Andy and I'm
from Pond Ridge, New York.

119
00:05:33,200 --> 00:05:35,270
And my question is
what parts make

120
00:05:35,270 --> 00:05:37,670
up the International
Space Station?

121
00:05:37,670 --> 00:05:39,790
>> Mike Fossum: Oh wow, Andy,
that's a great question.

122
00:05:39,790 --> 00:05:43,360
The International
Space Station is huge.

123
00:05:43,360 --> 00:05:45,900
It's longer and wider
than a football field

124
00:05:45,900 --> 00:05:47,830
when you include
the whole thing.

125
00:05:47,830 --> 00:05:50,330
And when you first look
at it, I mean probably one

126
00:05:50,330 --> 00:05:52,820
of the first things you see
are these great big arrays,

127
00:05:52,820 --> 00:05:56,370

these panels that are out on the
ends and they look gold colored.

128
00:05:56,370 --> 00:05:58,880
And those are the part
that grab sunlight

129
00:05:58,880 --> 00:06:01,080
and turn it into electricity.

130
00:06:01,080 --> 00:06:02,970
And those generate
all the electricity

131
00:06:02,970 --> 00:06:04,910
that we need on the
space station.

132
00:06:04,910 --> 00:06:07,450
And while the sun's shining on
them they make the electricity

133
00:06:07,450 --> 00:06:09,630
and they charge up some
batteries so when we're

134
00:06:09,630 --> 00:06:12,700
in the earth's shadow we're
using that electricity

135
00:06:12,700 --> 00:06:14,820
from the batteries
to keep things going.

136
00:06:14,820 --> 00:06:17,380
And then you see
the canned parts,

137
00:06:17,380 --> 00:06:20,970
they look like individual

pieces of like silver cans

138
00:06:20,970 --> 00:06:23,610
that go together to make
the pressurized parts

139
00:06:23,610 --> 00:06:26,790
of the space station and
that's where we live and work.

140
00:06:26,790 --> 00:06:29,660
And those individual
cans, and they were sized,

141
00:06:29,660 --> 00:06:32,120
most of them were sized to fit

142
00:06:32,120 --> 00:06:34,340
in the cargo bay of
the space shuttle.

143
00:06:34,340 --> 00:06:36,880
And so they filled up that
cargo bay of the space shuttle

144
00:06:36,880 --> 00:06:38,440
and the shuttles would
go up to the station

145
00:06:38,440 --> 00:06:40,030
and we'd add a new piece.

146
00:06:40,030 --> 00:06:42,600
And those pieces
are laboratories.

147
00:06:42,600 --> 00:06:44,390
They're living modules.

148

00:06:44,390 --> 00:06:47,250
One of them we kind of call
it our gymnasium module

149
00:06:47,250 --> 00:06:49,370
because it has a lot of
our exercise equipment

150
00:06:49,370 --> 00:06:51,450
and some storage
and stuff in there.

151
00:06:51,450 --> 00:06:53,620
So that's probably the
biggest stuff that makes it up.

152
00:06:53,620 --> 00:06:55,320
There's all the things
you have like at home.

153
00:06:55,320 --> 00:06:56,720
We have a bedroom.

154
00:06:56,720 --> 00:06:58,590
It's real small and
you sleep on the wall

155
00:06:58,590 --> 00:07:00,550
because you don't
need much room.

156
00:07:00,550 --> 00:07:03,400
And that's the biggest
things you see

157
00:07:03,400 --> 00:07:04,770
when you look at
the space station.

158
00:07:04,770 --> 00:07:07,090

Good question.

159
00:07:07,090 --> 00:07:13,730
>> Hi, my name is Riley and
I'm from Alberta, Canada.

160
00:07:13,730 --> 00:07:20,090
And my favorite thing was
the space shuttle simulation.

161
00:07:20,090 --> 00:07:21,520
And my question is what kind

162
00:07:21,520 --> 00:07:24,460
of conversations do
you have on the ISS?

163
00:07:24,460 --> 00:07:25,080
>> Mike Fossum: What kind

164
00:07:25,080 --> 00:07:27,240
of conversation do
we have on the ISS?

165
00:07:27,240 --> 00:07:30,220
Well that's, there's several
different answers to that

166
00:07:30,220 --> 00:07:32,670
because like I said right
now we have crew members

167
00:07:32,670 --> 00:07:35,340
from three different countries
that are living up there,

168
00:07:35,340 --> 00:07:39,010
two American's, one
Japanese and three Russians.

169
00:07:39,010 --> 00:07:41,970
And so you know one thing is
which language are we talking

170
00:07:41,970 --> 00:07:43,080
in while we're up there?

171
00:07:43,080 --> 00:07:47,240
And it tends to be a combination
of English and Russian

172
00:07:47,240 --> 00:07:50,910
because that's just
the strongest languages

173
00:07:50,910 --> 00:07:52,910
for the crew members onboard.

174
00:07:52,910 --> 00:07:57,280
Yesterday Joe Acaba, who
is of Puerto Rican descent,

175
00:07:57,280 --> 00:08:00,250
did an interview in Spanish
which is really a lot of fun

176
00:08:00,250 --> 00:08:04,830
so he was able to reach out
to a large community of people

177
00:08:04,830 --> 00:08:06,420
in their native tongue.

178
00:08:06,420 --> 00:08:07,850
We talk about work.

179
00:08:07,850 --> 00:08:09,260
The things we talk
about are kind

180
00:08:09,260 --> 00:08:10,690
of the same things
you talk about there.

181
00:08:10,690 --> 00:08:13,020
We're living with these
people for up to a half a year

182
00:08:13,020 --> 00:08:15,270
at a time so we talk about work.

183
00:08:15,270 --> 00:08:16,720
We talk about school.

184
00:08:16,720 --> 00:08:19,100
We tell old funny
stories from when we were

185
00:08:19,100 --> 00:08:22,800
in training together or
old stories of what it was

186
00:08:22,800 --> 00:08:26,010
like growing up in the United
States or growing up in Russia

187
00:08:26,010 --> 00:08:28,100
or growing up in Canada

188
00:08:28,100 --> 00:08:32,180
and comparing all those
different kind of experiences

189
00:08:32,180 --> 00:08:33,910
and getting to know
your crewmates better.

190
00:08:33,910 --> 00:08:36,100

>> And it is truly
an international.

191
00:08:36,100 --> 00:08:38,880
Today we just had an
interview with Akihiko Hoshide

192
00:08:38,880 --> 00:08:40,750
and he did it in Japanese.

193
00:08:40,750 --> 00:08:40,980
>> Mike Fossum: Right.

194
00:08:40,980 --> 00:08:45,290
>> And the crew aboard have
been watching the Olympics.

195
00:08:45,290 --> 00:08:47,390
>> Mike Fossum: Oh yeah, the
Olympics are another thing

196
00:08:47,390 --> 00:08:49,270
that really draws the
whole world together

197
00:08:49,270 --> 00:08:51,750
as we're all cheering
for the athletes,

198
00:08:51,750 --> 00:08:53,640
cheering for our home
country, of course

199
00:08:53,640 --> 00:08:56,650
but appreciating the great
efforts of everybody.

200
00:08:56,650 --> 00:08:57,320
>> Absolutely.

201
00:08:57,320 --> 00:08:58,440
Good question, next?

202
00:08:58,440 --> 00:09:08,780
>> My name is Colleen and I
come from Fairfield, Connecticut

203
00:09:08,780 --> 00:09:15,500
and my question is how did
you put the ISS into orbit?

204
00:09:15,500 --> 00:09:18,400
>> Mike Fossum: Oh boy, how
did we put the ISS into orbit?

205
00:09:18,400 --> 00:09:25,080
If you look at it now it's over
900,000 pounds and it's kind

206
00:09:25,080 --> 00:09:27,950
of hard to even think about
what it takes to put this thing

207
00:09:27,950 --> 00:09:31,570
into orbit because we couldn't
put this huge space station

208
00:09:31,570 --> 00:09:34,510
on top of a great big
monster huge rocket

209
00:09:34,510 --> 00:09:36,340
and launch it all at once.

210
00:09:36,340 --> 00:09:40,900
And so we actually
launched it piece by piece.

211
00:09:40,900 --> 00:09:44,790

It took many space
shuttle launches, about 27,

212
00:09:44,790 --> 00:09:47,890
I don't remember exactly how
many space shuttle launches

213
00:09:47,890 --> 00:09:51,270
to carry up individual pieces,
as well as the Russian parts

214
00:09:51,270 --> 00:09:53,490
of the space station
went up their own way.

215
00:09:53,490 --> 00:09:56,900
They launched a piece of space
station on top of a rocket

216
00:09:56,900 --> 00:10:01,690
and then there's automatically
go up and attach to it.

217
00:10:01,690 --> 00:10:04,360
And so we took it up
one piece at a time

218
00:10:04,360 --> 00:10:06,490
until we got the whole
thing built up there.

219
00:10:06,490 --> 00:10:09,600
>> And you actually flew aboard
two of the space shuttles,

220
00:10:09,600 --> 00:10:12,100
do you recall any of the
items that you brought up?

221
00:10:12,100 --> 00:10:13,910

>> Mike Fossum: The biggest
one we brought up was

222
00:10:13,910 --> 00:10:15,820
on my second space
shuttle flight was right

223
00:10:15,820 --> 00:10:20,220
at the main Japanese
laboratory and so it was one

224
00:10:20,220 --> 00:10:23,350
of the largest single
elements on the space station.

225
00:10:23,350 --> 00:10:25,980
It pretty much filled up
the cargo bay of the shuttle

226
00:10:25,980 --> 00:10:29,690
and so we went up with that in
the back of the space shuttle.

227
00:10:29,690 --> 00:10:32,640
We had attached the space
shuttle to the station

228
00:10:32,640 --> 00:10:36,310
and then we did some spacewalks
to prepare the laboratory,

229
00:10:36,310 --> 00:10:39,820
to install it and also to
prepare the space station

230
00:10:39,820 --> 00:10:42,990
because it's not quite as easy
as just plugging Legos together.

231
00:10:42,990 --> 00:10:45,610

Sometimes it looks
kind of simple

232
00:10:45,610 --> 00:10:47,630
as we plug models
together in different ways

233
00:10:47,630 --> 00:10:51,280
but it's all very, you
know, complicated and it has

234
00:10:51,280 --> 00:10:53,060
to be done just right.

235
00:10:53,060 --> 00:10:55,270
Because once we attach
that laboratory

236
00:10:55,270 --> 00:10:58,410
up there four years ago, you
know we wanted to make sure

237
00:10:58,410 --> 00:11:00,640
that it was perfectly clean
because it's never going

238
00:11:00,640 --> 00:11:04,290
to come off again so it needs
to work for the next 20 years.

239
00:11:04,290 --> 00:11:07,250
So it's, you know,
it's a great challenge.

240
00:11:07,250 --> 00:11:10,000
And one of the amazing
things was it all worked.

241
00:11:10,000 --> 00:11:12,630
It worked out really well.

242
00:11:12,630 --> 00:11:13,130
Thank you.

243
00:11:13,130 --> 00:11:16,410
>> Very good question,
next question.

244
00:11:16,410 --> 00:11:20,270
>> My name is Caitlyn
[phonetic] and I'm

245
00:11:20,270 --> 00:11:22,800
from Martinsburg, West Virginia.

246
00:11:22,800 --> 00:11:26,310
Have you had any
emergencies or close calls

247
00:11:26,310 --> 00:11:30,430
on the ISS and what were they?

248
00:11:30,430 --> 00:11:31,670
>> Mike Fossum: Yes
occasionally we do.

249
00:11:31,670 --> 00:11:33,930
We train for a lot of
different things, of course.

250
00:11:33,930 --> 00:11:37,370
We train for lots of
different kinds of emergencies.

251
00:11:37,370 --> 00:11:40,720
We haven't had any
that were real scary.

252
00:11:40,720 --> 00:11:43,740

We train for fires and we
have not had a real fire.

253
00:11:43,740 --> 00:11:49,420
We train for leaks,
the airs leaking out

254
00:11:49,420 --> 00:11:52,330
and you know we're okay there.

255
00:11:52,330 --> 00:11:55,950
We do train also for spilling
things because on the ground

256
00:11:55,950 --> 00:12:00,400
if you spill something bad,
something really nasty or toxic,

257
00:12:00,400 --> 00:12:02,550
as we call it, you know
it falls to the floor

258
00:12:02,550 --> 00:12:04,520
and you might have
a mess to clean up

259
00:12:04,520 --> 00:12:05,810
but it's not that big of deal.

260
00:12:05,810 --> 00:12:08,320
But if you spill some
acid or something

261
00:12:08,320 --> 00:12:11,600
in space well then it's floating
and it can get in your eyes,

262
00:12:11,600 --> 00:12:14,390
get in your lungs and stuff
so that's much more serious

263
00:12:14,390 --> 00:12:17,780
and so anything that we
spill can irritate your eyes

264
00:12:17,780 --> 00:12:21,170
or cause trouble so not quite
an emergency but it is something

265
00:12:21,170 --> 00:12:23,300
that we take very seriously.

266
00:12:23,300 --> 00:12:27,360
We do, occasionally we have
to move the space station

267
00:12:27,360 --> 00:12:30,190
because there's a piece of
space junk, usually it's a piece

268
00:12:30,190 --> 00:12:32,920
of an old satellite or something
and it's orbiting up there

269
00:12:32,920 --> 00:12:34,240
and we're orbiting together.

270
00:12:34,240 --> 00:12:37,280
And sometimes we get so
close that we're in danger

271
00:12:37,280 --> 00:12:41,630
of getting hit by this stuff
and so we have to maneuver,

272
00:12:41,630 --> 00:12:45,330
we have to ignite the
space station engines

273

00:12:45,330 --> 00:12:50,130
and do a little bit of an orbit
change to get out of its way.

274
00:12:50,130 --> 00:12:54,510
But we do that about
every couple of months.

275
00:12:54,510 --> 00:13:00,590
[Noise]

276
00:13:00,590 --> 00:13:01,570
>> My name is Calvin.

277
00:13:01,570 --> 00:13:03,220
I'm from Michigan.

278
00:13:03,220 --> 00:13:07,280
And what is your emergency
plan if an asteroid

279
00:13:07,280 --> 00:13:11,500
or a meteorite comes
at the space station?

280
00:13:11,500 --> 00:13:12,800
>> Mike Fossum: Okay Calvin,

281
00:13:12,800 --> 00:13:17,080
well the emergency plan the
first step you do is we have a

282
00:13:17,080 --> 00:13:20,240
big team of people on the
planet who are tracking all

283
00:13:20,240 --> 00:13:24,750
of these different things like
you know asteroids and comets

284
00:13:24,750 --> 00:13:27,020
and stuff and pieces
of satellites

285
00:13:27,020 --> 00:13:29,140
and rockets that are in orbit.

286
00:13:29,140 --> 00:13:34,230
They're tracking this stuff
and they use computer programs

287
00:13:34,230 --> 00:13:37,410
to predict where it's going
to be in the next days

288
00:13:37,410 --> 00:13:41,460
and weeks ahead and so we know
ahead of time if it's going

289
00:13:41,460 --> 00:13:44,950
to come close and that's why
we would change our orbit.

290
00:13:44,950 --> 00:13:47,910
Now it's possible that we
could get hit by something

291
00:13:47,910 --> 00:13:50,540
that is too small to
track and that's one

292
00:13:50,540 --> 00:13:51,760
of the things we train for

293
00:13:51,760 --> 00:13:53,170
and I think that's
what you're getting at.

294
00:13:53,170 --> 00:13:55,070

So it's possible that
we could get hit.

295
00:13:55,070 --> 00:13:59,090
Now if we get hit by a comet,
well that's going to be bad.

296
00:13:59,090 --> 00:14:01,620
That's so big it's
going to be really bad.

297
00:14:01,620 --> 00:14:04,070
But the more likely thing
is we get hit by something

298
00:14:04,070 --> 00:14:06,430
that could punch a hole
in part of the station

299
00:14:06,430 --> 00:14:12,170
and we would get all of the
people together and move away

300
00:14:12,170 --> 00:14:14,070
from the part of the
station that's leaking

301
00:14:14,070 --> 00:14:15,770
and get that sealed off.

302
00:14:15,770 --> 00:14:19,800
Once we get everybody safe well
then we'll work with everybody

303
00:14:19,800 --> 00:14:22,550
on the ground and on orbit
to figure out what we do next

304
00:14:22,550 --> 00:14:26,120
and that would depend on a lot

of details about exactly how big

305
00:14:26,120 --> 00:14:28,430
of a hole it is or what
kind of damage it caused.

306
00:14:28,430 --> 00:14:31,660
But you know we have a lot of
plans we hope we never need

307
00:14:31,660 --> 00:14:34,150
to use for how to make
repairs or recover

308
00:14:34,150 --> 00:14:35,660
from those kind of situations.

309
00:14:35,660 --> 00:14:39,860
But the first step is keep
the people safe and get them

310
00:14:39,860 --> 00:14:42,880
as safe as possible so good.

311
00:14:42,880 --> 00:14:43,770
>> Very good question.

312
00:14:43,770 --> 00:14:47,400
I think we still have some
time for more, next question?

313
00:14:47,400 --> 00:14:53,500
>> Hey, my name is
Alex from Virginia.

314
00:14:53,500 --> 00:14:58,480
My question is what's the worst
situation that you've been in?

315

00:14:58,480 --> 00:15:00,850
>> Mike Fossum: Okay Alex,
the worst situation I've been

316
00:15:00,850 --> 00:15:09,240
in was probably during my space
station mission last June there

317
00:15:09,240 --> 00:15:13,680
was a piece of junk that they
identified, space debris,

318
00:15:13,680 --> 00:15:19,370
they identified its track
as coming close to us,

319
00:15:19,370 --> 00:15:22,330
too late for us to do
the maneuver away from it

320
00:15:22,330 --> 00:15:24,830
and so what we had to do
was close all of the hatches

321
00:15:24,830 --> 00:15:28,780
on the station and kind
of get into our Soyuz,

322
00:15:28,780 --> 00:15:30,520
Russian Soyuz spacecraft,
and that's kind

323
00:15:30,520 --> 00:15:32,500
of our emergency way home.

324
00:15:32,500 --> 00:15:35,930
And so we got into our Soyuz
spacecraft and closed the hatch

325
00:15:35,930 --> 00:15:38,470

and then waited to make
sure we didn't get hit

326
00:15:38,470 --> 00:15:44,650
because they don't know exactly
where these things are going,

327
00:15:44,650 --> 00:15:46,350
especially when they're small

328
00:15:46,350 --> 00:15:49,300
and so there's enough
uncertainty about it

329
00:15:49,300 --> 00:15:51,610
and there's enough
risk associated with it

330
00:15:51,610 --> 00:15:54,590
that we had to, we call it
hunkering down or shelter

331
00:15:54,590 --> 00:15:56,510
in place and so we did that.

332
00:15:56,510 --> 00:15:59,830
So that's, you worry a little
bit as we sit there trying

333
00:15:59,830 --> 00:16:02,400
to listen and say okay,
do we hear anything?

334
00:16:02,400 --> 00:16:05,450
Do we hear any banging?

335
00:16:05,450 --> 00:16:07,960
[laughter] And talking to the
ground and the ground confirmed

336
00:16:07,960 --> 00:16:10,750
that all of the pressures
looked normal and so we waited

337
00:16:10,750 --> 00:16:13,800
until the time passed and
everything was normal.

338
00:16:13,800 --> 00:16:16,540
So we went back out and
opened up all the hatches.

339
00:16:16,540 --> 00:16:17,410
>> Came back to work.

340
00:16:17,410 --> 00:16:17,870
>> Mike Fossum: Back to work.

341
00:16:17,870 --> 00:16:17,980
[laughter]

342
00:16:17,980 --> 00:16:23,510
>> Very good question, next?

343
00:16:23,510 --> 00:16:24,550
>> My name is Layna Reynolds.

344
00:16:24,550 --> 00:16:26,250
I'm from Sacramento, California.

345
00:16:26,250 --> 00:16:28,230
And I was wondering how
do you go about working

346
00:16:28,230 --> 00:16:29,880
and communicating
with other countries

347

00:16:29,880 --> 00:16:34,240
through the International
Space Station?

348
00:16:34,240 --> 00:16:36,210
>> Mike Fossum: Communicating
with the other countries

349
00:16:36,210 --> 00:16:40,400
and ground control teams and
even astronauts is a challenge.

350
00:16:40,400 --> 00:16:43,860
Most of the communications
that we do on the station are

351
00:16:43,860 --> 00:16:47,190
with English with most
of the partner countries

352
00:16:47,190 --> 00:16:53,010
so the Mission Control
Center and Japan and Germany

353
00:16:53,010 --> 00:16:57,870
and Canada all work in English

354
00:16:57,870 --> 00:16:59,570
and we communicate
in English with them.

355
00:16:59,570 --> 00:17:01,340
When we're working with
the Mission Control

356
00:17:01,340 --> 00:17:07,510
in Moscow we work in Russian and
that's just kind of the nature

357
00:17:07,510 --> 00:17:10,670

of the language abilities in
different places and stuff.

358
00:17:10,670 --> 00:17:13,400
So it can be a little
bit confusing at times

359
00:17:13,400 --> 00:17:15,600
and when I'm talking to one
of my Russian crewmates,

360
00:17:15,600 --> 00:17:18,390
for instance, it's kind of
funny, it drives my wife crazy

361
00:17:18,390 --> 00:17:20,140
because I can have a
conversation with one

362
00:17:20,140 --> 00:17:22,700
of my buddies where
I'm speaking English

363
00:17:22,700 --> 00:17:25,340
and he understands my
English well enough

364
00:17:25,340 --> 00:17:26,740
to understand what I'm saying

365
00:17:26,740 --> 00:17:28,790
but he doesn't understand
English well enough

366
00:17:28,790 --> 00:17:29,510
to answer me.

367
00:17:29,510 --> 00:17:31,750
So he'll answer me in Russian.

368
00:17:31,750 --> 00:17:34,190
And I understand him just
fine and I might answer him

369
00:17:34,190 --> 00:17:36,640
in English, maybe a mix
of English and Russian.

370
00:17:36,640 --> 00:17:38,470
And so it's kind of funny
to listen to us talk

371
00:17:38,470 --> 00:17:39,860
because we're perfectly
comfortable

372
00:17:39,860 --> 00:17:40,940
after living together

373
00:17:40,940 --> 00:17:45,090
for so long having a
conversation like that.

374
00:17:45,090 --> 00:17:47,490
>> And so an astronaut who does
fly aboard the International

375
00:17:47,490 --> 00:17:50,590
Space Station does go through
some language training.

376
00:17:50,590 --> 00:17:50,870
>> Mike Fossum: Oh yeah.

377
00:17:50,870 --> 00:17:52,430
>> And so they learn Russian.

378
00:17:52,430 --> 00:17:54,880
>> Mike Fossum: Oh yes, learning

Russian is a requirement

379
00:17:54,880 --> 00:17:59,000
to learn enough to get by and
so it's actually one of the joys

380
00:17:59,000 --> 00:18:00,210
of it because it's so different

381
00:18:00,210 --> 00:18:02,640
from the other stuff I've
done throughout my career,

382
00:18:02,640 --> 00:18:05,640
which is focus mostly
on engineering work

383
00:18:05,640 --> 00:18:06,950
and system development.

384
00:18:06,950 --> 00:18:09,270
And so now I've tried to use
a different part of my brain

385
00:18:09,270 --> 00:18:10,530
to learn another language.

386
00:18:10,530 --> 00:18:13,750
It's very challenging but
very rewarding too to be able

387
00:18:13,750 --> 00:18:17,200
to now go around another country
and speak in their language

388
00:18:17,200 --> 00:18:19,240
and have that kind of freedom.

389
00:18:19,240 --> 00:18:22,050

It's really great
and I think a lot

390
00:18:22,050 --> 00:18:24,600
of Americans would benefit
more from learning languages

391
00:18:24,600 --> 00:18:26,380
so they could enjoy
other cultures.

392
00:18:26,380 --> 00:18:26,790
>> That's true.

393
00:18:26,790 --> 00:18:28,500
>> Mike Fossum: You don't really
understand another culture

394
00:18:28,500 --> 00:18:31,060
until you understand
some of its language.

395
00:18:31,060 --> 00:18:32,280
>> That's right, absolutely.

396
00:18:32,280 --> 00:18:35,720
So if you guys are interested
in learning something,

397
00:18:35,720 --> 00:18:37,990
even you know language
or something like that,

398
00:18:37,990 --> 00:18:40,440
we encourage you
to go after that.

399
00:18:40,440 --> 00:18:40,800
>> Mike Fossum: You bet.

400
00:18:40,800 --> 00:18:43,580
>> That was a good
question, next question?

401
00:18:43,580 --> 00:18:44,370
>> Thank you.

402
00:18:44,370 --> 00:18:46,830
That was the last of
the student questions

403
00:18:46,830 --> 00:18:48,230
but I was wondering
before you go,

404
00:18:48,230 --> 00:18:51,780
can you explain how you can
go from a space camp student

405
00:18:51,780 --> 00:18:53,690
to being like an
astronaut or an engineer

406
00:18:53,690 --> 00:18:55,400
or someone working in NASA?

407
00:18:55,400 --> 00:18:58,090
>> Mike Fossum: Oh
absolutely, absolutely,

408
00:18:58,090 --> 00:19:00,470
oh I know all the students there

409
00:19:00,470 --> 00:19:02,410
at space camp are
having a great time.

410
00:19:02,410 --> 00:19:04,920
It's a wonderful experience

and you get exposed

411
00:19:04,920 --> 00:19:08,350
to so many different things
because there are so many things

412
00:19:08,350 --> 00:19:10,810
to this space business, whether
you're in mission control

413
00:19:10,810 --> 00:19:13,620
where we're sitting right now
or one of the laboratories

414
00:19:13,620 --> 00:19:17,230
around here helping develop new
space systems for the future

415
00:19:17,230 --> 00:19:20,180
or an astronaut in
training in other buildings

416
00:19:20,180 --> 00:19:22,470
around the center here
or around the world.

417
00:19:22,470 --> 00:19:25,310
And so students can see from
their time in space camp,

418
00:19:25,310 --> 00:19:28,430
there's a lot of different
things associated with this.

419
00:19:28,430 --> 00:19:30,710
They have things there
where they can learn

420
00:19:30,710 --> 00:19:32,810
about neutral buoyancy,

where they can learn

421
00:19:32,810 --> 00:19:34,310
about different kinds
of engineering,

422
00:19:34,310 --> 00:19:37,120
where they can learn about the
different space science things

423
00:19:37,120 --> 00:19:41,220
like geology, planetary
geology, comparing the geology

424
00:19:41,220 --> 00:19:43,090
of the earth to that
of the moon.

425
00:19:43,090 --> 00:19:46,300
And now we have a new tool to
learn more about the geology

426
00:19:46,300 --> 00:19:48,050
and the history of Mars.

427
00:19:48,050 --> 00:19:51,340
And all of these things are
part of the body of knowledge

428
00:19:51,340 --> 00:19:53,310
that we're working
on putting together.

429
00:19:53,310 --> 00:19:57,040
On the space station we do
experiments in materials

430
00:19:57,040 --> 00:20:02,680
on human bodies, on chemistry,
on combustion, lots and lots

431
00:20:02,680 --> 00:20:04,850
of different kinds of
experiments in science go

432
00:20:04,850 --> 00:20:07,050
into the work we're doing
on the space station.

433
00:20:07,050 --> 00:20:10,950
So for the students
today, check it all out

434
00:20:10,950 --> 00:20:13,680
and when you're doing some
of these different things

435
00:20:13,680 --> 00:20:15,570
and something really
lights you up

436
00:20:15,570 --> 00:20:19,120
and you say wow that is so cool.

437
00:20:19,120 --> 00:20:22,190
Well, go learn more about
it, go study more about it.

438
00:20:22,190 --> 00:20:23,950
When you get back to
school in a few weeks,

439
00:20:23,950 --> 00:20:25,630
go ask your teachers about it.

440
00:20:25,630 --> 00:20:27,150
And maybe in the science classes

441
00:20:27,150 --> 00:20:28,880

or other things you
can learn more.

442
00:20:28,880 --> 00:20:32,480
And a lot of you can find your
future careers in these things

443
00:20:32,480 --> 00:20:33,740
that you learn at space camp

444
00:20:33,740 --> 00:20:36,670
where you go wow,
that's really cool.

445
00:20:36,670 --> 00:20:38,470
Go learn more about
it and that can end

446
00:20:38,470 --> 00:20:41,770
up being a college degree, it
could be a career here at NASA

447
00:20:41,770 --> 00:20:46,160
and there's people in the
astronaut office have lots

448
00:20:46,160 --> 00:20:49,240
of different backgrounds,
different kinds of engineering,

449
00:20:49,240 --> 00:20:53,550
sciences, mathematics,
medicine, lots of backgrounds.

450
00:20:53,550 --> 00:20:56,100
Astronauts can have many
different kinds of backgrounds

451
00:20:56,100 --> 00:20:59,150
and there's no one background

that's better than the others.

452
00:20:59,150 --> 00:21:01,170
The important thing
is what you really

453
00:21:01,170 --> 00:21:04,000
like so follow your
passion, find those things

454
00:21:04,000 --> 00:21:06,840
that really interest you
and go learn more about it

455
00:21:06,840 --> 00:21:09,440
and study hard and
be one of the best

456
00:21:09,440 --> 00:21:11,940
because that's what we're
looking for is people that stand

457
00:21:11,940 --> 00:21:15,000
out as some of the
best at what they do.

458
00:21:15,000 --> 00:21:18,650
And they're the best at it if
they really love it right here,

459
00:21:18,650 --> 00:21:20,570
just as much as they
love it up here.

460
00:21:20,570 --> 00:21:21,620
Have fun.

461
00:21:21,620 --> 00:21:23,280
>> And be sure to
thank your teachers

462
00:21:23,280 --> 00:21:24,070
and your mentors because

463
00:21:24,070 --> 00:21:24,530
>> Mike Fossum: Oh yes.

464
00:21:24,530 --> 00:21:27,500
>> They're there for you to help
you learn all those wonderful

465
00:21:27,500 --> 00:21:31,520
things and you have it here,
explore to explore, Mike Fossum,

466
00:21:31,520 --> 00:21:33,080
it's always a pleasure
to have you.

467
00:21:33,080 --> 00:21:36,760
Any other questions
before we cut out?

468
00:21:36,760 --> 00:21:38,510
>> Nope, we're good.

469
00:21:38,510 --> 00:21:39,450
Thank you.

470
00:21:39,450 --> 00:21:41,510
>> Mike Fossum: Okay guys,
enjoy your space camp.

471
00:21:41,510 --> 00:21:43,990
>> Thank you, bye,
mission control.