



1
00:00:27,910 --> 00:00:25,589

[Music]

2
00:00:30,470 --> 00:00:27,920

hello i'm jeanne missour and we are

3
00:00:33,030 --> 00:00:30,480

marking an important anniversary 20

4
00:00:35,190 --> 00:00:33,040

years ago three men embarked on a

5
00:00:37,670 --> 00:00:35,200

journey a journey to the international

6
00:00:40,389 --> 00:00:37,680

space station where they became the

7
00:00:43,670 --> 00:00:40,399

first full-time inhabitants we are now

8
00:00:46,869 --> 00:00:43,680

marking two decades of habitation

9
00:00:49,029 --> 00:00:46,879

cooperation and investigation today

10
00:00:51,189 --> 00:00:49,039

we're going to be talking about

11
00:00:51,990 --> 00:00:51,199

what's been done up there what it has

12
00:00:54,150 --> 00:00:52,000

meant

13
00:00:57,110 --> 00:00:54,160

and we're going to do that by talking to

14

00:00:58,790 --> 00:00:57,120

the crew of expedition 1 and some of

15

00:01:00,389 --> 00:00:58,800

those who supported them this

16

00:01:02,950 --> 00:01:00,399

conversation is brought to you by the

17

00:01:05,990 --> 00:01:02,960

team at nasa and by the space foundation

18

00:01:08,149 --> 00:01:06,000

for the support of boeing we had hoped

19

00:01:11,990 --> 00:01:08,159

to do this conversation in person at the

20

00:01:14,870 --> 00:01:12,000

space symposium but covet so let me

21

00:01:17,190 --> 00:01:14,880

introduce to you our guest today joining

22

00:01:19,749 --> 00:01:17,200

us virtually first the members of the

23

00:01:21,830 --> 00:01:19,759

crew we have the commander uh who is

24

00:01:24,469 --> 00:01:21,840

with us bill shepard he joins us from

25

00:01:27,749 --> 00:01:24,479

virginia also with us from russia his

26

00:01:31,350 --> 00:01:27,759

crewmates sergey krikalev and also yuri

27

00:01:33,270 --> 00:01:31,360

gazenko also joining us from texas a man

28

00:01:35,429 --> 00:01:33,280

whose vision and management and

29

00:01:38,870 --> 00:01:35,439

oversight was crucial to the success of

30

00:01:41,429 --> 00:01:38,880

the mission george abbey he was he is

31

00:01:43,990 --> 00:01:41,439

the former director of the johnson space

32

00:01:46,469 --> 00:01:44,000

center and also joining us as ginger

33

00:01:48,950 --> 00:01:46,479

carrick of nasa who was the russian

34

00:01:51,109 --> 00:01:48,960

training integration instructor for

35

00:01:53,590 --> 00:01:51,119

expedition one great to have you all

36

00:01:56,310 --> 00:01:53,600

with us here today george abbey i'd love

37

00:01:58,389 --> 00:01:56,320

to start with you um and get a sense of

38

00:02:01,109 --> 00:01:58,399

what you hoped for

39

00:02:03,109 --> 00:02:01,119

from this mission what was your goal

40

00:02:04,870 --> 00:02:03,119

what did nasa think it would get out of

41

00:02:06,870 --> 00:02:04,880

this

42

00:02:09,190 --> 00:02:06,880

well i thought it was very important

43

00:02:10,790 --> 00:02:09,200

that we partner with our russian

44

00:02:13,190 --> 00:02:10,800

colleagues

45

00:02:14,869 --> 00:02:13,200

we were working on a space station and

46

00:02:15,990 --> 00:02:14,879

had been working on it for some period

47

00:02:18,790 --> 00:02:16,000

of time

48

00:02:20,869 --> 00:02:18,800

and were not too successful so

49

00:02:24,070 --> 00:02:20,879

we went through a redesign

50

00:02:25,910 --> 00:02:24,080

and uh i felt it was important to bring

51
00:02:27,589 --> 00:02:25,920
our russian colleagues in and make them

52
00:02:29,990 --> 00:02:27,599
a part of the program

53
00:02:32,229 --> 00:02:30,000
and uh actually the program started with

54
00:02:33,750 --> 00:02:32,239
the shuttle mirror which was the russian

55
00:02:36,470 --> 00:02:33,760
space station

56
00:02:38,790 --> 00:02:36,480
and uh that gave us an opportunity to

57
00:02:41,670 --> 00:02:38,800
get some experience on space stations as

58
00:02:43,910 --> 00:02:41,680
we were not flying a space station and

59
00:02:46,150 --> 00:02:43,920
we were able to work with the russians

60
00:02:48,630 --> 00:02:46,160
and do that on this on the mere program

61
00:02:50,790 --> 00:02:48,640
at the same time partnering with them on

62
00:02:51,830 --> 00:02:50,800
an international space station

63
00:02:53,750 --> 00:02:51,840

and

64

00:02:56,710 --> 00:02:53,760

was uh turned out to be an excellent

65

00:02:58,949 --> 00:02:56,720

partnership and i think our success was

66

00:03:01,190 --> 00:02:58,959

really in a large part due to the fact

67

00:03:03,990 --> 00:03:01,200

that we had that partnership

68

00:03:05,990 --> 00:03:04,000

and so as we worked and through the

69

00:03:07,190 --> 00:03:06,000

shuttle mirror program

70

00:03:09,670 --> 00:03:07,200

we were looking ahead to the

71

00:03:12,309 --> 00:03:09,680

international space station and finally

72

00:03:15,270 --> 00:03:12,319

being able to get that first element up

73

00:03:17,750 --> 00:03:15,280

and then of course get the crew up which

74

00:03:19,430 --> 00:03:17,760

came about a year and a half after that

75

00:03:20,470 --> 00:03:19,440

first element went up

76

00:03:23,750 --> 00:03:20,480

so

77

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

i was looking forward to that day and uh

78

00:03:27,750 --> 00:03:26,319

with great expectations and uh great

79

00:03:30,390 --> 00:03:27,760

hope that we would finally get the

80

00:03:33,270 --> 00:03:30,400

program underway and get that first crew

81

00:03:34,789 --> 00:03:33,280

up there which we did and

82

00:03:36,789 --> 00:03:34,799

we have we were fortunate to have all

83

00:03:38,630 --> 00:03:36,799

three crew members with us this morning

84

00:03:41,350 --> 00:03:38,640

and i wanted to ask you about these

85

00:03:44,309 --> 00:03:41,360

three crew members why were these three

86

00:03:46,470 --> 00:03:44,319

picked for expedition one

87

00:03:48,149 --> 00:03:46,480

well i think they were picked by uh

88

00:03:50,390 --> 00:03:48,159

based on their experience and their

89

00:03:52,710 --> 00:03:50,400

backgrounds uh we wanted to make sure

90

00:03:55,830 --> 00:03:52,720

that first crew uh was an experienced

91

00:03:57,910 --> 00:03:55,840

crew and uh it was gonna be a

92

00:03:59,190 --> 00:03:57,920

first the first time in space with the

93

00:04:01,030 --> 00:03:59,200

space station

94

00:04:03,750 --> 00:04:01,040

and we wanted someone who would have

95

00:04:05,670 --> 00:04:03,760

been up there before and also could work

96

00:04:07,670 --> 00:04:05,680

in that environment and

97

00:04:08,949 --> 00:04:07,680

if there were problems could deal with

98

00:04:11,350 --> 00:04:08,959

them and

99

00:04:13,270 --> 00:04:11,360

we selected a crew where we had high

100

00:04:15,190 --> 00:04:13,280

confidence with the three crewmen that

101
00:04:17,270 --> 00:04:15,200
they would be able to do that

102
00:04:18,870 --> 00:04:17,280
and that turned out to be

103
00:04:20,710 --> 00:04:18,880
certainly the case and

104
00:04:22,469 --> 00:04:20,720
we were fortunate to have all three of

105
00:04:25,270 --> 00:04:22,479
them up there as we went through that

106
00:04:27,590 --> 00:04:25,280
that first step on expedition one

107
00:04:29,749 --> 00:04:27,600
um ginger you ended up working with

108
00:04:32,070 --> 00:04:29,759
these guys for years getting them ready

109
00:04:33,749 --> 00:04:32,080
for this mission would you agree with

110
00:04:36,230 --> 00:04:33,759
this was the right combination of

111
00:04:39,030 --> 00:04:36,240
personalities and skills

112
00:04:40,629 --> 00:04:39,040
oh absolutely from day one you know you

113
00:04:42,310 --> 00:04:40,639

got to remember this is the first time

114

00:04:44,710 --> 00:04:42,320

we were training a crew for the space

115

00:04:47,350 --> 00:04:44,720

station so we were building it as we

116

00:04:50,230 --> 00:04:47,360

went along and um all three of the crew

117

00:04:51,990 --> 00:04:50,240

members were quick to identify gaps in

118

00:04:54,790 --> 00:04:52,000

the support plan that we had put forward

119

00:04:57,510 --> 00:04:54,800

not only for training but for operations

120

00:04:59,670 --> 00:04:57,520

um so they were the perfect people um it

121

00:05:02,469 --> 00:04:59,680

took the courage for them to step out

122

00:05:05,270 --> 00:05:02,479

and try to establish a new training

123

00:05:07,110 --> 00:05:05,280

paradigm a new operations paradigm and

124

00:05:08,629 --> 00:05:07,120

they proved to be successful once they

125

00:05:09,430 --> 00:05:08,639

executed their mission

126

00:05:11,990 --> 00:05:09,440

um

127

00:05:14,230 --> 00:05:12,000

sergey i'd like to ask you and chef both

128

00:05:17,029 --> 00:05:14,240

you were both uh come out of a military

129

00:05:20,310 --> 00:05:17,039

background where you were trained to

130

00:05:22,070 --> 00:05:20,320

view one another as adversaries here

131

00:05:25,110 --> 00:05:22,080

you're put in a situation where you're

132

00:05:27,830 --> 00:05:25,120

going to interact cooperatively was that

133

00:05:31,110 --> 00:05:27,840

a difficult transition or did that come

134

00:05:35,110 --> 00:05:34,230

so sergey why don't you go ahead

135

00:05:36,070 --> 00:05:35,120

okay

136

00:05:38,390 --> 00:05:36,080

at first

137

00:05:41,510 --> 00:05:38,400

i came not from military background

138

00:05:43,350 --> 00:05:41,520

so that's one point and second maybe

139

00:05:44,629 --> 00:05:43,360

most important that this was not the

140

00:05:45,430 --> 00:05:44,639

first experience

141

00:05:46,790 --> 00:05:45,440

uh

142

00:05:49,350 --> 00:05:46,800

my first

143

00:05:51,670 --> 00:05:49,360

first space flight was uh international

144

00:05:54,870 --> 00:05:51,680

mission together with french

145

00:05:57,830 --> 00:05:54,880

cosmonaut but also before that before

146

00:06:01,029 --> 00:05:57,840

this mission i was uh trained and flew

147

00:06:03,029 --> 00:06:01,039

twice on shuttle uh first first flight

148

00:06:04,070 --> 00:06:03,039

was on sts-16 and we were trained

149

00:06:05,990 --> 00:06:04,080

together

150

00:06:07,270 --> 00:06:06,000

charlie bolden was the commander of this

151
00:06:09,510 --> 00:06:07,280
mission

152
00:06:12,150 --> 00:06:09,520
and my second flight on shuttle was

153
00:06:14,950 --> 00:06:12,160
actually first assembly mission so

154
00:06:17,029 --> 00:06:14,960
first station assembly mission an sts-88

155
00:06:18,070 --> 00:06:17,039
with bob come on bob cabana as a

156
00:06:19,430 --> 00:06:18,080
commander

157
00:06:21,189 --> 00:06:19,440
so

158
00:06:24,309 --> 00:06:21,199
it was not uh

159
00:06:26,790 --> 00:06:24,319
the first experience and actually uh

160
00:06:29,830 --> 00:06:26,800
even before us many years ago was very

161
00:06:31,990 --> 00:06:29,840
good example of good uh

162
00:06:35,430 --> 00:06:32,000
relations and good partnership uh start

163
00:06:38,150 --> 00:06:35,440

from uh serious apollo so we were based

164

00:06:40,309 --> 00:06:38,160

on previous experience and

165

00:06:43,029 --> 00:06:40,319

we were ready for good cooperation and

166

00:06:45,350 --> 00:06:43,039

that's why i think everything went very

167

00:06:47,270 --> 00:06:45,360

smooth from my point of view

168

00:06:49,510 --> 00:06:47,280

now chef you did have a military

169

00:06:52,309 --> 00:06:49,520

background i'm right there aren't i

170

00:06:55,110 --> 00:06:52,319

yeah actually uh yuri and i were really

171

00:06:58,070 --> 00:06:55,120

the two military guys um

172

00:07:00,230 --> 00:06:58,080

jumping way ahead in the answer uh one

173

00:07:02,629 --> 00:07:00,240

of my one of my most interesting moments

174

00:07:05,350 --> 00:07:02,639

with yuri in space was looking at the

175

00:07:08,390 --> 00:07:05,360

earth and he was saying okay i was a

176

00:07:09,430 --> 00:07:08,400

mig-21 pilot and i was stationed here

177

00:07:11,589 --> 00:07:09,440

and

178

00:07:13,510 --> 00:07:11,599

half an orbit later i would say okay i

179

00:07:16,070 --> 00:07:13,520

was a navy seal and we were here here

180

00:07:18,230 --> 00:07:16,080

and then that was a really interesting

181

00:07:19,749 --> 00:07:18,240

dialogue but um

182

00:07:21,749 --> 00:07:19,759

i think uh

183

00:07:23,670 --> 00:07:21,759

my personal interest in being part of

184

00:07:25,830 --> 00:07:23,680

this crew was to

185

00:07:27,029 --> 00:07:25,840

try and put the space station on the

186

00:07:28,950 --> 00:07:27,039

footing of

187

00:07:32,070 --> 00:07:28,960

either the early

188

00:07:34,469 --> 00:07:32,080

space voyages where we did not have a

189

00:07:36,950 --> 00:07:34,479

lot of contact with the ground and that

190

00:07:38,469 --> 00:07:36,960

seems to be seemed to me to be much more

191

00:07:40,629 --> 00:07:38,479

like

192

00:07:42,710 --> 00:07:40,639

being on a ship or a submarine than

193

00:07:45,189 --> 00:07:42,720

flying an airplane so

194

00:07:47,909 --> 00:07:45,199

nasa had a shuttle program which was

195

00:07:49,589 --> 00:07:47,919

basically airplane flying and i thought

196

00:07:51,350 --> 00:07:49,599

we were doing something different with

197

00:07:52,150 --> 00:07:51,360

space station that's why i really wanted

198

00:07:57,110 --> 00:07:52,160

to

199

00:07:59,029 --> 00:07:57,120

i had

200

00:08:01,589 --> 00:07:59,039

certain

201
00:08:03,430 --> 00:08:01,599
views on how the partners should

202
00:08:06,710 --> 00:08:03,440
interact

203
00:08:07,990 --> 00:08:06,720
and unfortunately yuri and sergey

204
00:08:10,790 --> 00:08:08,000
helped me

205
00:08:12,550 --> 00:08:10,800
maybe change my views quite a bit on

206
00:08:14,710 --> 00:08:12,560
what i thought was the right way to do

207
00:08:16,629 --> 00:08:14,720
things and so

208
00:08:18,150 --> 00:08:16,639
i was really fortunate to have both

209
00:08:19,749 --> 00:08:18,160
those guys on the crew because they

210
00:08:23,110 --> 00:08:19,759
taught me a lot

211
00:08:25,909 --> 00:08:23,120
um yuri from your perspective what was

212
00:08:28,629 --> 00:08:25,919
the biggest challenge here was it one of

213
00:08:32,960 --> 00:08:28,639

language was it one of culture was it

214

00:08:52,870 --> 00:08:32,970

the technological integration

215

00:08:58,550 --> 00:08:55,750

foreign

216

00:09:12,389 --> 00:08:58,560

yes we had some difficulties as we just

217

00:09:12,399 --> 00:09:48,949

foreign

218

00:09:54,870 --> 00:09:51,509

yes uh within some difficulties but not

219

00:09:57,269 --> 00:09:54,880

in interaction as friends or as the crew

220

00:09:59,269 --> 00:09:57,279

members here future crew members

221

00:10:01,670 --> 00:09:59,279

we have some difficulties in preparation

222

00:10:03,350 --> 00:10:01,680

because we were just starting and we

223

00:10:06,310 --> 00:10:03,360

didn't have

224

00:10:09,030 --> 00:10:06,320

all the proper materials all the

225

00:10:10,870 --> 00:10:09,040

simulators were not up to par we were

226

00:10:12,710 --> 00:10:10,880

just starting out and that was a

227

00:10:22,150 --> 00:10:12,720

difficulty in training not an

228

00:10:26,310 --> 00:10:24,310

if i might suggest why don't you ask

229

00:10:27,670 --> 00:10:26,320

ginger if she can explain what brain

230

00:10:29,750 --> 00:10:27,680

sharing was

231

00:10:31,750 --> 00:10:29,760

brain sharing yeah

232

00:10:33,350 --> 00:10:31,760

we might pull up my apologies you're

233

00:10:35,990 --> 00:10:33,360

just breaking up a little bit i think

234

00:10:37,590 --> 00:10:36,000

olga's having a little bit of trouble uh

235

00:10:40,790 --> 00:10:37,600

making out what you're saying ginger you

236

00:10:42,230 --> 00:10:40,800

want to hop in here oh sure so

237

00:10:44,310 --> 00:10:42,240

one of the things that yuri was talking

238

00:10:45,670 --> 00:10:44,320

about was it was difficult to train when

239

00:10:47,590 --> 00:10:45,680

you didn't have training materials you

240

00:10:49,430 --> 00:10:47,600

didn't have all the right simulations so

241

00:10:51,590 --> 00:10:49,440

we spent a lot of time with the hardware

242

00:10:53,430 --> 00:10:51,600

owners the hardware developers and there

243

00:10:55,750 --> 00:10:53,440

was one particular instance where this

244

00:10:57,670 --> 00:10:55,760

brain sharing

245

00:10:59,750 --> 00:10:57,680

name came to be is

246

00:11:00,389 --> 00:10:59,760

chef had gone and met with some one of

247

00:11:02,389 --> 00:11:00,399

the

248

00:11:03,990 --> 00:11:02,399

hardware developers and was asking a

249

00:11:05,350 --> 00:11:04,000

series of questions you know three or

250

00:11:07,269 --> 00:11:05,360

four questions

251

00:11:09,110 --> 00:11:07,279

and then sergey was a little late so

252

00:11:11,269 --> 00:11:09,120

sergey comes in and he looks at the

253

00:11:13,430 --> 00:11:11,279

hardware and immediately same three or

254

00:11:15,350 --> 00:11:13,440

four questions and we're just like oh my

255

00:11:17,990 --> 00:11:15,360

god they're sharing a brain now these

256

00:11:21,509 --> 00:11:18,710

um

257

00:11:23,670 --> 00:11:21,519

i'm curious about the language issue

258

00:11:25,990 --> 00:11:23,680

what was the language that you spoke of

259

00:11:29,509 --> 00:11:26,000

and sergey you want to weigh in i i i

260

00:11:32,069 --> 00:11:29,519

wanted to add maybe what chef said that

261

00:11:33,750 --> 00:11:32,079

shuttle was closer to airplane in in a

262

00:11:36,150 --> 00:11:33,760

way of operating because it was most of

263

00:11:37,110 --> 00:11:36,160

the time in com

264

00:11:39,350 --> 00:11:37,120

but

265

00:11:41,269 --> 00:11:39,360

actually with us yuri and i had the

266

00:11:43,590 --> 00:11:41,279

previous experience of flying on

267

00:11:45,829 --> 00:11:43,600

and the

268

00:11:48,230 --> 00:11:45,839

communication system and

269

00:11:51,030 --> 00:11:48,240

way how we

270

00:11:54,550 --> 00:11:51,040

operate on the station was very similar

271

00:11:56,230 --> 00:11:54,560

what we expected to be on iss

272

00:11:57,030 --> 00:11:56,240

especially for first expedition when we

273

00:12:01,509 --> 00:11:57,040

have

274

00:12:03,430 --> 00:12:01,519

decision ourselves in case of

275

00:12:04,710 --> 00:12:03,440

malfunction and we have to be

276
00:12:06,470 --> 00:12:04,720
more or less

277
00:12:07,829 --> 00:12:06,480
self-sufficient

278
00:12:09,350 --> 00:12:07,839
so

279
00:12:11,750 --> 00:12:09,360
as i said

280
00:12:14,470 --> 00:12:11,760
it was very interesting also because uh

281
00:12:16,949 --> 00:12:14,480
a lot of new things uh have to happen

282
00:12:18,629 --> 00:12:16,959
here on this first mission and

283
00:12:20,550 --> 00:12:18,639
that's why we

284
00:12:21,269 --> 00:12:20,560
uh we

285
00:12:23,110 --> 00:12:21,279
are

286
00:12:25,350 --> 00:12:23,120
exactly what chef said it's more like

287
00:12:27,670 --> 00:12:25,360
submarine or ship in

288
00:12:28,389 --> 00:12:27,680

at sea

289

00:12:31,990 --> 00:12:28,399

um

290

00:12:34,069 --> 00:12:32,000

language uh i in talking to to all of

291

00:12:36,230 --> 00:12:34,079

you can see that the um

292

00:12:39,030 --> 00:12:36,240

that chef and gingers both both speak

293

00:12:41,590 --> 00:12:39,040

some russian yuri and sergey you speak

294

00:12:43,350 --> 00:12:41,600

english what was the language

295

00:12:45,670 --> 00:12:43,360

on the international space station what

296

00:12:47,990 --> 00:12:45,680

did you speak and i would presume that

297

00:12:50,870 --> 00:12:48,000

in that kind of a situation you really

298

00:12:52,790 --> 00:12:50,880

have to be thinking in the right

299

00:12:55,350 --> 00:12:52,800

language that you can't be going through

300

00:12:57,110 --> 00:12:55,360

the translation process

301
00:12:59,269 --> 00:12:57,120
yeah i think we went back and forth

302
00:13:00,230 --> 00:12:59,279
quite a bit here we go ahead

303
00:13:01,990 --> 00:13:00,240
uh

304
00:13:03,990 --> 00:13:02,000
maybe

305
00:13:07,910 --> 00:13:04,000
for me in the beginning i had some

306
00:13:09,750 --> 00:13:07,920
challenges with uh english language

307
00:13:10,949 --> 00:13:09,760
just only for me

308
00:13:34,470 --> 00:13:10,959
i

309
00:13:38,069 --> 00:13:34,480
about some systems

310
00:13:39,189 --> 00:13:38,079
and after several months i mean

311
00:13:42,069 --> 00:13:39,199
in a year

312
00:13:54,790 --> 00:13:42,079
that was not very important for me

313
00:14:00,790 --> 00:13:58,069

yeah i thought initially that

314

00:14:02,949 --> 00:14:00,800

because the united states had an

315

00:14:04,629 --> 00:14:02,959

agreement with the other partners

316

00:14:06,389 --> 00:14:04,639

where we said english was going to be

317

00:14:08,629 --> 00:14:06,399

the standard language

318

00:14:09,750 --> 00:14:08,639

that would be the way to go but i got to

319

00:14:11,990 --> 00:14:09,760

russia and

320

00:14:14,150 --> 00:14:12,000

was working with many of the

321

00:14:16,629 --> 00:14:14,160

engineers technicians and managers some

322

00:14:19,110 --> 00:14:16,639

of these people helped to put sputnik in

323

00:14:20,949 --> 00:14:19,120

space and launched yuri gagarin and

324

00:14:23,269 --> 00:14:20,959

these people were still there

325

00:14:25,110 --> 00:14:23,279

and so i thought i said well

326

00:14:27,269 --> 00:14:25,120

you know we're not going to

327

00:14:30,230 --> 00:14:27,279

have completely invert the russian space

328

00:14:31,590 --> 00:14:30,240

system because we like english but even

329

00:14:32,710 --> 00:14:31,600

beyond that

330

00:14:35,670 --> 00:14:32,720

um

331

00:14:37,670 --> 00:14:35,680

in order for it's not enough to know

332

00:14:40,150 --> 00:14:37,680

what the russians did

333

00:14:42,310 --> 00:14:40,160

the the key element of making the space

334

00:14:44,150 --> 00:14:42,320

station work was to understand why

335

00:14:46,790 --> 00:14:44,160

the russians approached problems a

336

00:14:48,710 --> 00:14:46,800

certain way and the only

337

00:14:51,030 --> 00:14:48,720

method by which we were really going to

338

00:14:53,430 --> 00:14:51,040

get to that was if we could talk to all

339

00:14:55,590 --> 00:14:53,440

these people in russian so

340

00:14:57,350 --> 00:14:55,600

that became the way we operated if we

341

00:14:59,990 --> 00:14:57,360

could pull up uh

342

00:15:02,230 --> 00:15:00,000

picture number four i'll show you

343

00:15:04,550 --> 00:15:02,240

uh kind of one of the crutches that we

344

00:15:06,710 --> 00:15:04,560

use to get by that if we can do some

345

00:15:08,629 --> 00:15:06,720

screen sharing here yeah and what this

346

00:15:11,670 --> 00:15:08,639

is is going to be a picture of me in one

347

00:15:14,470 --> 00:15:11,680

of the training mock-ups and a big sheet

348

00:15:18,069 --> 00:15:14,480

of paper to the right is a

349

00:15:20,790 --> 00:15:18,079

a big schematic drawing of this the air

350

00:15:23,750 --> 00:15:20,800

purification system that i'm working on

351

00:15:26,629 --> 00:15:23,760

and our effort the early on in the space

352

00:15:29,430 --> 00:15:26,639

station training was to create

353

00:15:31,670 --> 00:15:29,440

very understandable graphic diagrams of

354

00:15:33,829 --> 00:15:31,680

all the systems that we had to use and i

355

00:15:35,829 --> 00:15:33,839

i gender correct me if i'm wrong i think

356

00:15:38,550 --> 00:15:35,839

we still use these today

357

00:15:40,710 --> 00:15:38,560

yes we still use those today

358

00:15:41,829 --> 00:15:40,720

and for me that was a big help because a

359

00:15:43,990 --> 00:15:41,839

lot of times

360

00:15:45,670 --> 00:15:44,000

i could go through class and i i could

361

00:15:47,110 --> 00:15:45,680

look at the diagram and even if i didn't

362

00:15:50,069 --> 00:15:47,120

get 100

363

00:15:52,150 --> 00:15:50,079

what the instructor was trying to

364

00:15:54,790 --> 00:15:52,160

teach us i could i could make sense out

365

00:15:57,829 --> 00:15:54,800

of it by referring to the diagram

366

00:15:59,269 --> 00:15:57,839

so um ginger or shep um i'm curious as

367

00:16:01,430 --> 00:15:59,279

to whether the russians had a very

368

00:16:04,030 --> 00:16:01,440

different approach to training if there

369

00:16:05,749 --> 00:16:04,040

were things that you learned uh from

370

00:16:08,629 --> 00:16:05,759

participating

371

00:16:11,829 --> 00:16:08,639

in russia um that might not have been

372

00:16:14,949 --> 00:16:11,839

obvious to you previously

373

00:16:17,030 --> 00:16:14,959

yeah um you they broke down lessons into

374

00:16:19,269 --> 00:16:17,040

theoretical and practical and you would

375

00:16:21,590 --> 00:16:19,279

get all of your theoretical lessons and

376

00:16:23,910 --> 00:16:21,600

then do your practical lessons

377

00:16:26,230 --> 00:16:23,920

um they had a less of a reliance on

378

00:16:27,910 --> 00:16:26,240

diagrams and documentation because

379

00:16:30,310 --> 00:16:27,920

they've had the people teaching the

380

00:16:32,470 --> 00:16:30,320

classes were experts and knew that

381

00:16:34,949 --> 00:16:32,480

information inside and out whereas on

382

00:16:36,230 --> 00:16:34,959

the u.s side we were all starting up

383

00:16:38,790 --> 00:16:36,240

there a lot of the instructors were

384

00:16:40,550 --> 00:16:38,800

young i was young at that time and um so

385

00:16:43,509 --> 00:16:40,560

we were developing materials and we

386

00:16:45,910 --> 00:16:43,519

didn't have the expertise so it was um

387

00:16:48,069 --> 00:16:45,920

interesting to see the dichotomy between

388

00:16:50,150 --> 00:16:48,079

the us approach and the russian approach

389

00:16:53,269 --> 00:16:50,160

um but we learned a lot um from each

390

00:16:55,269 --> 00:16:53,279

other and i think each of us adapted our

391

00:16:58,629 --> 00:16:55,279

uh approaches so that we were both

392

00:17:00,310 --> 00:16:58,639

better off um in the end

393

00:17:02,470 --> 00:17:00,320

to hear your perspective from the

394

00:17:04,870 --> 00:17:02,480

russian side did the americans have

395

00:17:06,069 --> 00:17:04,880

something to teach you

396

00:17:09,110 --> 00:17:06,079

uh actually

397

00:17:11,189 --> 00:17:09,120

ginger is 100 correct we are learning

398

00:17:12,949 --> 00:17:11,199

from each other and

399

00:17:16,150 --> 00:17:12,959

returning back to your previous question

400

00:17:17,909 --> 00:17:16,160

uh what was the language where

401
00:17:20,069 --> 00:17:17,919
shep was speaking some russian we were

402
00:17:22,549 --> 00:17:20,079
speaking some english so we called this

403
00:17:24,710 --> 00:17:22,559
mixture of languages wrongly

404
00:17:26,949 --> 00:17:24,720
and that's what we use

405
00:17:30,070 --> 00:17:26,959
during the mission we actually

406
00:17:31,990 --> 00:17:30,080
had this name when i was training for

407
00:17:33,590 --> 00:17:32,000
shuttle flight and actually for us it

408
00:17:36,390 --> 00:17:33,600
was very interesting exchange of

409
00:17:38,950 --> 00:17:36,400
experience because uh we were ginger is

410
00:17:41,270 --> 00:17:38,960
right we were based more on theoretical

411
00:17:43,750 --> 00:17:41,280
knowledge of the system and preparation

412
00:17:48,630 --> 00:17:43,760
for long duration flight

413
00:17:50,630 --> 00:17:48,640

was such that we were not able to repeat

414

00:17:52,390 --> 00:17:50,640

every step for several times

415

00:17:54,150 --> 00:17:52,400

getting ready for the flight because

416

00:17:54,950 --> 00:17:54,160

flight itself is

417

00:17:56,870 --> 00:17:54,960

long

418

00:17:57,830 --> 00:17:56,880

and you cannot

419

00:17:59,990 --> 00:17:57,840

do

420

00:18:02,950 --> 00:18:00,000

kind of usual rehearsal but and

421

00:18:05,029 --> 00:18:02,960

certainly it's possible to do and

422

00:18:06,470 --> 00:18:05,039

training for short duration flight is

423

00:18:08,710 --> 00:18:06,480

little different

424

00:18:10,950 --> 00:18:08,720

you know but what we learned that

425

00:18:12,870 --> 00:18:10,960

we can use more

426
00:18:16,470 --> 00:18:12,880
computer

427
00:18:19,750 --> 00:18:16,480
lessons or

428
00:18:21,830 --> 00:18:19,760
mock-up simulators

429
00:18:24,630 --> 00:18:21,840
before that computer was not as

430
00:18:27,430 --> 00:18:24,640
available and we had to have all this

431
00:18:29,430 --> 00:18:27,440
diagram in our head we had to

432
00:18:31,510 --> 00:18:29,440
understand how system worked

433
00:18:33,750 --> 00:18:31,520
and it actually had some advantages

434
00:18:35,830 --> 00:18:33,760
because if you are working in stressful

435
00:18:37,510 --> 00:18:35,840
environment in limited

436
00:18:39,510 --> 00:18:37,520
amount of time sometimes it's better to

437
00:18:40,830 --> 00:18:39,520
have everything in your head although

438
00:18:43,830 --> 00:18:40,840

it's more difficult

439

00:18:44,950 --> 00:18:43,840

to to build up this knowledge

440

00:18:46,630 --> 00:18:44,960

but

441

00:18:48,789 --> 00:18:46,640

as we said we were

442

00:18:49,830 --> 00:18:48,799

learning from each other we

443

00:18:52,630 --> 00:18:49,840

tried to

444

00:18:55,270 --> 00:18:52,640

share our experience experience of mere

445

00:18:56,470 --> 00:18:55,280

missions and we were learning from all

446

00:18:59,590 --> 00:18:56,480

this

447

00:19:01,990 --> 00:18:59,600

computer support training from u.s side

448

00:19:03,350 --> 00:19:02,000

and i think at the end

449

00:19:06,070 --> 00:19:03,360

now we have

450

00:19:09,510 --> 00:19:06,080

some kind of mix mixed system of

451
00:19:11,750 --> 00:19:09,520
training crew for now actually maybe

452
00:19:15,110 --> 00:19:11,760
one more difficulties we had in the

453
00:19:17,270 --> 00:19:15,120
beginning no one exactly knew what

454
00:19:19,990 --> 00:19:17,280
what kind of knowledge we will need in

455
00:19:22,710 --> 00:19:20,000
flight so for this purpose in case of

456
00:19:25,350 --> 00:19:22,720
this uncertainty we have to

457
00:19:27,110 --> 00:19:25,360
have more information that we really

458
00:19:29,430 --> 00:19:27,120
needed because no one knew

459
00:19:32,230 --> 00:19:29,440
how much information exactly we need and

460
00:19:34,789 --> 00:19:32,240
i see now that training for subsequent

461
00:19:36,150 --> 00:19:34,799
missions and especially now uh allow

462
00:19:38,789 --> 00:19:36,160
people to

463
00:19:41,510 --> 00:19:38,799

to learn only what they really need for

464

00:19:43,750 --> 00:19:41,520

the flight uh in our case we learn uh

465

00:19:46,630 --> 00:19:43,760

with some margin

466

00:19:48,549 --> 00:19:46,640

and it was really interesting

467

00:19:50,230 --> 00:19:48,559

um yuri did you want to weigh in on what

468

00:19:59,190 --> 00:19:50,240

you might have learned from the american

469

00:20:17,909 --> 00:20:02,050

um

470

00:20:22,789 --> 00:20:20,549

it was actually interesting to work

471

00:20:24,630 --> 00:20:22,799

together because we were learning from

472

00:20:28,630 --> 00:20:24,640

each other and different approaches

473

00:20:34,950 --> 00:20:31,909

um george was this exactly the kind of

474

00:20:36,950 --> 00:20:34,960

synergy you wanted to see come out of

475

00:20:39,350 --> 00:20:36,960

this international mission

476

00:20:42,950 --> 00:20:39,360

yes it was it really uh really turned

477

00:20:45,270 --> 00:20:42,960

out just to be what i hoped it to be

478

00:20:48,789 --> 00:20:45,280

and uh we had worked with our russian

479

00:20:51,990 --> 00:20:48,799

colleagues before on apollo soyuz uh the

480

00:20:53,909 --> 00:20:52,000

first uh joint talking mission and so i

481

00:20:55,270 --> 00:20:53,919

had confidence that we would be able to

482

00:20:57,990 --> 00:20:55,280

work with them and

483

00:21:00,549 --> 00:20:58,000

it would really turn out to be a good

484

00:21:02,470 --> 00:21:00,559

a good partnership for us and that we

485

00:21:05,190 --> 00:21:02,480

could learn from them and hopefully they

486

00:21:07,909 --> 00:21:05,200

could learn from us and between uh our

487

00:21:10,230 --> 00:21:07,919

two par our two nations we would uh come

488

00:21:11,750 --> 00:21:10,240

up with the great space station and i

489

00:21:13,830 --> 00:21:11,760

think this crew

490

00:21:16,149 --> 00:21:13,840

made it all happen

491

00:21:17,190 --> 00:21:16,159

hey gene one important part point that

492

00:21:19,110 --> 00:21:17,200

sergey

493

00:21:20,789 --> 00:21:19,120

touched on that i wanna i wanna double

494

00:21:22,710 --> 00:21:20,799

down on um

495

00:21:25,110 --> 00:21:22,720

in houston we had

496

00:21:27,909 --> 00:21:25,120

extensive simulators for the shuttle and

497

00:21:29,510 --> 00:21:27,919

the crew spent hundreds of hours in

498

00:21:31,590 --> 00:21:29,520

these machines

499

00:21:33,590 --> 00:21:31,600

and quite often we would be sitting

500

00:21:35,669 --> 00:21:33,600

waiting for the computers come up

501

00:21:38,390 --> 00:21:35,679

because the sim had crashed and it

502

00:21:40,630 --> 00:21:38,400

happened like twice a day and it took

503

00:21:42,070 --> 00:21:40,640

about 30 or 40 minutes to reboot the

504

00:21:45,350 --> 00:21:42,080

computers and get everything running

505

00:21:47,990 --> 00:21:45,360

again when i got to star city and i

506

00:21:50,549 --> 00:21:48,000

asked the instructors there about their

507

00:21:53,430 --> 00:21:50,559

soyuz simulator and how often they had

508

00:21:56,870 --> 00:21:53,440

to reboot it because it had crashed the

509

00:22:00,390 --> 00:21:56,880

answer was well uh we do this maybe once

510

00:22:03,830 --> 00:22:00,400

a year and so when i finished the space

511

00:22:05,909 --> 00:22:03,840

station and i came back to johnson i was

512

00:22:08,149 --> 00:22:05,919

trying to get the point across to senior

513

00:22:11,110 --> 00:22:08,159

management that the way the russians

514

00:22:13,669 --> 00:22:11,120

designed some things is really good and

515

00:22:15,270 --> 00:22:13,679

we need to learn from this unfortunately

516

00:22:16,310 --> 00:22:15,280

uh

517

00:22:18,870 --> 00:22:16,320

you know

518

00:22:21,190 --> 00:22:18,880

space technology being what it is we

519

00:22:23,110 --> 00:22:21,200

have we have a fascination particularly

520

00:22:24,710 --> 00:22:23,120

in the states with the most complex

521

00:22:27,750 --> 00:22:24,720

things we can build

522

00:22:29,430 --> 00:22:27,760

i'm not sure that's the right answer

523

00:22:31,190 --> 00:22:29,440

george abby i have to give you a chance

524

00:22:33,510 --> 00:22:31,200

to respond to that

525

00:22:35,270 --> 00:22:33,520

well i think i would go along with what

526

00:22:38,149 --> 00:22:35,280

chef says i think

527

00:22:40,549 --> 00:22:38,159

the russian design approaches

528

00:22:42,950 --> 00:22:40,559

is a very good one and uh

529

00:22:45,510 --> 00:22:42,960

they uh they come up with very reliable

530

00:22:48,630 --> 00:22:45,520

equipment and very reliable systems

531

00:22:51,190 --> 00:22:48,640

and uh i think we learned from them and

532

00:22:53,669 --> 00:22:51,200

hopefully we can adapt uh some of those

533

00:22:56,070 --> 00:22:53,679

lessons and incorporate them into our

534

00:22:59,029 --> 00:22:56,080

spacecraft but

535

00:23:01,430 --> 00:22:59,039

yes i agree with shep

536

00:23:03,430 --> 00:23:01,440

uh ginger uh i'd love to talk to you a

537

00:23:06,630 --> 00:23:03,440

little bit about your feelings after

538

00:23:09,110 --> 00:23:06,640

working with these guys for years

539

00:23:11,590 --> 00:23:09,120

uh they're about to take off

540

00:23:13,750 --> 00:23:11,600

um tell me that story of what that was

541

00:23:15,430 --> 00:23:13,760

like and what you felt

542

00:23:17,430 --> 00:23:15,440

seeing them launch

543

00:23:19,990 --> 00:23:17,440

yeah you know i spent four years of my

544

00:23:23,110 --> 00:23:20,000

life wherever this crew was that's where

545

00:23:25,029 --> 00:23:23,120

i was if we were in baikonur kazakhstan

546

00:23:26,470 --> 00:23:25,039

looking at the service module before it

547

00:23:28,870 --> 00:23:26,480

launched i was right there with them if

548

00:23:31,669 --> 00:23:28,880

we were in florida if we were in

549

00:23:33,430 --> 00:23:31,679

huntsville alabama or houston or star

550

00:23:36,390 --> 00:23:33,440

city russia so

551

00:23:39,750 --> 00:23:36,400

we formed quite the bond

552

00:23:42,230 --> 00:23:39,760

and so on launch day i got to go to

553

00:23:44,390 --> 00:23:42,240

their launch and it was a foggy day

554

00:23:47,590 --> 00:23:44,400

and i remember watching them walk up the

555

00:23:49,710 --> 00:23:47,600

stairs of the launch vehicle and as soon

556

00:23:52,549 --> 00:23:49,720

as that hat shut i started

557

00:23:54,630 --> 00:23:52,559

hyperventilating and i know the

558

00:23:57,269 --> 00:23:54,640

spacecraft i knew that they were going

559

00:24:00,149 --> 00:23:57,279

to be safe but something inside me said

560

00:24:01,830 --> 00:24:00,159

my family is going on a rocket and i

561

00:24:04,230 --> 00:24:01,840

could not handle it

562

00:24:06,870 --> 00:24:04,240

and one of the russian um high-ranking

563

00:24:08,789 --> 00:24:06,880

military officials noticed that put his

564

00:24:10,950 --> 00:24:08,799

arm around me and started partying the

565

00:24:13,510 --> 00:24:10,960

crowd to try to bring me to a closer

566

00:24:15,590 --> 00:24:13,520

view and as he's doing that he says at

567

00:24:17,190 --> 00:24:15,600

the moment

568

00:24:19,909 --> 00:24:17,200

it's the mother of the crew get out of

569

00:24:21,269 --> 00:24:19,919

the way and uh but he put me in a spot

570

00:24:22,870 --> 00:24:21,279

where i could watch them and i was

571

00:24:25,990 --> 00:24:22,880

reassured that everything was going to

572

00:24:27,830 --> 00:24:26,000

be okay but it was weird because you

573

00:24:30,710 --> 00:24:27,840

know we were a family of four and three

574

00:24:33,750 --> 00:24:30,720

of them were going to space

575

00:24:35,990 --> 00:24:33,760

and so the three of you arrive at the

576

00:24:38,390 --> 00:24:36,000

space station love to get your first

577

00:24:40,549 --> 00:24:38,400

impressions sergey

578

00:24:44,070 --> 00:24:40,559

what did you feel what did you see what

579

00:24:45,510 --> 00:24:44,080

did you spell as you arrived there

580

00:24:48,070 --> 00:24:45,520

actually

581

00:24:49,110 --> 00:24:48,080

the service model of international space

582

00:24:51,510 --> 00:24:49,120

station

583

00:24:53,269 --> 00:24:51,520

is very similar to a core module of

584

00:24:56,230 --> 00:24:53,279

mirror station uh

585

00:24:58,950 --> 00:24:56,240

mechanically so the only difference i

586

00:25:03,029 --> 00:24:58,960

felt that we came to the station and it

587

00:25:05,590 --> 00:25:03,039

was very new very clean and

588

00:25:07,190 --> 00:25:05,600

not completely empty but much emptier

589

00:25:07,990 --> 00:25:07,200

that you

590

00:25:10,470 --> 00:25:08,000

this

591

00:25:12,230 --> 00:25:10,480

space happened to be after several

592

00:25:15,190 --> 00:25:12,240

months of uh

593

00:25:17,990 --> 00:25:15,200

crew living there so i remember

594

00:25:20,470 --> 00:25:18,000

we were discussing with designers on the

595

00:25:22,870 --> 00:25:20,480

ground that maybe the table we had in

596

00:25:26,470 --> 00:25:22,880

the middle of this

597

00:25:28,710 --> 00:25:26,480

big compartment uh can be not assembled

598

00:25:30,789 --> 00:25:28,720

as a full part maybe only part of it can

599

00:25:31,750 --> 00:25:30,799

exist but when we came there with no

600

00:25:34,710 --> 00:25:31,760

table

601
00:25:37,190 --> 00:25:34,720
we switch on lights and the first uh

602
00:25:39,669 --> 00:25:37,200
thing we need to do is prepare

603
00:25:42,950 --> 00:25:39,679
uh our tv downlink uh to have the

604
00:25:44,630 --> 00:25:42,960
teleconference from the station and we

605
00:25:46,950 --> 00:25:44,640
start to

606
00:25:48,470 --> 00:25:46,960
search for for connectors

607
00:25:51,350 --> 00:25:48,480
and it was

608
00:25:52,470 --> 00:25:51,360
typical operation but it was very

609
00:25:54,549 --> 00:25:52,480
memorable

610
00:25:56,390 --> 00:25:54,559
switching on light for the first time

611
00:25:58,630 --> 00:25:56,400
when we came to

612
00:26:00,549 --> 00:25:58,640
almost dark stations switching on light

613
00:26:04,230 --> 00:26:00,559

and it became very light

614

00:26:08,149 --> 00:26:06,230

and trying to

615

00:26:11,510 --> 00:26:08,159

make hot water because for two days we

616

00:26:12,310 --> 00:26:11,520

were flying on soyuz we had only snaps

617

00:26:15,909 --> 00:26:12,320

and

618

00:26:17,909 --> 00:26:15,919

cold cold food so we knew how system is

619

00:26:20,789 --> 00:26:17,919

built and start to activate

620

00:26:23,350 --> 00:26:20,799

uh hot water to have a hot drink on the

621

00:26:26,230 --> 00:26:23,360

station right yuri is right

622

00:26:29,110 --> 00:26:26,240

yuri the the job of of your crew

623

00:26:31,590 --> 00:26:29,120

primarily was to set up house

624

00:26:33,590 --> 00:26:31,600

uh on the space station can you talk to

625

00:26:35,830 --> 00:26:33,600

us a little bit about about that what

626
00:27:04,549 --> 00:26:35,840
you had to do when you got there besides

627
00:27:09,269 --> 00:27:06,630
well first i want to say that when we

628
00:27:12,870 --> 00:27:09,279
just got there we were not able to open

629
00:27:14,710 --> 00:27:12,880
the hatch right away we had struggle

630
00:27:17,750 --> 00:27:14,720
with sergey with our

631
00:27:19,590 --> 00:27:17,760
legs with our arms uh for maybe five

632
00:27:21,190 --> 00:27:19,600
minutes and we were thinking how come we

633
00:27:31,669 --> 00:27:21,200
just drive to the station but we are not

634
00:27:31,679 --> 00:27:39,990
to

635
00:27:46,310 --> 00:27:40,870
and

636
00:27:49,110 --> 00:27:46,320
in as sergey said we turned on the light

637
00:27:52,789 --> 00:27:49,120
we got some hot water we activated the

638
00:27:55,830 --> 00:27:52,799

toilet and i remember uh chef said now

639

00:28:02,230 --> 00:27:55,840

we can live we have light we have hot

640

00:28:07,430 --> 00:28:04,470

jumping in again i think uh

641

00:28:10,789 --> 00:28:07,440

history may forget our first cargo ship

642

00:28:13,590 --> 00:28:10,799

came up about 10 days after we arrived

643

00:28:15,350 --> 00:28:13,600

and uh yuri did a great job of of

644

00:28:17,269 --> 00:28:15,360

docking it because it was supposed to

645

00:28:20,310 --> 00:28:17,279

find this automatically

646

00:28:22,789 --> 00:28:20,320

um but it came up and it was acting very

647

00:28:24,470 --> 00:28:22,799

strangely and and you really flew it in

648

00:28:25,909 --> 00:28:24,480

by hand maybe you can tell a little bit

649

00:28:27,750 --> 00:28:25,919

yuri and sergey can tell a little bit

650

00:28:32,310 --> 00:28:27,760

about how that went it was a pretty big

651

00:28:36,950 --> 00:28:34,710

uh yeah it was unusual uh

652

00:28:39,110 --> 00:28:36,960

docking because as shep said uh this

653

00:28:42,389 --> 00:28:39,120

cargo vehicle is supposed to

654

00:28:45,590 --> 00:28:42,399

approach and then dock in automatic mode

655

00:28:46,870 --> 00:28:45,600

but when it uh came for about 100 meters

656

00:28:48,870 --> 00:28:46,880

uh range

657

00:28:51,669 --> 00:28:48,880

then it started to

658

00:28:55,110 --> 00:28:51,679

uh to wobble and searching for for

659

00:28:58,470 --> 00:28:55,120

docking and this oscillation became so

660

00:29:01,510 --> 00:28:58,480

big that it start to be dangerous

661

00:29:04,549 --> 00:29:01,520

and fortunately we had uh opportunity

662

00:29:07,110 --> 00:29:04,559

uh to manually control it so we had to

663

00:29:09,190 --> 00:29:07,120

switch to manual control and the yuri

664

00:29:10,630 --> 00:29:09,200

was controlling it but by hand

665

00:29:13,190 --> 00:29:10,640

controllers

666

00:29:15,830 --> 00:29:13,200

installed in the station but next uh

667

00:29:19,669 --> 00:29:15,840

issue was that uh

668

00:29:22,549 --> 00:29:19,679

lens on the camera that was used for uh

669

00:29:24,630 --> 00:29:22,559

for a lining vehicle was fogged and we

670

00:29:26,549 --> 00:29:24,640

didn't know what is this

671

00:29:29,830 --> 00:29:26,559

fork is it kind of glue

672

00:29:32,789 --> 00:29:29,840

something else stick to the

673

00:29:34,470 --> 00:29:32,799

window of this camera or something else

674

00:29:36,149 --> 00:29:34,480

so

675

00:29:42,310 --> 00:29:36,159

we call this

676
00:29:46,230 --> 00:29:44,470
but the problem was that because yuri

677
00:29:48,950 --> 00:29:46,240
cannot see

678
00:29:51,590 --> 00:29:48,960
station and target well i was jumping to

679
00:29:54,470 --> 00:29:51,600
window and we have what we said

680
00:29:56,389 --> 00:29:54,480
tell italia operation mode because i was

681
00:29:58,310 --> 00:29:56,399
looking out in the window

682
00:30:01,750 --> 00:29:58,320
gives some guidance to yuri and yuri was

683
00:30:04,310 --> 00:30:01,760
trying to control it try to use some

684
00:30:07,190 --> 00:30:04,320
image on the

685
00:30:09,430 --> 00:30:07,200
monitor and some information he got from

686
00:30:11,590 --> 00:30:09,440
me because i was looking directly to

687
00:30:13,669 --> 00:30:11,600
approaching vehicle so finally we were

688
00:30:14,870 --> 00:30:13,679

able to station keep

689

00:30:15,990 --> 00:30:14,880

this

690

00:30:18,230 --> 00:30:16,000

vehicle

691

00:30:19,350 --> 00:30:18,240

very close to the station and on

692

00:30:21,590 --> 00:30:19,360

sunlight

693

00:30:23,909 --> 00:30:21,600

this fork on the lens

694

00:30:26,149 --> 00:30:23,919

came out and we were able finally to do

695

00:30:27,190 --> 00:30:26,159

that it was very unusual way of talking

696

00:30:29,269 --> 00:30:27,200

vehicle

697

00:30:32,230 --> 00:30:29,279

but fortunately we had

698

00:30:34,149 --> 00:30:32,240

very many layers of redundancy and one

699

00:30:37,350 --> 00:30:34,159

of these layers worked out well and we

700

00:30:38,950 --> 00:30:37,360

were able to do working safely and maybe

701
00:30:41,190 --> 00:30:38,960
chef can add something because he was

702
00:30:43,350 --> 00:30:41,200
monitoring and recording this

703
00:30:46,710 --> 00:30:43,360
looking at us jumping

704
00:30:49,430 --> 00:30:46,720
to the control panel to window and back

705
00:30:51,110 --> 00:30:49,440
yeah i think it's one of the issues of

706
00:30:54,549 --> 00:30:51,120
if you will the culture

707
00:30:56,230 --> 00:30:54,559
russian designs put in many ways to get

708
00:30:58,710 --> 00:30:56,240
things done

709
00:31:01,990 --> 00:30:58,720
there's lots of redundancy and

710
00:31:03,750 --> 00:31:02,000
in some programs the the us does not

711
00:31:04,710 --> 00:31:03,760
have as much and i think that's one of

712
00:31:06,310 --> 00:31:04,720
the things

713
00:31:08,950 --> 00:31:06,320

in the future we need to pay a lot of

714

00:31:09,909 --> 00:31:08,960

attention to

715

00:31:11,830 --> 00:31:09,919

um

716

00:31:13,590 --> 00:31:11,840

chef can you tell us what the average

717

00:31:15,590 --> 00:31:13,600

day would have been like this was

718

00:31:17,750 --> 00:31:15,600

obviously an unusual day when you had

719

00:31:19,590 --> 00:31:17,760

this docking drama but what about the

720

00:31:22,149 --> 00:31:19,600

average day what did you guys do did you

721

00:31:23,750 --> 00:31:22,159

have assigned responsibilities did you

722

00:31:24,950 --> 00:31:23,760

all do a little bit of everything how

723

00:31:27,190 --> 00:31:24,960

did it go

724

00:31:29,430 --> 00:31:27,200

well i gotta say that i don't think you

725

00:31:31,909 --> 00:31:29,440

could say we had an average day at least

726

00:31:34,149 --> 00:31:31,919

not too many of them but this was good

727

00:31:36,950 --> 00:31:34,159

because uh we were up there

728

00:31:40,389 --> 00:31:36,960

to get a lot of work done and every day

729

00:31:43,269 --> 00:31:40,399

seemed to have its own set of challenges

730

00:31:45,430 --> 00:31:43,279

we got up uh 6 30ish in the morning i

731

00:31:49,350 --> 00:31:45,440

like to get a cup of coffee and

732

00:31:52,310 --> 00:31:49,360

read on the laptop where the printouts

733

00:31:55,269 --> 00:31:52,320

what the ground wanted us to do but from

734

00:31:58,630 --> 00:31:55,279

then on it was kind of free free for all

735

00:32:00,549 --> 00:31:58,640

the one thing i did enjoy was

736

00:32:03,110 --> 00:32:00,559

we got together around

737

00:32:05,269 --> 00:32:03,120

the the galley table we another story

738

00:32:06,630 --> 00:32:05,279

about that but three times a day we made

739

00:32:08,870 --> 00:32:06,640

a point to have our meals together and

740

00:32:10,870 --> 00:32:08,880

that was a that was a big part of

741

00:32:13,110 --> 00:32:10,880

keeping everybody kind of on the same

742

00:32:16,789 --> 00:32:13,120

plan of the day but i'll let yuri and

743

00:32:18,870 --> 00:32:16,799

sergey talk about their perspectives

744

00:32:39,350 --> 00:32:18,880

yuri tell us what

745

00:32:39,360 --> 00:32:55,190

just listening

746

00:32:59,750 --> 00:32:57,830

uh my impression after looking back you

747

00:33:01,509 --> 00:32:59,760

know 20 years back

748

00:33:03,590 --> 00:33:01,519

seems like the first couple weeks we

749

00:33:05,509 --> 00:33:03,600

were just working and working and

750

00:33:17,350 --> 00:33:05,519

working

751

00:33:22,710 --> 00:33:20,710

especially uh the first week i think uh

752

00:33:24,310 --> 00:33:22,720

the first shaving we did we shaved

753

00:33:26,149 --> 00:33:24,320

probably like three days after we

754

00:33:28,470 --> 00:33:26,159

arrived maybe even later because we were

755

00:33:29,509 --> 00:33:28,480

not even able to find the

756

00:33:36,389 --> 00:33:29,519

the

757

00:33:39,590 --> 00:33:38,070

but it was extremely interesting very

758

00:33:42,310 --> 00:33:39,600

interesting

759

00:33:44,950 --> 00:33:42,320

um george i'm curious if there ever was

760

00:33:46,710 --> 00:33:44,960

tension between what the united states

761

00:33:49,669 --> 00:33:46,720

wanted the crew to be doing and what the

762

00:33:50,470 --> 00:33:49,679

russians wanted through to be doing

763

00:33:53,669 --> 00:33:50,480

no

764

00:33:56,389 --> 00:33:53,679

uh there wasn't any of that kind of

765

00:33:58,789 --> 00:33:56,399

tension i think uh having uh worked with

766

00:34:00,630 --> 00:33:58,799

the russians on the mirror program

767

00:34:02,870 --> 00:34:00,640

the shuttle merit program

768

00:34:05,110 --> 00:34:02,880

we had developed a lot of confidence in

769

00:34:06,870 --> 00:34:05,120

each other and uh confidence when they

770

00:34:09,430 --> 00:34:06,880

made a decision that

771

00:34:10,950 --> 00:34:09,440

they exercised all of everything that

772

00:34:12,149 --> 00:34:10,960

needed to be done to make sure it was a

773

00:34:13,270 --> 00:34:12,159

good decision

774

00:34:15,909 --> 00:34:13,280

and so

775

00:34:18,069 --> 00:34:15,919

really that that those missions that we

776
00:34:20,550 --> 00:34:18,079
flew to the mirror and working with the

777
00:34:23,030 --> 00:34:20,560
russians in their control center really

778
00:34:24,950 --> 00:34:23,040
gave us a good foundation for moving

779
00:34:26,790 --> 00:34:24,960
into the assembly flights and that

780
00:34:28,790 --> 00:34:26,800
worked right with the international

781
00:34:31,510 --> 00:34:28,800
space station so

782
00:34:33,349 --> 00:34:31,520
initially on the shuttle mirror we had

783
00:34:36,310 --> 00:34:33,359
some tensions but that had been well

784
00:34:37,589 --> 00:34:36,320
worked out by the time we were doing uh

785
00:34:40,069 --> 00:34:37,599
the first mission

786
00:34:42,550 --> 00:34:40,079
of the international space station

787
00:34:43,990 --> 00:34:42,560
hey gene i gotta jump in on that because

788
00:34:46,149 --> 00:34:44,000

early on

789

00:34:48,470 --> 00:34:46,159

the two control centers

790

00:34:50,629 --> 00:34:48,480

flying the iss was kind of new for both

791

00:34:53,270 --> 00:34:50,639

of them and

792

00:34:54,790 --> 00:34:53,280

about for the first maybe two or three

793

00:34:56,869 --> 00:34:54,800

weeks of things

794

00:34:59,270 --> 00:34:56,879

occasionally we would get conflict

795

00:35:01,990 --> 00:34:59,280

conflicting marching orders uh things

796

00:35:04,230 --> 00:35:02,000

that houston had said and then the

797

00:35:07,030 --> 00:35:04,240

control center in moscow changed later

798

00:35:09,990 --> 00:35:07,040

and this and it would go back and forth

799

00:35:12,550 --> 00:35:10,000

almost orbit by orbit sometimes and i i

800

00:35:14,950 --> 00:35:12,560

got really frustrated one day

801
00:35:17,589 --> 00:35:14,960
and i got on the radio and both control

802
00:35:20,150 --> 00:35:17,599
centers can hear you when you can talk

803
00:35:21,589 --> 00:35:20,160
to a ground station and said look we're

804
00:35:23,510 --> 00:35:21,599
the international space station you guys

805
00:35:25,270 --> 00:35:23,520
have to coordinate

806
00:35:27,270 --> 00:35:25,280
one plan and give it to us and that's

807
00:35:29,670 --> 00:35:27,280
the one we'll do we're not doing one

808
00:35:31,670 --> 00:35:29,680
plan for moscow and one plan for houston

809
00:35:34,069 --> 00:35:31,680
they they just needed that little

810
00:35:36,069 --> 00:35:34,079
reminder and i was happy to give it to

811
00:35:41,670 --> 00:35:36,079
him and i gotta say that was my happiest

812
00:35:45,829 --> 00:35:43,430
so you guys were living together in

813
00:35:47,030 --> 00:35:45,839

pretty tight quarters up there

814

00:35:49,109 --> 00:35:47,040

um

815

00:35:51,190 --> 00:35:49,119

how did you get along i mean were there

816

00:35:53,510 --> 00:35:51,200

tensions that developed were you ever

817

00:35:56,230 --> 00:35:53,520

able to have privacy

818

00:35:58,710 --> 00:35:56,240

was everybody chummy

819

00:36:01,030 --> 00:35:58,720

who wants to weigh in first

820

00:36:03,670 --> 00:36:01,040

stage station was not big at that time

821

00:36:04,710 --> 00:36:03,680

but i think it was still bigger than

822

00:36:08,470 --> 00:36:04,720

shuttle

823

00:36:10,710 --> 00:36:08,480

and

824

00:36:12,870 --> 00:36:10,720

we had

825

00:36:16,069 --> 00:36:12,880

enough room to have

826

00:36:18,550 --> 00:36:16,079

at least some privacy uh but uh really

827

00:36:19,349 --> 00:36:18,560

we don't need much privacy because we

828

00:36:21,430 --> 00:36:19,359

were

829

00:36:22,950 --> 00:36:21,440

working together and i would like to

830

00:36:25,750 --> 00:36:22,960

return back maybe to previous questions

831

00:36:28,870 --> 00:36:25,760

when chef said that we didn't have a

832

00:36:31,750 --> 00:36:28,880

normal day because every day was

833

00:36:34,150 --> 00:36:31,760

special and i also remember another

834

00:36:35,990 --> 00:36:34,160

interesting thing when we were

835

00:36:37,990 --> 00:36:36,000

still on the ground preparing for the

836

00:36:40,630 --> 00:36:38,000

flight and we were shown

837

00:36:42,470 --> 00:36:40,640

tools we are going to have

838

00:36:44,069 --> 00:36:42,480

onboard the station

839

00:36:45,910 --> 00:36:44,079

one of the

840

00:36:48,710 --> 00:36:45,920

big tools i don't really don't know how

841

00:36:50,150 --> 00:36:48,720

it's called in english but like a big

842

00:36:53,349 --> 00:36:50,160

chunk of metal

843

00:36:54,550 --> 00:36:53,359

like you you open the door or

844

00:36:55,750 --> 00:36:54,560

safe

845

00:36:57,910 --> 00:36:55,760

but

846

00:36:59,430 --> 00:36:57,920

shep was laughing saying why do we need

847

00:37:00,150 --> 00:36:59,440

this big

848

00:37:02,870 --> 00:37:00,160

big

849

00:37:05,670 --> 00:37:02,880

heavy instrument in there we said well

850

00:37:07,109 --> 00:37:05,680

chef let's take it just in case and i

851

00:37:09,670 --> 00:37:07,119

think maybe not in first but on the

852

00:37:12,069 --> 00:37:09,680

second week when we were installing one

853

00:37:14,630 --> 00:37:12,079

of the equipment uh that supposed to

854

00:37:16,950 --> 00:37:14,640

take like 15 minutes to install and we

855

00:37:18,870 --> 00:37:16,960

when we had the training for

856

00:37:21,030 --> 00:37:18,880

this installation on the ground it was

857

00:37:23,670 --> 00:37:21,040

very simple we just put it in make

858

00:37:26,150 --> 00:37:23,680

several connections and put uh

859

00:37:27,109 --> 00:37:26,160

four bolts to hold this uh piece of

860

00:37:29,750 --> 00:37:27,119

equipment

861

00:37:32,470 --> 00:37:29,760

uh on the station maybe station was

862

00:37:34,630 --> 00:37:32,480

deformed a little bit from uh

863

00:37:38,069 --> 00:37:34,640

ground position and flight position but

864

00:37:39,109 --> 00:37:38,079

really we need to use all heavy tools

865

00:37:44,310 --> 00:37:39,119

to

866

00:37:45,589 --> 00:37:44,320

in in a proper place and it was almost

867

00:37:47,510 --> 00:37:45,599

like

868

00:37:50,390 --> 00:37:47,520

i don't know special adventure so every

869

00:37:52,710 --> 00:37:50,400

day day was very adventurous

870

00:37:55,109 --> 00:37:52,720

um ginger we talked a little bit about

871

00:37:57,270 --> 00:37:55,119

how you felt seeing these guys go off

872

00:38:01,430 --> 00:37:57,280

that you were the mother of the crew are

873

00:38:06,790 --> 00:38:03,910

oh very much so um every time i'm in

874

00:38:09,829 --> 00:38:06,800

town well in russia i always try to find

875

00:38:11,829 --> 00:38:09,839

yuri and sergey um i think i saw yuri a

876

00:38:13,270 --> 00:38:11,839

couple of novembers ago when i was in

877

00:38:15,190 --> 00:38:13,280

star city

878

00:38:16,710 --> 00:38:15,200

and sergey makes more frequent trips out

879

00:38:18,790 --> 00:38:16,720

to the us

880

00:38:21,349 --> 00:38:18,800

so he was able to meet my fiance his

881

00:38:23,589 --> 00:38:21,359

last trip and um

882

00:38:25,349 --> 00:38:23,599

i'm hoping that they can both make it

883

00:38:27,589 --> 00:38:25,359

for the wedding in march if travel

884

00:38:31,589 --> 00:38:27,599

allows and shep is going to be giving me

885

00:38:34,150 --> 00:38:31,599

away um so yes we still stay in touch we

886

00:38:35,270 --> 00:38:34,160

have formed i think what are lifelong

887

00:38:38,150 --> 00:38:35,280

friendships

888

00:38:39,990 --> 00:38:38,160

um and i'm very thankful to nasa for

889

00:38:41,829 --> 00:38:40,000

giving me a job that allowed me not only

890

00:38:43,430 --> 00:38:41,839

to support the expedition 1 crew in

891

00:38:45,670 --> 00:38:43,440

their mission but also to make such

892

00:38:47,670 --> 00:38:45,680

great friends

893

00:38:49,829 --> 00:38:47,680

we're coming down to our last minutes

894

00:38:53,030 --> 00:38:49,839

and i'd like to get from each of you

895

00:38:56,390 --> 00:38:53,040

your thoughts on what the big takeaway

896

00:38:58,470 --> 00:38:56,400

from your mission was um chef why don't

897

00:39:01,190 --> 00:38:58,480

we start with you

898

00:39:02,710 --> 00:39:01,200

uh i think space station particular

899

00:39:05,030 --> 00:39:02,720

expedition one

900

00:39:09,589 --> 00:39:05,040

uh set the tone for how crews need to

901
00:39:14,310 --> 00:39:12,310
um that uh we can fly a really big

902
00:39:16,790 --> 00:39:14,320
complex vehicle lots of international

903
00:39:18,150 --> 00:39:16,800
partners and with the right ground

904
00:39:20,230 --> 00:39:18,160
support and training we can figure out

905
00:39:22,069 --> 00:39:20,240
how to make it all work i think it's the

906
00:39:24,310 --> 00:39:22,079
blueprint for uh

907
00:39:25,990 --> 00:39:24,320
larger expeditions and going certainly

908
00:39:28,310 --> 00:39:26,000
to the moon and probably beyond that to

909
00:39:37,349 --> 00:39:28,320
mars and elsewhere

910
00:39:37,359 --> 00:39:48,150
from

911
00:39:52,150 --> 00:39:49,109
yes

912
00:39:53,829 --> 00:39:52,160
i just will join a chef here and want to

913
00:39:55,030 --> 00:39:53,839

add that the

914

00:39:58,310 --> 00:39:55,040

main

915

00:40:01,109 --> 00:39:58,320

objective for our mission was to prepare

916

00:40:02,950 --> 00:40:01,119

the station for the next cruise so for

917

00:40:14,470 --> 00:40:02,960

crew number two commander three and so

918

00:40:18,630 --> 00:40:16,390

and i just wanted to add that right now

919

00:40:22,550 --> 00:40:18,640

on the station we have already grew

920

00:40:26,069 --> 00:40:22,560

number 63 this is mission number 63 and

921

00:40:27,430 --> 00:40:26,079

64 there as well and 63 is going to land

922

00:40:31,670 --> 00:40:27,440

today

923

00:40:36,790 --> 00:40:33,670

sergey your thoughts on

924

00:40:39,589 --> 00:40:36,800

reflecting on your mission

925

00:40:41,670 --> 00:40:39,599

well as we said at that time that the

926

00:40:44,230 --> 00:40:41,680

goal of our mission was to make station

927

00:40:46,309 --> 00:40:44,240

alive because when we came most of the

928

00:40:48,470 --> 00:40:46,319

system was shut down some of them was

929

00:40:50,390 --> 00:40:48,480

not even installed and some of them

930

00:40:52,309 --> 00:40:50,400

installation and activation of this

931

00:40:54,630 --> 00:40:52,319

system was

932

00:40:56,950 --> 00:40:54,640

life critical so if we wouldn't be able

933

00:41:00,069 --> 00:40:56,960

to do this on time we had to

934

00:41:01,349 --> 00:41:00,079

stop mission early and return back home

935

00:41:03,430 --> 00:41:01,359

so we

936

00:41:05,829 --> 00:41:03,440

as a crew we need to be very reliable

937

00:41:07,910 --> 00:41:05,839

and i think our crew was able to do what

938

00:41:11,030 --> 00:41:07,920

we were supposed to do

939

00:41:13,750 --> 00:41:11,040

but i think our goal was not only

940

00:41:16,550 --> 00:41:13,760

prepare station for future experiments i

941

00:41:20,150 --> 00:41:18,710

space station program itself is very big

942

00:41:21,670 --> 00:41:20,160

and interesting

943

00:41:24,390 --> 00:41:21,680

technical experiment

944

00:41:26,790 --> 00:41:24,400

uh what we did on expedition one was big

945

00:41:28,790 --> 00:41:26,800

technical experiment because we were put

946

00:41:30,950 --> 00:41:28,800

some things together we were activating

947

00:41:32,309 --> 00:41:30,960

them in unusual

948

00:41:35,990 --> 00:41:32,319

situation

949

00:41:38,390 --> 00:41:36,000

as we said some of the hardware never

950

00:41:40,230 --> 00:41:38,400

met each other on the ground and we we

951
00:41:43,030 --> 00:41:40,240
had to install it in space for the first

952
00:41:45,990 --> 00:41:43,040
time and not every time it was smooth

953
00:41:47,550 --> 00:41:46,000
so i think it was

954
00:41:49,990 --> 00:41:47,560
very interesting technical and

955
00:41:51,910 --> 00:41:50,000
organizational experiment and the result

956
00:41:55,109 --> 00:41:51,920
of this experiment we are using up to

957
00:41:56,790 --> 00:41:55,119
now and as you reset 63 and 6 expedition

958
00:42:00,150 --> 00:41:56,800
6364

959
00:42:01,990 --> 00:42:00,160
is flying now so result of our first

960
00:42:04,150 --> 00:42:02,000
technical and organizational experiment

961
00:42:06,470 --> 00:42:04,160
was successful

962
00:42:09,430 --> 00:42:06,480
ginger

963
00:42:12,230 --> 00:42:09,440

um like to build on what sergey sheppard

964

00:42:14,069 --> 00:42:12,240

yuri said with with respect to the

965

00:42:16,870 --> 00:42:14,079

the marvel of construction that is the

966

00:42:18,950 --> 00:42:16,880

international space station i think

967

00:42:20,790 --> 00:42:18,960

they were able to set the tone the

968

00:42:22,470 --> 00:42:20,800

expedition 1 crew and the international

969

00:42:24,069 --> 00:42:22,480

space station program that the world

970

00:42:26,870 --> 00:42:24,079

should follow you know when you look in

971

00:42:29,030 --> 00:42:26,880

the news today and you see our countries

972

00:42:32,069 --> 00:42:29,040

not getting along or other countries not

973

00:42:34,069 --> 00:42:32,079

getting along and yet when you work on a

974

00:42:35,990 --> 00:42:34,079

common goal even if something as

975

00:42:37,270 --> 00:42:36,000

complicated as the international space

976
00:42:39,510 --> 00:42:37,280
station we

977
00:42:41,910 --> 00:42:39,520
have proven to the world that when

978
00:42:44,150 --> 00:42:41,920
you're joined in a common goal that you

979
00:42:46,790 --> 00:42:44,160
can accomplish anything so i think the

980
00:42:49,109 --> 00:42:46,800
iss should be the model for how the

981
00:42:50,470 --> 00:42:49,119
world should be getting along how the

982
00:42:53,589 --> 00:42:50,480
world should be

983
00:42:55,510 --> 00:42:53,599
making bigger and better things together

984
00:42:57,829 --> 00:42:55,520
george abby let me give the last word to

985
00:42:59,910 --> 00:42:57,839
you on what this mission accomplished

986
00:43:03,030 --> 00:42:59,920
and what it's meant

987
00:43:04,550 --> 00:43:03,040
i was convinced that before this mission

988
00:43:06,069 --> 00:43:04,560

that

989

00:43:08,870 --> 00:43:06,079

we're going to explore space we need to

990

00:43:11,349 --> 00:43:08,880

do that working internationally it's

991

00:43:14,550 --> 00:43:11,359

much better to work with partners and i

992

00:43:16,550 --> 00:43:14,560

think this first crew proved that

993

00:43:18,309 --> 00:43:16,560

sir david saying we had

994

00:43:19,589 --> 00:43:18,319

components and systems that were built

995

00:43:21,589 --> 00:43:19,599

all over the world and they came

996

00:43:23,510 --> 00:43:21,599

together for the

997

00:43:25,510 --> 00:43:23,520

first time in space and this crew was

998

00:43:27,270 --> 00:43:25,520

able to deal with them and put them

999

00:43:30,309 --> 00:43:27,280

together and make them all work

1000

00:43:32,550 --> 00:43:30,319

and that provided a good foundation to

1001
00:43:33,910 --> 00:43:32,560
build on 20 years that have followed on

1002
00:43:36,309 --> 00:43:33,920
a space station

1003
00:43:37,990 --> 00:43:36,319
and as ginger said this is a model

1004
00:43:40,390 --> 00:43:38,000
should be a model for what we should do

1005
00:43:42,309 --> 00:43:40,400
in the future because as we look the

1006
00:43:44,150 --> 00:43:42,319
only beyond earth orbit

1007
00:43:45,990 --> 00:43:44,160
going back to the moon and maybe someday

1008
00:43:48,390 --> 00:43:46,000
to mars we ought to be doing it

1009
00:43:49,990 --> 00:43:48,400
internationally and do it in the same

1010
00:43:51,750 --> 00:43:50,000
way that we're working together on the

1011
00:43:54,470 --> 00:43:51,760
international space mission

1012
00:43:56,390 --> 00:43:54,480
it is our truly a model for how we can

1013
00:43:57,910 --> 00:43:56,400

work with other countries and

1014

00:43:59,990 --> 00:43:57,920

not only with russia but all the

1015

00:44:02,470 --> 00:44:00,000

partnerships that we form with the

1016

00:44:04,150 --> 00:44:02,480

international space station

1017

00:44:06,230 --> 00:44:04,160

and with that i want to thank you all

1018

00:44:08,550 --> 00:44:06,240

for your participation today and thank

1019

00:44:12,390 --> 00:44:08,560

you all for your contributions to

1020

00:44:14,069 --> 00:44:12,400

science and cooperation internationally

1021

00:44:16,069 --> 00:44:14,079

and on behalf of nasa and the space

1022

00:44:19,750 --> 00:44:16,079

foundation thanks to all of you who are

1023

00:44:23,349 --> 00:44:19,760

watching us today there will be more iss

1024

00:44:25,349 --> 00:44:23,359

20 20th anniversary programming on nasa

1025

00:44:28,470 --> 00:44:25,359

television and also on the space

1026

00:44:31,349 --> 00:44:28,480

foundation's new online digital platform

1027

00:44:34,309 --> 00:44:31,359

space symposium 365 you can learn more

1028

00:44:37,750 --> 00:44:34,319

about that by going to [www](#)