



1
00:00:00,500 --> 00:00:34,060
[Background Discussions]

2
00:00:34,060 --> 00:00:35,250
>> Howdy. This is Mike Fossum.

3
00:00:35,250 --> 00:00:37,810
Am I talking to the Aggieland?

4
00:00:37,810 --> 00:00:39,510
[Multiple Voices] Howdy.

5
00:00:39,510 --> 00:01:09,140
[Silence and Laughter]

6
00:01:09,140 --> 00:01:11,510
>> Okay. Who do we have on that end?

7
00:01:11,510 --> 00:01:16,050
[Pause]

8
00:01:16,050 --> 00:01:18,020
>> This is [Inaudible] of Engineering.

9
00:01:18,020 --> 00:01:22,840
And we have our students from
Aerospace Mechanical across the College.

10
00:01:22,840 --> 00:01:26,780
Please to have you, sir.

11
00:01:26,780 --> 00:01:27,770
>> Oh, that's great.

12
00:01:27,770 --> 00:01:28,700
That's great.

13

00:01:28,700 --> 00:01:32,580

No, it's my honor to speak
to you and the students.

14

00:01:32,580 --> 00:01:35,610

This is something I've wanted
to do for a long time.

15

00:01:35,610 --> 00:01:40,740

And, really, it's great for me to share this
experience of being up here with you guys.

16

00:01:40,740 --> 00:01:43,000

>> We appreciate it.

17

00:01:43,000 --> 00:01:51,040

And students are lined up here to ask you
questions, if it is all right with you.

18

00:01:51,040 --> 00:01:52,070

>> That's great.

19

00:01:52,070 --> 00:01:55,510

Let me just start off with
a couple of quick things.

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00:01:55,510 --> 00:02:01,040

[Pause]

21

00:02:01,040 --> 00:02:04,380

>> First of all, I, -- you know,
I am Mike Fossum, Class of '80.

22

00:02:04,380 --> 00:02:10,370

I was a mechanical engineering student at A
and M, and a proud member of the Corps Cadets.

23

00:02:10,370 --> 00:02:14,160

I went into the military and I
worked as a flight test engineer.

24

00:02:14,160 --> 00:02:18,980

I worked for a period of time
as an engineer at NASA Houston

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00:02:18,980 --> 00:02:21,720

in the very early days of
the space shuttle program.

26

00:02:21,720 --> 00:02:25,510

And that's when my dream of flying
in space started to become more real.

27

00:02:25,510 --> 00:02:27,330

It's one that I had since jobhood.

28

00:02:27,330 --> 00:02:29,790

And I started to realize
that astronauts weren't God.

29

00:02:29,790 --> 00:02:32,090

They're really a lot more like normal people.

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00:02:32,090 --> 00:02:34,010

Some are more normal than others.

31

00:02:34,010 --> 00:02:39,210

And that kind of lit me up and caused
me to work harder to achieve this dream.

32

00:02:39,210 --> 00:02:42,800

But I'm really glad to share the
day with you and answer questions.

33

00:02:42,800 --> 00:02:43,600

This is our time.

34

00:02:43,600 --> 00:02:44,230

It is public.

35

00:02:44,230 --> 00:02:47,510

It's going out to the world,
so just let you know that too.

36

00:02:47,510 --> 00:02:53,460

[Pause]

37

00:02:53,460 --> 00:03:01,070

>> Howdy. My name is Andrew Marshall, and I'm
a mechanical engineering major, like yourself.

38

00:03:01,070 --> 00:03:10,380

And my question is I'm working on an engineering
design project whose goal is to create a system

39

00:03:10,380 --> 00:03:15,540

that allows astronauts on the ISS to add
specific amounts of additives to beverages,

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00:03:15,540 --> 00:03:17,640

like sugar and creamer to coffee.

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00:03:17,640 --> 00:03:26,410

Now, as an astronaut, are there any particular
suggestions or perspectives you could offer?

42

00:03:26,410 --> 00:03:28,750

>> Oh, I need to get some video to you.

43

00:03:28,750 --> 00:03:34,700

Some of my comrades up here like to add
sweetened condensed milk [Inaudible],

44

00:03:34,700 --> 00:03:36,330

and that's the trick.

45

00:03:36,330 --> 00:03:42,240

On the US side, our beverage containers

basically have kind of like a large bore needle

46
00:03:42,240 --> 00:03:49,140
that goes through a septum to fill it with
their proper amount of water, hot or cold water.

47
00:03:49,140 --> 00:03:50,400
And the [Inaudible] is premixed.

48
00:03:50,400 --> 00:03:55,270
The powdered coffee is premixed with
the cream and the sugar in there,

49
00:03:55,270 --> 00:04:01,010
but they like to make it more like, you
know, kind of what the Starbucks coffee.

50
00:04:01,010 --> 00:04:05,940
And the Russian beverage containers use a
whole different kind of thing where it's kind

51
00:04:05,940 --> 00:04:12,720
of a cone-shaped nozzle and a receptacle on
the plastic drink bag that you cut an opening

52
00:04:12,720 --> 00:04:17,010
and you slide it over the nozzle,
hold it tight and we use that.

53
00:04:17,010 --> 00:04:23,040
And, actually, use a syringe to fill with
the sweetened condensed milk and inject it

54
00:04:23,040 --> 00:04:28,010
into the coffee bag and then
add the hot water and mix it up.

55
00:04:28,010 --> 00:04:32,510
That's what you do when you're bored and
you want to play with the food, I guess.

56

00:04:32,510 --> 00:04:39,320

[Pause]

57

00:04:39,320 --> 00:04:44,150

>> It's an interesting project
because everybody has their own taste

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00:04:44,150 --> 00:04:48,720

for beverage coffee and what
they like with them.

59

00:04:48,720 --> 00:04:53,090

And they're actually fairly expensive to make.

60

00:04:53,090 --> 00:04:54,680

The actual bag of [Inaudible].

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00:04:54,680 --> 00:04:59,830

It's a whole lot more than when you buy
it at a commercial place and bought it.

62

00:04:59,830 --> 00:05:05,950

And so it may have to launch this
coffee black [Inaudible] sugar.

63

00:05:05,950 --> 00:05:10,840

Coffee with artificial sweetener.

64

00:05:10,840 --> 00:05:16,450

And you don't know -- we can't just
run down to the store and pick up more

65

00:05:16,450 --> 00:05:18,550

when we run out of the kind we like.

66

00:05:18,550 --> 00:05:21,750

And so there would be some
advantages to being able to dial in.

67

00:05:21,750 --> 00:05:23,160

I like black coffee.

68

00:05:23,160 --> 00:05:27,240

I've gone through a lot of the black coffee in our immediate stores.

69

00:05:27,240 --> 00:05:32,510

And so I've been working on acquiring a taste with coffee with other things in it.

70

00:05:32,510 --> 00:05:35,170

And it would be kind of nice if I could just dial

71

00:05:35,170 --> 00:05:37,100

into black coffee without adding other stuff.

72

00:05:37,100 --> 00:05:38,700

So good luck with the project.

73

00:05:38,700 --> 00:05:40,110

>> All right.

74

00:05:40,110 --> 00:05:42,030

Thank you very much.

75

00:05:44,130 --> 00:05:46,100

>> Howdy. My name is Alhonderaz [Phonetic] Razzacar [Phonetic],

76

00:05:46,100 --> 00:05:48,610

and I am a sophomore aerospace engineer.

77

00:05:48,610 --> 00:05:51,150

And what I'm wondering is what advice you have for another [Inaudible]

78

00:05:51,150 --> 00:05:54,030

who also wants to become an astronaut?

79

00:05:56,730 --> 00:05:58,420

>> The way I drive, I wish you well.

80

00:05:58,420 --> 00:06:00,190

And I want you to hurry up.

81

00:06:00,190 --> 00:06:01,570

I need some help in the astronaut [Inaudible].

82

00:06:01,570 --> 00:06:05,320

There's only one of us here these days, and I take a lot of heat.

83

00:06:05,320 --> 00:06:06,640

So I need some help.

84

00:06:06,640 --> 00:06:10,640

And I would say, in general, is just keep working hard.

85

00:06:10,640 --> 00:06:16,140

You know, follow your passion and work really hard from the best at what you're doing.

86

00:06:16,140 --> 00:06:18,860

And there's, you know, -- you have to be really --

87

00:06:18,860 --> 00:06:21,650

you know, you don't have to work in the space business.

88

00:06:21,650 --> 00:06:24,700

We like to bring people in that come from other areas.

89
00:06:24,700 --> 00:06:30,480
Having some space experience in some ways is helpful, but it's also great to be, you know, --

90
00:06:30,480 --> 00:06:34,210
to work hard and become, you know, -- recognize this as an expert in your field.

91
00:06:34,210 --> 00:06:36,230
And it takes something like that.

92
00:06:36,230 --> 00:06:41,320
And so, hopefully, you really like the engineering track you're on and are going

93
00:06:41,320 --> 00:06:44,300
to enjoy working in that area in the years ahead.

94
00:06:44,300 --> 00:06:44,970
And good luck.

95
00:06:44,970 --> 00:06:46,630
Hurry up.

96
00:06:46,630 --> 00:06:48,440
>> Thank you.

97
00:06:48,440 --> 00:06:51,490
>> How's it going Mike?

98
00:06:51,490 --> 00:06:54,300
My name is Bubba and I'm a computer engineer.

99
00:06:54,300 --> 00:06:58,170
And how do you think of going to space has changed your perspective on life?

100

00:06:58,170 --> 00:06:59,480

And how so?

101

00:06:59,480 --> 00:07:04,940

>> Hey, Bubba, I'm glad to meet you.

102

00:07:04,940 --> 00:07:07,840

My perspective on life, you know, that's an interesting one.

103

00:07:07,840 --> 00:07:12,430

It's -- for me, it's -- you can look at that in so many ways.

104

00:07:12,430 --> 00:07:18,750

And, really, this is now a reality, but it started as a dream when I was 11 years old

105

00:07:18,750 --> 00:07:23,370

and watched the moon landing, the first moon landing on Earth, or the first moon landing.

106

00:07:23,370 --> 00:07:28,600

And then within a year or two, I started thinking about it

107

00:07:28,600 --> 00:07:31,210

like every red-blooded kid on the planet.

108

00:07:31,210 --> 00:07:33,240

You know, I mean, I want to do that.

109

00:07:33,240 --> 00:07:35,570

But I didn't really think it would come true.

110

00:07:35,570 --> 00:07:37,710

I did not have the faith.

111

00:07:37,710 --> 00:07:42,480

You know, as kids do, dreams kind of come and go, and this one only stayed in the back

112

00:07:42,480 --> 00:07:44,760

of my mind, but I couldn't shake it completely.

113

00:07:44,760 --> 00:07:49,860

And I also couldn't accept that in any way it could become real.

114

00:07:49,860 --> 00:07:55,090

And I think that, you know, achieving this for me, this was really a long shot for a kid

115

00:07:55,090 --> 00:07:59,030

from the Rio Grande Valley, and a kid from anywhere, really.

116

00:07:59,030 --> 00:08:07,890

And it's just such an incredible long shot and to be able to be fortunate enough to, you know,

117

00:08:07,890 --> 00:08:14,490

to be living and working here right now is just about beyond comprehension, but it goes to show

118

00:08:14,490 --> 00:08:16,640

that anything really is possible.

119

00:08:16,640 --> 00:08:17,730

You have to stick to it.

120

00:08:17,730 --> 00:08:18,880

You have to believe in it.

121

00:08:18,880 --> 00:08:25,710

You have to work hard, reach, always find ways to reach and to knock down or go round or climb

122

00:08:25,710 --> 00:08:28,930

over barriers that are in
your way, but it can happen.

123

00:08:28,930 --> 00:08:37,390

And so I think in that big sense of the reality
of dreams that can come true is a big one.

124

00:08:37,390 --> 00:08:39,670

>> Awesome, dude.

125

00:08:39,670 --> 00:08:40,480

Thanks.

126

00:08:40,480 --> 00:08:46,070

>> Howdy. I'm Zack [Assumed Spelling] Anderson.

127

00:08:46,070 --> 00:08:48,540

I'm a freshman aerospace engineering major.

128

00:08:48,540 --> 00:08:51,970

And I was curious how has been a
member of the Corps Cadets help you

129

00:08:51,970 --> 00:08:55,800

in your life, in your career, sir?

130

00:08:57,540 --> 00:08:58,560

>> Howdy, Zack.

131

00:08:58,560 --> 00:09:00,860

To me, you know, joining the Corps, --

132

00:09:00,860 --> 00:09:05,060

some of you have heard this story
before perhaps, -- was almost on a whim.

133

00:09:05,060 --> 00:09:06,310

I needed a dorm room.

134

00:09:06,310 --> 00:09:07,460

The dorms were full.

135

00:09:07,460 --> 00:09:09,340

Apartments were too expensive.

136

00:09:09,340 --> 00:09:11,330

I had hair down to my shoulders.

137

00:09:11,330 --> 00:09:13,530

And if you join the Corps, you got a dorm room.

138

00:09:13,530 --> 00:09:15,380

And so I was sold.

139

00:09:15,380 --> 00:09:19,270

And that's absolutely a true story.

140

00:09:19,270 --> 00:09:22,930

And, you know, I got in not knowing what I was getting into.

141

00:09:22,930 --> 00:09:25,580

I had only visited A and M a couple of times.

142

00:09:25,580 --> 00:09:28,930

When I visited it the first time, I knew that's where I wanted to go to school.

143

00:09:28,930 --> 00:09:30,930

But I didn't know how I was going to make it happen.

144

00:09:30,930 --> 00:09:33,090

This is kind of an example of what it took.

145

00:09:33,090 --> 00:09:36,420

Because I tried things, tried to get
the dorms, tried to find an apartment,

146

00:09:36,420 --> 00:09:39,000

tried to find some way to
finance it, and it wasn't there.

147

00:09:39,000 --> 00:09:41,600

So I had only one option and I went for it.

148

00:09:41,600 --> 00:09:43,690

And it was life changing for me.

149

00:09:43,690 --> 00:09:46,470

Joining the Corps Cadets,
it's a great experience.

150

00:09:46,470 --> 00:09:49,450

I made friends there that
had been friends for life.

151

00:09:49,450 --> 00:09:54,170

And I went in with absolutely no
intention of going in the military.

152

00:09:54,170 --> 00:10:00,630

I found out that the military had all kinds of
opportunities to offer and great experiences,

153

00:10:00,630 --> 00:10:04,630

not to mention just the satisfaction
of serving our country.

154

00:10:04,630 --> 00:10:09,840

And so being in the Corps really woke me
up to all of those possibilities and opened

155

00:10:09,840 --> 00:10:15,320

up a complete progression of life
events that really got me here today.

156

00:10:15,320 --> 00:10:18,820

Because, again, when I went to A and M, I had no intention of going in the military.

157

00:10:18,820 --> 00:10:22,880

But, really, for me, one of the keys was working as a flight test engineer

158

00:10:22,880 --> 00:10:27,310

and having the flight experience in the Air Force; that gave me a skill set that happened

159

00:10:27,310 --> 00:10:32,890

to be something that matches up with skills that NASA needed for this kind of job.

160

00:10:32,890 --> 00:10:38,490

And I would not be here today if it wasn't for, you know, -- having taken that faithful step.

161

00:10:38,490 --> 00:10:40,380

I cut my hair and joined the Corps.

162

00:10:40,380 --> 00:10:43,510

>> Thank you, sir.

163

00:10:43,510 --> 00:10:49,050

[Pause]

164

00:10:49,050 --> 00:10:49,570

>> Hello, Mr. Fossum.

165

00:10:49,570 --> 00:10:50,850

My name is Franco [Assumed Spelling] Vitatti [Phonetic].

166

00:10:50,850 --> 00:10:55,210

And my question is I know there are many

but I'm very curious what your opinion is.

167

00:10:55,210 --> 00:10:59,000

What do you think is the primary benefit of human space missions

168

00:10:59,000 --> 00:11:00,380

for those of us here on the ground?

169

00:11:00,380 --> 00:11:06,870

>> You know, that's a really good question.

170

00:11:06,870 --> 00:11:11,680

I think in a really big way, -- I mean, there's the pure science that we're doing

171

00:11:11,680 --> 00:11:14,320

up here, and it's really exciting.

172

00:11:14,320 --> 00:11:17,650

You know, the International Space Station started

173

00:11:17,650 --> 00:11:24,340

as the largest engineering integration project ever attempted.

174

00:11:24,340 --> 00:11:32,060

Fifteen nations have come together to build this [Inaudible], almost a million pounds

175

00:11:32,060 --> 00:11:35,370

in orbit and 240 miles above the Earth.

176

00:11:35,370 --> 00:11:37,940

These -- look at the list of the countries.

177

00:11:37,940 --> 00:11:41,900

We haven't always been close

friends with these countries.

178

00:11:41,900 --> 00:11:45,600

So this has been a really huge
undertake around the globe.

179

00:11:45,600 --> 00:11:49,230

It's really brought us together
in a lot of ways.

180

00:11:49,230 --> 00:11:53,380

At the same time, as an engineering
project, it had built, was one aspect.

181

00:11:53,380 --> 00:11:55,470

And now we're in the scientific phase

182

00:11:55,470 --> 00:11:58,830

where we're finally built [Inaudible]
a space shuttle's job is done

183

00:11:58,830 --> 00:12:02,170

and the space shuttles, of
course, has been retired.

184

00:12:02,170 --> 00:12:05,570

And now we're moving from the assembly
into the science and utilization.

185

00:12:05,570 --> 00:12:09,120

And a lot of what we're doing
is just the pure science.

186

00:12:09,120 --> 00:12:13,490

You know, you know the basics of the convected
heat transfer, and all those kind of things

187

00:12:13,490 --> 00:12:16,910

where you have the buoyancy effects
and all, which we don't have here.

188

00:12:16,910 --> 00:12:19,580

And from the material science point of view, it's fascinating,

189

00:12:19,580 --> 00:12:21,430

the kind of research that you can do.

190

00:12:21,430 --> 00:12:25,150

And right above the camera that you're looking out of right now is a furnace

191

00:12:25,150 --> 00:12:28,840

that does exactly those kind of test runs.

192

00:12:28,840 --> 00:12:31,310

Just right here is another facility.

193

00:12:31,310 --> 00:12:32,930

It's a combustion facility.

194

00:12:32,930 --> 00:12:40,000

And without the buoyancy effects on the flame, we're running things in different atmospheres

195

00:12:40,000 --> 00:12:46,250

and really getting into the detailed physics of the flame to understand what's going on,

196

00:12:46,250 --> 00:12:50,460

and they're really details, and finding the flame boundaries for different conditions.

197

00:12:50,460 --> 00:12:53,650

And, you know, from the engineering problems, finding the boundary conditions,

198

00:12:53,650 --> 00:12:58,220

establishing the true boundary conditions

is crucial for finding the real answer

199

00:12:58,220 --> 00:13:03,290

to a real-world problem that aren't as neat as they come in a textbook.

200

00:13:03,290 --> 00:13:06,430

So that's the kind of -- just cutting-edge research that we're doing

201

00:13:06,430 --> 00:13:10,380

and the materials science physics, you know, in a lot of areas.

202

00:13:10,380 --> 00:13:11,510

There's plant growth.

203

00:13:11,510 --> 00:13:17,340

And then there's the human guinea pig aspect where, you know, I'm a subject for bone studies,

204

00:13:17,340 --> 00:13:20,420

cardiovascular studies, muscle, you know, eyes,

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00:13:20,420 --> 00:13:24,400

and a lot of other things associated with long duration space life.

206

00:13:24,400 --> 00:13:27,120

So there's basic learning there.

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00:13:27,120 --> 00:13:33,210

There's one more and it's really huge and it's really simple and that's the pioneering spirit.

208

00:13:33,210 --> 00:13:41,710

You know, as Americans, our entire [Inaudible] coming to the shore and looking west and looking

209

00:13:41,710 --> 00:13:45,340
for the next opportunity that
lies just behind what you can see,

210
00:13:45,340 --> 00:13:46,960
and that's a part of our psychic.

211
00:13:46,960 --> 00:13:48,480
It's a part of who we are.

212
00:13:48,480 --> 00:13:52,540
And I think it's important for
us to maintain that kind of edge

213
00:13:52,540 --> 00:13:58,160
because it is what has made us a great country,
and continuing to look at the world that way

214
00:13:58,160 --> 00:14:01,400
and to look at opportunities that
way; and this is one of those ways.

215
00:14:01,400 --> 00:14:03,170
Space is another frontier.

216
00:14:03,170 --> 00:14:06,920
We're pioneering space now as we
learn how to live and work here.

217
00:14:06,920 --> 00:14:11,650
And we establish the foundation
for bigger things for the future.

218
00:14:11,650 --> 00:14:12,930
That's what it's all about.

219
00:14:12,930 --> 00:14:14,750
>> Thank you very much.

220

00:14:14,750 --> 00:14:19,390

>> Howdy, Mr. Fossum, Sir.

221

00:14:19,390 --> 00:14:21,690

My name is David Wilson.

222

00:14:21,690 --> 00:14:25,410

I'm a junior engineering technology major focusing on electronics.

223

00:14:25,410 --> 00:14:30,070

And my question for you is what advice you have for undergraduates?

224

00:14:30,070 --> 00:14:31,510

And what's your favorite space gadget?

225

00:14:31,510 --> 00:14:36,040

[Pause]

226

00:14:36,040 --> 00:14:37,000

>> Oh, that's good.

227

00:14:37,000 --> 00:14:37,960

Howdy, David.

228

00:14:37,960 --> 00:14:40,710

I'm glad to meet you.

229

00:14:40,710 --> 00:14:47,120

My advice for undergraduates is, you know, so much of the time we're worried about grades.

230

00:14:47,120 --> 00:14:48,540

You know, you're worried about grades.

231

00:14:48,540 --> 00:14:53,990

You know, if you want to be, you know, want to be one of the fighters that's trying to stay

232

00:14:53,990 --> 00:14:56,340

in school, you, of course,
are worried about grades.

233

00:14:56,340 --> 00:14:58,750

Your parents are worried about
grades, when they get the reports

234

00:14:58,750 --> 00:15:00,200

and they want to know how things are going.

235

00:15:00,200 --> 00:15:04,300

And that's to be expected because they're
making an investment in helping you

236

00:15:04,300 --> 00:15:07,080

through this, but it's not about grades.

237

00:15:07,080 --> 00:15:07,730

It's really not.

238

00:15:07,730 --> 00:15:11,180

It's about learning and you
have to approach it that way.

239

00:15:11,180 --> 00:15:15,030

And, of course, you got to knock the classes
off, but you have to be thinking about them

240

00:15:15,030 --> 00:15:17,000

and how they fit together with the other things.

241

00:15:17,000 --> 00:15:20,270

Because what you're trying
to do during this four years

242

00:15:20,270 --> 00:15:25,030

or rather five years is build

a toolset that you can use.

243

00:15:25,030 --> 00:15:30,000

You're filling a box, a toolbox full of tools,
and you need to know how they all work together

244

00:15:30,000 --> 00:15:35,660

to go out and solve real problems that aren't
neatly defined by textbooks and class projects.

245

00:15:35,660 --> 00:15:38,450

And it requires critical
thinking, and it requires you

246

00:15:38,450 --> 00:15:41,320

to understand the different tools
that you have at your disposal.

247

00:15:41,320 --> 00:15:49,280

So go at it but a passion not to get the A,
a passion burn and to understand the concepts

248

00:15:49,280 --> 00:15:51,930

that you're dealing with here
and how they fit together.

249

00:15:51,930 --> 00:15:54,690

That's my best advice for right now.

250

00:15:54,690 --> 00:15:56,430

>> Thank you, sir.

251

00:15:56,430 --> 00:16:02,210

Could you also tell me what's
your favorite gadget in space?

252

00:16:02,210 --> 00:16:07,610

>> My favorite gadget in space,
it has to be -- it's a big one.

253

00:16:07,610 --> 00:16:09,160

It's the EMU.

254

00:16:09,160 --> 00:16:12,480

It's the spacesuit that we use to do spacewalks.

255

00:16:12,480 --> 00:16:17,190

And I've done seven spacewalks now.

256

00:16:17,190 --> 00:16:20,720

And that's a pretty cool gadget
to be outside in [Inaudible].

257

00:16:20,720 --> 00:16:22,120

And, really, it's a spaceship.

258

00:16:22,120 --> 00:16:26,350

>> Thank you, sir.

259

00:16:28,460 --> 00:16:46,560

>> Good afternoon, sir.

260

00:16:46,560 --> 00:16:51,190

My name is Michael Vaneski [Assumed Spelling].

261

00:16:51,190 --> 00:16:53,170

I'm a sophomore aerospace engineering major.

262

00:16:53,170 --> 00:16:58,560

And my question is do you believe that the
private-based industry will play a large part

263

00:16:58,560 --> 00:17:02,140

in the future of man space exploration,
or that there will be a return

264

00:17:02,140 --> 00:17:05,090

to government-funded projects once we get some

265

00:17:05,090 --> 00:17:09,950
of our own economic issues
back here and sort it out, sir?

266

00:17:09,950 --> 00:17:17,470
>> Hey, Michael, we can talk all
afternoon and evening about that one.

267

00:17:17,470 --> 00:17:21,580
I think the private-based
industries are here to stay.

268

00:17:21,580 --> 00:17:26,600
They're in this business in a
really big really serious way.

269

00:17:26,600 --> 00:17:32,040
There's a lot of confusing number
of them that are, to me, anyway,

270

00:17:32,040 --> 00:17:36,290
because I've hitched down
training for years here.

271

00:17:36,290 --> 00:17:38,940
But there's a lot of action going on.

272

00:17:38,940 --> 00:17:42,140
There's a lot [Inaudible] with a lot of
ideas and they're making things happen.

273

00:17:42,140 --> 00:17:42,840
They are building rockets.

274

00:17:42,840 --> 00:17:45,300
And they are launching spaceships.

275

00:17:45,300 --> 00:17:48,250

There's several that are right
on the verge of being able

276

00:17:48,250 --> 00:17:53,130

to launch commercial cargo
ship to the space station.

277

00:17:53,130 --> 00:17:58,930

And they're working [Inaudible] working
to get a human launch capability.

278

00:17:58,930 --> 00:18:03,490

I think that there's definitely a
role for the government in this too.

279

00:18:03,490 --> 00:18:07,220

It's a little hard to say yet
what the business model might be.

280

00:18:07,220 --> 00:18:08,950

And I am certainly no expert in this.

281

00:18:08,950 --> 00:18:11,560

And I'm not a NASA space policy kind of guy.

282

00:18:11,560 --> 00:18:15,440

But if NASA's you're only
customer, then, you know,

283

00:18:15,440 --> 00:18:17,230

I don't understand why we
make real big departures

284

00:18:17,230 --> 00:18:19,990

from the ways we've done it in the past.

285

00:18:19,990 --> 00:18:23,920

So I think NASA's going to be continuing
to work and develop things too.

286

00:18:23,920 --> 00:18:26,720

There are some progress made in that arena.

287

00:18:26,720 --> 00:18:28,490

And, you know, time will tell.

288

00:18:28,490 --> 00:18:30,380

There's a lot of great ideas,
a lot of smart [Inaudible]

289

00:18:30,380 --> 00:18:31,860

and very hard that are highly motivated.

290

00:18:31,860 --> 00:18:34,050

And that's a very futile opportunity, to
make things happen and come up with new ways

291

00:18:34,050 --> 00:18:35,640

of doing business, you know, smart
ways of getting things certified.

292

00:18:35,640 --> 00:18:37,200

And maybe, you know, sometimes
the government moves kind of slow

293

00:18:37,200 --> 00:18:39,540

and the private industry has the advantage of
not having the kind of government, you know,

294

00:18:39,540 --> 00:18:40,470

[Inaudible] like to have
but some of that also, --

295

00:18:40,470 --> 00:18:42,390

you know, there's been trade-offs through
the years as we've learned some hard lessons.

296

00:18:42,390 --> 00:18:43,410

So it's going to be interesting to see.

297

00:18:43,410 --> 00:18:44,400

I think both are going to be involved.

298

00:18:44,400 --> 00:18:45,510

>> Thank you very much, sir.

299

00:18:45,510 --> 00:18:52,080

[Pause]

300

00:18:52,080 --> 00:18:53,110

>> Howdy, Mike Fossum.

301

00:18:53,110 --> 00:18:54,200

I'm Nick [Inaudible].

302

00:18:54,200 --> 00:18:56,700

I'm a freshman aerospace engineering major.

303

00:18:56,700 --> 00:19:05,600

And I just wanted to ask how is it like living in space for an extended period of time?

304

00:19:05,600 --> 00:19:06,120

>> Howdy, Nick.

305

00:19:06,120 --> 00:19:09,900

It's really amazing to live up here for an extended period of time.

306

00:19:09,900 --> 00:19:13,090

My first two missions were space shuttle missions to the space station.

307

00:19:13,090 --> 00:19:16,440

So I visited here, and those missions were two weeks.

308

00:19:16,440 --> 00:19:21,860

At two weeks, you know, you're going [Inaudible]
because you only have, you know, a certain --

309

00:19:21,860 --> 00:19:25,060

a very short amount of time
to get a big job done.

310

00:19:25,060 --> 00:19:30,560

And you don't have much time to look out
the window and really enjoy being here.

311

00:19:30,560 --> 00:19:35,070

You also don't really fully
adapt to living and working here.

312

00:19:35,070 --> 00:19:40,120

So, to me, the advantage of living
up here for the long haul is,

313

00:19:40,120 --> 00:19:42,570

you know, I am a creature of space now.

314

00:19:42,570 --> 00:19:44,520

My body is fully adapted.

315

00:19:44,520 --> 00:19:46,730

My reflexes have changed.

316

00:19:46,730 --> 00:19:53,270

I can do a lot [Inaudible] with just my feet not
touching with my hands to grab onto handrails

317

00:19:53,270 --> 00:19:55,650

and stuff because you learn
where the handrails are.

318

00:19:55,650 --> 00:19:59,070

The other day we were working over here
right behind me, and I had to move some stuff

319

00:19:59,070 --> 00:20:01,880

and it ended up displacing one of the handrails.

320

00:20:01,880 --> 00:20:03,340

It's really a foot rail.

321

00:20:03,340 --> 00:20:08,230

And it was funny to watch guys come in and try to stop [Inaudible] because the handrails --

322

00:20:08,230 --> 00:20:12,350

they're used to sticking their foot under -- wasn't there anymore.

323

00:20:12,350 --> 00:20:15,240

So you really adapt up here.

324

00:20:15,240 --> 00:20:19,380

The other thing that's great about it is there's a little more time.

325

00:20:19,380 --> 00:20:21,530

We do get most of the weekends off.

326

00:20:21,530 --> 00:20:23,520

We do some voluntary science on the weekends.

327

00:20:23,520 --> 00:20:29,720

And there's always housekeeping, literally, to keeping the place clean, and things like that.

328

00:20:29,720 --> 00:20:34,690

But there's more time to look out the windows and to really just live it,

329

00:20:34,690 --> 00:20:37,440

to experience it, and to enjoy it.

330

00:20:37,440 --> 00:20:39,540

And it's been a great experience for me.

331

00:20:39,540 --> 00:20:42,510

>> Thank you very much, sir.

332

00:20:42,510 --> 00:20:47,090

[Pause]

333

00:20:47,090 --> 00:20:48,870

>> Howdy, Mike.

334

00:20:48,870 --> 00:20:51,330

Paul Schattenberg [Assumed Spelling].

335

00:20:51,330 --> 00:20:56,780

My question to you is, in your opinion, what is the single most important experiments conducted

336

00:20:56,780 --> 00:20:57,680

on the International Space Station?

337

00:20:57,680 --> 00:20:59,510

And how might that be a benefit to us here on earth?

338

00:20:59,510 --> 00:21:05,190

[Pause]

339

00:21:05,190 --> 00:21:05,920

>> Well, howdy, Paul.

340

00:21:05,920 --> 00:21:08,600

It's good to talk to you in person, not just spread e-mails.

341

00:21:08,600 --> 00:21:13,880

I look forward to talking to you tomorrow too.

342

00:21:13,880 --> 00:21:19,060

I think the Number One --
you've actually stumped me here.

343

00:21:19,060 --> 00:21:20,510

What would that be?

344

00:21:20,510 --> 00:21:25,330

[Pause]

345

00:21:25,330 --> 00:21:30,040

>> I think it's the many things that we're
able to study in the human body very quickly.

346

00:21:30,040 --> 00:21:37,850

Osteoporosis is an absolute threat for me,
for humans up here in microgravity because,

347

00:21:37,850 --> 00:21:43,790

you know, I'm floating right now and my bones
aren't doing any work to help support my frame

348

00:21:43,790 --> 00:21:49,770

and that osteoporosis start the
process of calcification of the bones,

349

00:21:49,770 --> 00:21:52,760

starts within hours of reaching zero gravity.

350

00:21:52,760 --> 00:21:58,690

And so what takes place in the human on earth
over the course of decades, particularly,

351

00:21:58,690 --> 00:22:02,080

you know, elderly women, you know,
takes place in us in the course

352

00:22:02,080 --> 00:22:04,740

of weeks and months, very quickly.

353

00:22:04,740 --> 00:22:06,370

And it can be dangerous.

354

00:22:06,370 --> 00:22:12,850

And so we have, -- you know, we're the guinea pigs for medicines and exercise regiments

355

00:22:12,850 --> 00:22:16,710

to help maintain, you know, that bone mass.

356

00:22:16,710 --> 00:22:21,070

And I think that, that has the immediate payoffs.

357

00:22:21,070 --> 00:22:25,910

There's also -- there's a lot of things, having medicine and materials science.

358

00:22:25,910 --> 00:22:31,350

And I just -- I couldn't -- I just couldn't nail those down to just one.

359

00:22:31,350 --> 00:22:32,600

>> Hey, no worries.

360

00:22:32,600 --> 00:22:34,290

Thanks. See you tomorrow.

361

00:22:34,290 --> 00:22:38,130

>> Hey, talk to you tomorrow.

362

00:22:38,130 --> 00:22:41,010

And everybody that's interested in talking tomorrow,

363

00:22:41,010 --> 00:22:45,370

come out to the Aggie [Inaudible] Club.

364

00:22:45,370 --> 00:22:46,360

>> Howdy, Mr. Fossum.

365

00:22:46,360 --> 00:22:47,250

I'm Thomas Dowell [Assumed Spelling].

366

00:22:47,250 --> 00:22:49,610

I'm a freshman aerospace engineer here.

367

00:22:49,610 --> 00:22:53,520

And earlier you spoke of
private industry and spaceflight

368

00:22:53,520 --> 00:22:57,900

and how the ISS was this massive project
with many nations involved in it.

369

00:22:57,900 --> 00:22:59,960

Do you think that in the future private industry

370

00:22:59,960 --> 00:23:03,510

and government organizations could
work together on a similar project?

371

00:23:03,510 --> 00:23:09,070

[Pause]

372

00:23:09,070 --> 00:23:16,960

>> Howdy. You know, we've talked about it, and
for the US part of the station and, really,

373

00:23:16,960 --> 00:23:21,180

for the entire station, even the parts
that were built in other countries.

374

00:23:21,180 --> 00:23:24,830

It was a private contract that did the building.

375

00:23:24,830 --> 00:23:28,800

NASA didn't build much of the hardware that you see around me right here.

376

00:23:28,800 --> 00:23:32,560

This is the US laboratory that we're in right now, this central part of the US part

377

00:23:32,560 --> 00:23:36,170

of the station, and it was all built by contract.

378

00:23:36,170 --> 00:23:42,570

And so to say contract versus NASA, it's -- you know, it gets a little mixed.

379

00:23:42,570 --> 00:23:47,240

You know, NASA was the prime contract or NASA was empowered to the project,

380

00:23:47,240 --> 00:23:51,330

but we had a prime contract work for NASA with NASA.

381

00:23:51,330 --> 00:23:54,690

And, really, all the important Boards, space station program,

382

00:23:54,690 --> 00:23:57,370

there were two Chairs of those Boards.

383

00:23:57,370 --> 00:24:02,820

You know, NASA Chair and a [Inaudible] Chair and they worked together and, you know,

384

00:24:02,820 --> 00:24:08,340

kind of came to a unanimous agreement on things as we were working through it.

385

00:24:08,340 --> 00:24:15,320

So, in a case like this, where you're building a national -- an international world facility,

386

00:24:15,320 --> 00:24:20,530

that's the realm of governments because there's no payoff in it for a private company.

387

00:24:20,530 --> 00:24:26,250

The reason the private companies want to get into the launch business is they believe

388

00:24:26,250 --> 00:24:28,580

that there's a market to launch, you know,

389

00:24:28,580 --> 00:24:31,760

people into space that have nothing to do with NASA.

390

00:24:31,760 --> 00:24:38,890

The people that want to go up in orbit go up [Inaudible], see space with their own eyes,

391

00:24:38,890 --> 00:24:42,380

go up and do an orbit, come home or go up,

392

00:24:42,380 --> 00:24:45,980

and even have other facilities, separate facilities than this.

393

00:24:45,980 --> 00:24:51,080

That's this space hotel, is a concept being worked on in several quarters.

394

00:24:51,080 --> 00:24:56,050

And they believe that there's going to be a market in the next 5, 10, 20 years.

395

00:24:56,050 --> 00:25:01,750

And so, you know, the partnership at NASA,

that gets people to and from the space station,

396

00:25:01,750 --> 00:25:08,380

they leverage them for a launch capability for these kinds of other commercial opportunities

397

00:25:08,380 --> 00:25:11,810

that have nothing to do with NASA and our human spaceflight program.

398

00:25:11,810 --> 00:25:14,510

>> Thank you, sir.

399

00:25:14,510 --> 00:25:19,040

[Pause]

400

00:25:19,040 --> 00:25:20,040

>> Howdy, sir.

401

00:25:20,040 --> 00:25:20,560

My name is [Inaudible].

402

00:25:20,560 --> 00:25:22,040

I'm a senior geophysics major.

403

00:25:22,040 --> 00:25:26,680

And I was wondering how much then is it decades [Inaudible] to life on space?

404

00:25:26,680 --> 00:25:28,640

And how do you adjust your life back on earth

405

00:25:28,640 --> 00:25:35,070

because you're being confined to gravity and such?

406

00:25:35,070 --> 00:25:39,340

>> Well, there's, I think, the adaptation to zero gravity or microgravity

407

00:25:39,340 --> 00:25:41,440

up there is actually a lot easier.

408

00:25:41,440 --> 00:25:43,930

You learn fairly quickly how to handle yourself.

409

00:25:43,930 --> 00:25:46,190

I was still adapting after two months.

410

00:25:46,190 --> 00:25:51,060

So I noticed that I was, all of a sudden,
moving a little more smoothly through things,

411

00:25:51,060 --> 00:25:58,140

and even three months and it's small
adjustments and how I just work up here.

412

00:25:58,140 --> 00:25:59,090

The [Inaudible].

413

00:25:59,090 --> 00:26:02,900

And, for me, the adjustment
coming up is fairly easy.

414

00:26:02,900 --> 00:26:07,680

I don't have any real symptoms
or issues with coming up.

415

00:26:07,680 --> 00:26:11,090

Some people, you know, there's different
things that can happen that's part

416

00:26:11,090 --> 00:26:16,780

of the transition from, you know, 1
G to zero G. Your spine stretches.

417

00:26:16,780 --> 00:26:20,820

The disc [Inaudible], and the vertebrae

in your back stretch a little bit

418

00:26:20,820 --> 00:26:22,420

because they're not being compressed every day;

419

00:26:22,420 --> 00:26:24,820

and that can cause back pain
and stuff like that.

420

00:26:24,820 --> 00:26:27,670

Going home is a joy though.

421

00:26:27,670 --> 00:26:32,210

That's harder and you find out
that gravity really stinks.

422

00:26:32,210 --> 00:26:40,410

You know, we work out a couple hours a day,
resistive training and cardiovascular training,

423

00:26:40,410 --> 00:26:47,100

aerobic training, so we don't lose all of our
muscle mass and we keep our bones healthy,

424

00:26:47,100 --> 00:26:50,620

but just to balance, reestablishing balance.

425

00:26:50,620 --> 00:26:53,440

And right now our blood is part
of your cardiovascular system.

426

00:26:53,440 --> 00:26:55,360

Our blood [Inaudible] circle.

427

00:26:55,360 --> 00:26:59,690

The heart doesn't have to work at all
too much from my lower legs all the way

428

00:26:59,690 --> 00:27:01,870

up to my brain and moving around.

429

00:27:01,870 --> 00:27:05,470

On Earth, you have a series of balance in your legs that help that check balance.

430

00:27:05,470 --> 00:27:10,840

When your heart pumps that blood a little ways, and the check balance keeps it from cooling back

431

00:27:10,840 --> 00:27:15,000

down and those all get from [Inaudible].

432

00:27:15,000 --> 00:27:17,690

They don't work as well at first.

433

00:27:17,690 --> 00:27:19,450

And you've got to retrain them, even some

434

00:27:19,450 --> 00:27:23,020

of those autonomic responses in your body to work again.

435

00:27:23,020 --> 00:27:27,930

And so the adaptation is the big adaptation, is in the first week or so.

436

00:27:27,930 --> 00:27:33,320

And my friends tell me that they're feeling close to normal after about a month.

437

00:27:33,320 --> 00:27:34,510

>> Thank you, sir.

438

00:27:34,510 --> 00:27:40,080

[Pause]

439

00:27:40,080 --> 00:27:41,230

>> Howdy. My name is Amanda

Couch [Assumed Spelling]

440

00:27:41,230 --> 00:27:43,170

and I'm an electrical engineering major.

441

00:27:43,170 --> 00:27:45,840

And I was wondering how you
felt your time at Texas A

442

00:27:45,840 --> 00:27:49,170

and M helped prepare you for a career in space?

443

00:27:51,750 --> 00:27:53,330

>> Howdy, Amanda.

444

00:27:53,330 --> 00:27:54,850

You know, in a lot of different ways.

445

00:27:54,850 --> 00:27:59,800

One was just the exposure to the
engineering and the technology and, you know,

446

00:27:59,800 --> 00:28:05,220

a bunch of just amazing professors who, you
know, encouraged and pushed and beat on us,

447

00:28:05,220 --> 00:28:09,590

and whatever it took to help us
learn, once it was a big part of it.

448

00:28:09,590 --> 00:28:15,360

For me too the experience, you know, equal
to that was really the community experience,

449

00:28:15,360 --> 00:28:20,760

working with my friends and studying with
buddies and kind of a teamwork thing.

450

00:28:20,760 --> 00:28:21,780

And we learned that.

451

00:28:21,780 --> 00:28:25,880

Of course, the people in the Corps learned that they're living with a group that you have

452

00:28:25,880 --> 00:28:30,450

to learn how to get along with and, you know, kind of a confined space,

453

00:28:30,450 --> 00:28:34,100

but even across the [Inaudible] the real feeling of teamwork

454

00:28:34,100 --> 00:28:38,880

and camaraderie that show up in so many ways.

455

00:28:38,880 --> 00:28:40,960

It's just part of the Aggie spirit.

456

00:28:40,960 --> 00:28:43,850

And I think that, that's really important because, you know,

457

00:28:43,850 --> 00:28:45,720

right now I'm the only American up here.

458

00:28:45,720 --> 00:28:48,720

My two crew mates are from Russia and from Japan.

459

00:28:48,720 --> 00:28:51,400

And we're very different people.

460

00:28:51,400 --> 00:28:57,690

And you know, we don't even have -- well, we're very different people but we get along great.

461

00:28:57,690 --> 00:29:02,440

And part of this experience for me was just learning how to get along with people at A

462

00:29:02,440 --> 00:29:08,010

and M, get along with people that were different than me, and learning the value,

463

00:29:08,010 --> 00:29:12,950

learning the value and the teamwork and, you know, playing well with others,

464

00:29:12,950 --> 00:29:17,310

and to really just value that time with your friends.

465

00:29:17,310 --> 00:29:21,090

My buddies are waiting for me right now because we're going to have dinner together.

466

00:29:21,090 --> 00:29:24,120

And they're not going to start dinner until I'm done.

467

00:29:24,120 --> 00:29:27,600

So we can all, you know, have dinner together because that's something that we do up here.

468

00:29:27,600 --> 00:29:29,190

We make a point of doing.

469

00:29:29,190 --> 00:29:33,550

And so, you know, you're there at A and M for the college degree,

470

00:29:33,550 --> 00:29:35,150

but there's more to it than that.

471

00:29:35,150 --> 00:29:40,840

You know, enjoy the whole experience of being an Aggie and the friendships and camaraderie,

472

00:29:40,840 --> 00:29:43,730

the spirit and everything else
that comes with being there.

473

00:29:43,730 --> 00:29:46,510

>> Thank you very much.

474

00:29:46,510 --> 00:29:51,470

[Pause]

475

00:29:51,470 --> 00:29:52,040

>> Hello, sir.

476

00:29:52,040 --> 00:29:55,020

I'm [Inaudible] from computer engineering.

477

00:29:55,020 --> 00:30:00,720

I just wanted to ask from your perspective
how would the ISS be a beneficial

478

00:30:00,720 --> 00:30:03,230

in mind explorations to Mars?

479

00:30:03,230 --> 00:30:08,580

Is it playing a very critical
factor in such things?

480

00:30:08,580 --> 00:30:09,820

>> Oh, absolutely.

481

00:30:09,820 --> 00:30:10,860

It's huge.

482

00:30:10,860 --> 00:30:13,490

Well, one, is you got to keep humans healthy.

483

00:30:13,490 --> 00:30:17,180

This is a five and a half month, almost six-month mission.

484

00:30:17,180 --> 00:30:22,570

And so, you know, they -- under controlled conditions that if something goes wrong, we,

485

00:30:22,570 --> 00:30:28,580

you know, we literally back on the surface to the earth and, you know, less than two hours.

486

00:30:28,580 --> 00:30:30,580

That's pushing it some but in less, --

487

00:30:30,580 --> 00:30:33,910

you know, 4 to 5 hours we could be on the surface of the earth.

488

00:30:33,910 --> 00:30:36,860

And we could get somebody home if we needed to.

489

00:30:36,860 --> 00:30:40,790

The moon, where we've been before, and I think we'll go again,

490

00:30:40,790 --> 00:30:45,580

is only three days away using standard propulsion systems,

491

00:30:45,580 --> 00:30:48,010

and things like that, three days away.

492

00:30:48,010 --> 00:30:53,630

So as we saw with the, you know, the famous incident on Apollo 13, something went wrong

493

00:30:53,630 --> 00:30:54,880

and they were just a few days away.

494

00:30:54,880 --> 00:30:57,370

And they managed to find a way to limp it back home and, you know,

495

00:30:57,370 --> 00:31:01,280

a lot of really bright [Inaudible] worked hard in hopes of some miracles.

496

00:31:01,280 --> 00:31:07,330

But, you know, again, it was not -- it wasn't quite as bad.

497

00:31:07,330 --> 00:31:10,890

Mars, nanotechnology, today, with what we can see

498

00:31:10,890 --> 00:31:15,280

for rocket propulsion is like 7 to 8 months, one way.

499

00:31:15,280 --> 00:31:19,580

And once you get there, you need to be healthy enough, and you need to --

500

00:31:19,580 --> 00:31:22,230

it's a huge investment to get there, and you need to, you know,

501

00:31:22,230 --> 00:31:27,170

have time to work on the real exploration, not to mention, you really need to wait.

502

00:31:27,170 --> 00:31:31,030

You can't just go to Mars from Earth anytime you want to.

503

00:31:31,030 --> 00:31:37,580

Earth and Mars need to be lined up to advantageously get there

504

00:31:37,580 --> 00:31:40,070
with the least amount of fuel and time.

505
00:31:40,070 --> 00:31:43,390
And then they have to be lined
up to make that trip back home.

506
00:31:43,390 --> 00:31:49,720
So you're really talking a two-year trip
to go to Mars, you know, to and from Mars.

507
00:31:49,720 --> 00:31:49,960
>> Okay.

508
00:31:49,960 --> 00:31:55,170
>> And then we have a cargo ship,
visits us on a regular basis.

509
00:31:55,170 --> 00:31:57,410
We ship the hatches on a cargo ship today.

510
00:31:57,410 --> 00:32:02,260
We filled it full of trash and it's leaving
tomorrow and it's going home, sort of.

511
00:32:02,260 --> 00:32:05,440
It's going to be really an impressive
shooting star over the Pacific.

512
00:32:05,440 --> 00:32:11,040
And then another one is going to launch
in a few days and come up and, you know,

513
00:32:11,040 --> 00:32:12,710
automatic dock at the space station.

514
00:32:12,710 --> 00:32:16,540
If you're on your way to Mars, you
have to take everything with you.

515

00:32:16,540 --> 00:32:20,200

You can conceptualize most of the stuff that you need to take to Mars

516

00:32:20,200 --> 00:32:23,930

with one exception, that's water.

517

00:32:23,930 --> 00:32:29,490

Two years' worth of water is still going to weigh 1 kilogram per liter.

518

00:32:29,490 --> 00:32:33,100

There's no way to dehydrate it or compress it or anything else.

519

00:32:33,100 --> 00:32:38,480

And it's really huge because we need a certain amount of water every day to stay healthy.

520

00:32:38,480 --> 00:32:43,980

You've got to have a closed loop water system, as close as you can make it.

521

00:32:43,980 --> 00:32:48,000

You need to recover that water and that system and we use it.

522

00:32:48,000 --> 00:32:49,140

We have one right now.

523

00:32:49,140 --> 00:32:53,130

I mean, our -- where's my drink bag?

524

00:32:53,130 --> 00:32:56,290

I mean, the water we're drinking right now is urine yesterday.

525

00:32:56,290 --> 00:32:57,220

That's a fact.

526

00:32:57,220 --> 00:33:00,840

Because we recycle it and turn it back into drinking water.

527

00:33:00,840 --> 00:33:05,150

We recover the condensation out of the air conditioning system, and that goes back

528

00:33:05,150 --> 00:33:06,900

into the purification system too.

529

00:33:06,900 --> 00:33:12,210

So when we breathe and we sweat water back, [Inaudible] that way.

530

00:33:12,210 --> 00:33:15,710

Now, that kind of system will be critical for Mars.

531

00:33:15,710 --> 00:33:23,120

And you have to have a system that's reliable enough that it will operate to and from

532

00:33:23,120 --> 00:33:28,440

without getting some kind of out of control mold, slimes,

533

00:33:28,440 --> 00:33:32,390

bacteria growth in this system that takes it out of commission.

534

00:33:32,390 --> 00:33:37,360

Because if you lose your water system on your way to Mars or your way home, your dead.

535

00:33:37,360 --> 00:33:45,960

So we are [Inaudible] carbon dioxide removal systems, the oxygen generation systems.

536

00:33:45,960 --> 00:33:48,730

And we're doing some, little
bit of work on plant growth

537

00:33:48,730 --> 00:33:52,070

because we think it will be important
for crews to have some plants.

538

00:33:52,070 --> 00:33:57,140

I don't think you'll be able to grow enough
to make it a significant amount of your diet.

539

00:33:57,140 --> 00:33:59,950

It will be an important thing to
see just a little bit of green

540

00:33:59,950 --> 00:34:03,930

on that lawn in your time in between planets.

541

00:34:03,930 --> 00:34:07,510

>> Thank you for your insight, sir.

542

00:34:07,510 --> 00:34:13,040

[Pause]

543

00:34:13,040 --> 00:34:13,440

>> Howdy, sir.

544

00:34:13,440 --> 00:34:14,200

My name is Jenny [Inaudible].

545

00:34:14,200 --> 00:34:16,650

And I'm currently an aerospace
engineering student.

546

00:34:16,650 --> 00:34:20,430

And I was curious how important
is it to learn a foreign language?

547

00:34:20,430 --> 00:34:25,510

And have you had any difficulty communicating across language barriers or cultural barriers?

548

00:34:25,510 --> 00:34:30,040

[Pause]

549

00:34:30,040 --> 00:34:30,610

>> Howdy, Jenny.

550

00:34:30,610 --> 00:34:34,900

Oh, yes. I really think it's hugely important.

551

00:34:34,900 --> 00:34:36,720

And I'm like most Americans.

552

00:34:36,720 --> 00:34:40,040

That is not my strength and it's embarrassing sometimes.

553

00:34:40,040 --> 00:34:45,600

You know, growing up in the Valley, I grew up being exposed to Spanish

554

00:34:45,600 --> 00:34:49,560

down there, and that was a real blessing.

555

00:34:49,560 --> 00:34:54,720

Up here, we use a combination operationally for the space station.

556

00:34:54,720 --> 00:34:59,090

I mean, English is theoretically the language at the space station.

557

00:34:59,090 --> 00:35:02,830

But the reality is we're also launching our Russian [Inaudible] rocket.

558

00:35:02,830 --> 00:35:07,000

So you need some amount of Russian language also.

559

00:35:07,000 --> 00:35:14,160

I think learning any language at the earliest age you can help enable your brain

560

00:35:14,160 --> 00:35:18,550

to stay more flexible and accept there's other ways, there's other words for this,

561

00:35:18,550 --> 00:35:22,880

there's other ways to express these concepts, and it will help you later.

562

00:35:22,880 --> 00:35:27,060

One of the joys -- I mean, I love the mission, is great.

563

00:35:27,060 --> 00:35:30,050

I'm just loving every minute of it.

564

00:35:30,050 --> 00:35:33,830

But the two and half years of training to get here was something I dreaded.

565

00:35:33,830 --> 00:35:36,400

I really thought it was going to be horrible, and it wasn't.

566

00:35:36,400 --> 00:35:38,490

The travel was hard.

567

00:35:38,490 --> 00:35:42,340

Being away from my family as much as I was, was very hard.

568

00:35:42,340 --> 00:35:48,590

But there was also a benefit of traveling around the globe and training in Japan, in Germany,

569

00:35:48,590 --> 00:35:55,980

in Canada, and a lot in Russia, and getting to know those people and getting to know, you know,

570

00:35:55,980 --> 00:36:03,010

I'll never be -- certainly never be able to even get by in Japanese,

571

00:36:03,010 --> 00:36:07,770

but I can get around a little bit in Germany and I can get around in Russia.

572

00:36:07,770 --> 00:36:11,490

And learning some of the language helps you really know the people better.

573

00:36:11,490 --> 00:36:13,060

It helps you know the place better.

574

00:36:13,060 --> 00:36:15,140

It helps to know our planet better.

575

00:36:15,140 --> 00:36:16,070

It's really important.

576

00:36:16,070 --> 00:36:18,170

I encourage everybody to.

577

00:36:18,170 --> 00:36:21,920

>> Mike, [Inaudible], just a heads up, four minutes to your LOS.

578

00:36:21,920 --> 00:36:24,510

>> Thank you, sir.

579

00:36:24,510 --> 00:36:29,040

[Pause]

580

00:36:29,040 --> 00:36:29,480

>> I'm sorry.

581

00:36:29,480 --> 00:36:33,490

[Inaudible] we just have a little less than four minutes left, so that's a good heads up.

582

00:36:33,490 --> 00:36:36,420

I'm ready for the next one now.

583

00:36:36,420 --> 00:36:38,180

>> Howdy. My name is Eric Anderson.

584

00:36:38,180 --> 00:36:40,850

I'm a freshman aerospace engineering major.

585

00:36:40,850 --> 00:36:43,510

And what do you think of Texas A and M going to the SCC?

586

00:36:43,510 --> 00:36:51,040

[Laughter]

587

00:36:51,040 --> 00:36:52,960

>> I think it's going to make things really interesting.

588

00:36:52,960 --> 00:36:59,200

I kind of [Inaudible] behind our, you know, some of the teams that we have played for, you know,

589

00:36:59,200 --> 00:37:05,330

generations from the old Southwest [Inaudible], big 12 and I'm going to miss playing.

590

00:37:05,330 --> 00:37:10,120

I'm absolutely going to miss that,

playing the annual games with those teams

591

00:37:10,120 --> 00:37:12,320

because I have a lot of friends
from those schools.

592

00:37:12,320 --> 00:37:14,860

And it's always, you know, good ball for us.

593

00:37:14,860 --> 00:37:17,530

We have a lot of fun with that every
year, giving each other a hard time.

594

00:37:17,530 --> 00:37:18,740

So I'm going to miss that.

595

00:37:18,740 --> 00:37:24,660

But I think it's exciting times
with SCC and I look forward to it.

596

00:37:24,660 --> 00:37:25,510

>> Thank you.

597

00:37:25,510 --> 00:37:30,040

[Pause]

598

00:37:30,040 --> 00:37:30,710

>> Howdy, Mr. Fossum.

599

00:37:30,710 --> 00:37:31,540

I'm Ashton.

600

00:37:31,540 --> 00:37:33,790

I'm an aerospace engineering [Inaudible].

601

00:37:33,790 --> 00:37:38,660

My first question is how often do you
use your thrusters in the spaceship?

602

00:37:38,660 --> 00:37:42,480

And what effect does that have on your experiments?

603

00:37:42,480 --> 00:37:49,520

And the second question is how do you do your laundry?

604

00:37:49,520 --> 00:37:53,250

>> Okay. I'll do the thrusters first.

605

00:37:53,250 --> 00:37:57,800

Actually, we just use the thrusters just periodically to bump up our [Inaudible]

606

00:37:57,800 --> 00:38:00,780

because we actually have a little bit of atmospheric drag here.

607

00:38:00,780 --> 00:38:05,080

It's not much, but it's enough to drop us a few meters a day, tens of meters.

608

00:38:05,080 --> 00:38:06,960

I'm not even sure of the number.

609

00:38:06,960 --> 00:38:10,220

And we've done two reboots in the last couple of weeks.

610

00:38:10,220 --> 00:38:12,180

We did one two days ago.

611

00:38:12,180 --> 00:38:15,840

I think [Inaudible] on NASA YouTube you might be able to find some video

612

00:38:15,840 --> 00:38:18,650

that we took of it on board to show.

613

00:38:18,650 --> 00:38:23,270

As we're floating in space, we're at constant speed, right, because we're in orbit.

614

00:38:23,270 --> 00:38:29,800

And we're floating just like this in the cabin, and the ship starts accelerating away

615

00:38:29,800 --> 00:38:31,810

from us, pushing us back that way.

616

00:38:31,810 --> 00:38:36,110

It was really [Inaudible]
and we don't do that --

617

00:38:36,110 --> 00:38:40,620

I mean, we just do that periodically to adjust the orbit a little bit or to maneuver away

618

00:38:40,620 --> 00:38:46,360

from a bit of space debris,
but it's not that much.

619

00:38:46,360 --> 00:38:50,820

And there was a second part
of your maneuvering question.

620

00:38:50,820 --> 00:38:52,570

>> The maneuvering question?

621

00:38:54,820 --> 00:38:54,230

>> The laundry.

622

00:38:54,820 --> 00:38:55,940

The laundry question.

623

00:38:55,940 --> 00:38:58,720

How do you do your laundry?

624

00:38:58,720 --> 00:39:01,630

>> Okay. I thought something about the rockets.

625

00:39:01,630 --> 00:39:02,980

Laundry, we don't.

626

00:39:02,980 --> 00:39:05,970

You wear them until they're ready to throw out.

627

00:39:05,970 --> 00:39:12,780

[Inaudible] back in 15, 18, 20 years ago, we were working on the space washing machine.

628

00:39:12,780 --> 00:39:16,540

And, man, it is really complicated.

629

00:39:16,540 --> 00:39:22,220

We don't have a space shower either because trying to get the water to go

630

00:39:22,220 --> 00:39:24,460

where you want it to go it's just hard.

631

00:39:24,460 --> 00:39:27,560

And resources, and the water is one of those critical resources.

632

00:39:27,560 --> 00:39:32,030

Right. So you just -- you wear it until it's time to throw it out.

633

00:39:32,030 --> 00:39:35,690

Now the place is very dry.

634

00:39:35,690 --> 00:39:37,220

It's very -- it's cool.

635

00:39:37,220 --> 00:39:39,290

It's air-conditioned really well.

636

00:39:39,290 --> 00:39:43,930

We, you know, we change into gym clothes twice a day to work out and then we clean up after that.

637

00:39:43,930 --> 00:39:49,200

And so you're not -- you know, you're not like [Inaudible], and things like that.

638

00:39:49,200 --> 00:39:54,860

But, you know, I only have so many Aggie T-shirts and I've got to take care of it.

639

00:39:54,860 --> 00:39:56,510

>> Thank you very much, sir.

640

00:39:56,510 --> 00:40:01,040

[Pause]

641

00:40:01,040 --> 00:40:01,480

>> Howdy, Mike.

642

00:40:01,480 --> 00:40:02,280

My name's Claire [Assumed Spelling].

643

00:40:02,280 --> 00:40:02,910

I'm a freshman --

644

00:40:02,910 --> 00:40:03,190

>> Hi, guys.

645

00:40:03,190 --> 00:40:04,120

>> -- physics major.

646

00:40:04,120 --> 00:40:06,510

And I just wanted to ask what's your favorite thing?

647

00:40:06,510 --> 00:40:09,390

What was your favorite thing
about flying on the space shuttle?

648

00:40:11,490 --> 00:40:17,380

>> My favorite thing about flying on the
space shuttle was part really the launch

649

00:40:17,380 --> 00:40:21,520

and then looking, which is just an incredible
ride, and then looking out of the windows

650

00:40:21,520 --> 00:40:24,290

for the very first time to see what it was like,

651

00:40:24,290 --> 00:40:29,170

to see the earth from space,
not a video, not a picture.

652

00:40:29,170 --> 00:40:30,510

My eyes --

653

00:40:30,510 --> 00:40:39,040

[Inaudible]

654

00:40:39,040 --> 00:40:40,510

>> Bye Mike.

655

00:40:40,510 --> 00:40:49,480

[Laughter]

656

00:40:49,480 --> 00:40:50,510

>> Well, thank you for coming.

657

00:40:50,510 --> 00:40:53,000

You know, we'll say bye to Mr. Fossum.