



1  
00:00:25,269 --> 00:00:23,750  
good morning and welcome to the johnson

2  
00:00:26,870 --> 00:00:25,279  
space center thank you for joining us

3  
00:00:28,630 --> 00:00:26,880  
here this morning for the

4  
00:00:31,589 --> 00:00:28,640  
joint post flight press conference for

5  
00:00:32,950 --> 00:00:31,599  
the sts-71 and mere 18 crew members

6  
00:00:34,389 --> 00:00:32,960  
now to start the conference and to

7  
00:00:36,709 --> 00:00:34,399  
introduce the rest of the crew members

8  
00:00:39,910 --> 00:00:36,719  
is the commander of sts-71

9  
00:00:41,830 --> 00:00:39,920  
navy captain robert hoot gibson hoot

10  
00:00:43,430 --> 00:00:41,840  
thank you eileen and welcome to the post

11  
00:00:46,310 --> 00:00:43,440  
flight press conference for mere 18 and

12  
00:00:47,830 --> 00:00:46,320  
sts-71 it was a bit of a complex mission

13  
00:00:50,150 --> 00:00:47,840

and so i'm sure the debriefing will be

14

00:00:51,910 --> 00:00:50,160

done in a little bit of a complex way

15

00:00:53,750 --> 00:00:51,920

but first let me start off and introduce

16

00:00:55,350 --> 00:00:53,760

the the two crews that we have here in

17

00:00:57,590 --> 00:00:55,360

houston today

18

00:01:01,590 --> 00:00:57,600

seated immediately to my right our

19

00:01:03,270 --> 00:01:01,600

mission pilot for sds 71 charlie precord

20

00:01:04,789 --> 00:01:03,280

next to charlie our payload commander

21

00:01:08,070 --> 00:01:04,799

and mission specialist number one

22

00:01:10,310 --> 00:01:08,080

dr ellen baker next to ellen

23

00:01:11,350 --> 00:01:10,320

our flight engineer mission specialist

24

00:01:15,190 --> 00:01:11,360

number two

25

00:01:18,070 --> 00:01:15,200

dr greg harbaugh seated next to greg

26  
00:01:18,550 --> 00:01:18,080  
our mission specialist number three and

27  
00:01:21,270 --> 00:01:18,560  
the

28  
00:01:23,270 --> 00:01:21,280  
mirror 18 backup crew member dr bonnie

29  
00:01:26,950 --> 00:01:23,280  
dunbar

30  
00:01:29,830 --> 00:01:26,960  
and then we have the crew of mere 18

31  
00:01:32,149 --> 00:01:29,840  
starting with the board engineer mr

32  
00:01:35,429 --> 00:01:32,159  
gennady strikov

33  
00:01:37,270 --> 00:01:35,439  
the commander of mir 18 vladimir

34  
00:01:39,670 --> 00:01:37,280  
desjarov

35  
00:01:41,350 --> 00:01:39,680  
and our very own cosmonaut researcher

36  
00:01:44,950 --> 00:01:41,360  
aboard mere 18 dr norm

37  
00:01:45,990 --> 00:01:44,960  
thagard so at this point i would like to

38  
00:01:48,789 --> 00:01:46,000

have the

39

00:01:49,270 --> 00:01:48,799

the mere 18 crew perhaps starting off

40

00:01:52,429 --> 00:01:49,280

with

41

00:01:55,429 --> 00:01:52,439

dr thaigard discuss mere 18.

42

00:01:59,350 --> 00:01:55,439

normie thanks sue

43

00:02:01,830 --> 00:01:59,360

we actually as the mere 18 crew began uh

44

00:02:03,830 --> 00:02:01,840

training in february late february of

45

00:02:08,229 --> 00:02:03,840

the 94

46

00:02:10,389 --> 00:02:08,239

and in the course of about a year

47

00:02:12,150 --> 00:02:10,399

bonnie and i went through a program that

48

00:02:13,670 --> 00:02:12,160

was a combination it was a combination

49

00:02:14,550 --> 00:02:13,680

of the sorts of things we would normally

50

00:02:17,190 --> 00:02:14,560

do

51  
00:02:18,790 --> 00:02:17,200  
as a candidate for a whole year just

52  
00:02:20,470 --> 00:02:18,800  
that alone and then

53  
00:02:22,150 --> 00:02:20,480  
at the same time we had to train

54  
00:02:24,710 --> 00:02:22,160  
specifically for the mir 18

55  
00:02:27,030 --> 00:02:24,720  
flight so that made it a little bit

56  
00:02:30,869 --> 00:02:27,040  
intensive but not overly so

57  
00:02:33,190 --> 00:02:30,879  
and we found i think by the time that we

58  
00:02:35,350 --> 00:02:33,200  
were ready to fly we had

59  
00:02:36,869 --> 00:02:35,360  
we had managed to acquire enough

60  
00:02:38,710 --> 00:02:36,879  
expertise enough knowledge of the

61  
00:02:40,470 --> 00:02:38,720  
systems of mirror and soyuz to feel

62  
00:02:42,229 --> 00:02:40,480  
fairly comfortable with a mission

63  
00:02:43,589 --> 00:02:42,239

i won't talk a lot about the mission now

64

00:02:45,430 --> 00:02:43,599

i'm sure there'll be questions but i

65

00:02:48,070 --> 00:02:45,440

will say that velocity told me about

66

00:02:48,869 --> 00:02:48,080

a week before the shuttle got there that

67

00:02:50,869 --> 00:02:48,879

i had seen

68

00:02:53,910 --> 00:02:50,879

more than almost any cosmonaut ever

69

00:02:56,150 --> 00:02:53,920

seized because we had gone up on a soyuz

70

00:02:57,670 --> 00:02:56,160

we had seen the arrival of a progress

71

00:03:01,589 --> 00:02:57,680

resupply ship

72

00:03:03,430 --> 00:03:01,599

we had done several transfers of modules

73

00:03:06,390 --> 00:03:03,440

from node to node at the

74

00:03:08,229 --> 00:03:06,400

at the attachment node and in addition

75

00:03:12,309 --> 00:03:08,239

of course we had seen the spectre module

76

00:03:16,710 --> 00:03:14,630

at with that i think what i'd like to do

77

00:03:17,910 --> 00:03:16,720

is go ahead and start in with our slide

78

00:03:19,430 --> 00:03:17,920

in our videos we'll start with the

79

00:03:21,190 --> 00:03:19,440

slides first and we'll

80

00:03:22,949 --> 00:03:21,200

uh we'll try and give you some

81

00:03:25,670 --> 00:03:22,959

commentary first of all no

82

00:03:27,430 --> 00:03:25,680

nothing we do ever starts out without

83

00:03:28,630 --> 00:03:27,440

the emblem or the patch that was the

84

00:03:30,550 --> 00:03:28,640

mere 18 patch

85

00:03:32,550 --> 00:03:30,560

we all had a hand in the design of that

86

00:03:34,869 --> 00:03:32,560

patch and so we als

87

00:03:36,789 --> 00:03:34,879

we all feel some ownership for it it

88

00:03:39,110 --> 00:03:36,799

represents of course a launch

89

00:03:40,390 --> 00:03:39,120

our launch mere 18 from baikonur in

90

00:03:41,990 --> 00:03:40,400

central asia

91

00:03:43,990 --> 00:03:42,000

docking with the mir station the

92

00:03:45,750 --> 00:03:44,000

three-month stay and then finally the

93

00:03:47,350 --> 00:03:45,760

arrival of the shuttle and our return to

94

00:03:50,470 --> 00:03:47,360

earth at the kennedy space center in

95

00:03:54,789 --> 00:03:53,429

the the first concern i guess i had

96

00:03:56,550 --> 00:03:54,799

because it was long duration space

97

00:03:58,710 --> 00:03:56,560

flight and we didn't have

98

00:04:00,149 --> 00:03:58,720

any recent experience with it is what do

99

00:04:02,390 --> 00:04:00,159

you need to do by a

100

00:04:04,869 --> 00:04:02,400

way of exercise to make sure that you're

101  
00:04:06,550 --> 00:04:04,879  
in good shape when you come home

102  
00:04:07,910 --> 00:04:06,560  
there is an excellent program of

103  
00:04:08,869 --> 00:04:07,920  
physical conditioning on board the

104  
00:04:11,750 --> 00:04:08,879  
mirror station

105  
00:04:13,110 --> 00:04:11,760  
we had two treadmills and a bicycle

106  
00:04:15,750 --> 00:04:13,120  
shown here is the

107  
00:04:17,189 --> 00:04:15,760  
bicycle and when the spectrum module

108  
00:04:18,310 --> 00:04:17,199  
arrived of course we received yet

109  
00:04:20,469 --> 00:04:18,320  
another bicycle

110  
00:04:22,230 --> 00:04:20,479  
so the space station mirror can

111  
00:04:24,629 --> 00:04:22,240  
adequately provide for

112  
00:04:25,990 --> 00:04:24,639  
physical exercise and it's my personal

113  
00:04:27,510 --> 00:04:26,000

feeling although we are certainly

114

00:04:29,350 --> 00:04:27,520

studying it to see if that's true that

115

00:04:31,270 --> 00:04:29,360

the exercise is a benefit

116

00:04:35,510 --> 00:04:31,280

for those people when they on upon

117

00:04:51,670 --> 00:04:38,150

i have already had experience on the

118

00:05:00,230 --> 00:04:57,030

the adaptation didn't take much time

119

00:05:02,790 --> 00:05:00,240

that was a very

120

00:05:08,230 --> 00:05:02,800

atmosphere that we were used to working

121

00:05:13,430 --> 00:05:11,270

and this slide in particular

122

00:05:19,749 --> 00:05:13,440

shows you how we are studying atmosphere

123

00:05:27,189 --> 00:05:22,390

contaminations in the atmosphere and

124

00:05:30,310 --> 00:05:29,029

i would like to say that station

125

00:05:32,629 --> 00:05:30,320

atmosphere

126

00:05:34,469 --> 00:05:32,639

practically has not changed for the five

127

00:05:40,790 --> 00:05:34,479

years that i have not been on the board

128

00:05:44,790 --> 00:05:42,710

and myself were measuring these

129

00:05:46,870 --> 00:05:44,800

parameters many times

130

00:05:50,469 --> 00:05:46,880

many times in different points of the

131

00:06:00,230 --> 00:05:50,479

station in different modules

132

00:06:06,070 --> 00:06:04,230

we have conducted a grand amount of work

133

00:06:07,590 --> 00:06:06,080

and a very hard work on board of the

134

00:06:10,469 --> 00:06:07,600

mirror station

135

00:06:12,390 --> 00:06:10,479

especially it was a very hard work after

136

00:06:14,870 --> 00:06:12,400

specter module ducking to the mere

137

00:06:27,909 --> 00:06:17,430

it was necessary for us to activate the

138

00:06:33,510 --> 00:06:30,469

in order to do that we had completely

139

00:06:40,950 --> 00:06:36,710

and routed necessary number of

140

00:06:46,390 --> 00:06:40,960

cables also we prepared the

141

00:06:54,870 --> 00:06:48,550

we also prepared the station for the

142

00:06:54,880 --> 00:07:00,710

it took a large amount of time

143

00:07:00,720 --> 00:07:05,510

but

144

00:07:11,350 --> 00:07:08,629

to fulfill this completely and

145

00:07:13,110 --> 00:07:11,360

all of us gennady norm and myself were

146

00:07:24,550 --> 00:07:13,120

working on the same tasks

147

00:07:27,670 --> 00:07:26,629

how we were working with the power

148

00:07:31,270 --> 00:07:27,680

supply system

149

00:07:34,390 --> 00:07:31,280

of the whole station

150

00:07:39,110 --> 00:07:34,400

we have replaced many accumulators

151

00:07:45,990 --> 00:07:42,230

replaced batteries we were

152

00:07:49,510 --> 00:07:46,000

preparing for docking and

153

00:07:51,589 --> 00:07:49,520

we were maintaining the space station

154

00:07:56,830 --> 00:07:51,599

we're making sure that the work with the

155

00:07:56,840 --> 00:08:01,270

sufficient

156

00:08:01,280 --> 00:08:07,189

and this is a very brief minute of rest

157

00:08:11,589 --> 00:08:10,150

yes during the day we were getting very

158

00:08:15,830 --> 00:08:11,599

tired

159

00:08:17,749 --> 00:08:15,840

we and when i saw a guitar

160

00:08:23,029 --> 00:08:17,759

that has been onboard of the station for

161

00:08:29,430 --> 00:08:26,150

i was trying to play some music

162

00:08:32,790 --> 00:08:29,440

and norm thagart took a picture of me

163

00:08:32,800 --> 00:08:53,110

what is this

164

00:08:53,120 --> 00:08:57,750

where norm thagar was sleeping

165

00:09:02,630 --> 00:09:01,670

in particular this is repulsion mirror

166

00:09:05,350 --> 00:09:02,640

station

167

00:09:16,389 --> 00:09:05,360

propulsion system control panel system

168

00:09:23,829 --> 00:09:19,829

sometimes we had to disturb norm

169

00:09:26,790 --> 00:09:23,839

because we had to work with the systems

170

00:09:49,269 --> 00:09:26,800

he was very understandable and he was

171

00:09:53,430 --> 00:09:51,750

because this picture was taken prior to

172

00:09:56,790 --> 00:09:53,440

chibik's experiment

173

00:10:00,310 --> 00:09:56,800

and we had to put on the altar

174

00:10:16,949 --> 00:10:00,320

24 hours in advance and you can see that

175

00:10:21,190 --> 00:10:20,630

how to resolve on time this was actually

176  
00:10:24,710 --> 00:10:21,200  
taken

177  
00:10:28,150 --> 00:10:24,720  
obviously during the sts-7 joint mission

178  
00:10:31,750 --> 00:10:28,160  
i'm not mistaken there

179  
00:10:34,069 --> 00:10:31,760  
but this was this was a pretty standard

180  
00:10:35,350 --> 00:10:34,079  
view to be seen on station that is right

181  
00:10:38,630 --> 00:10:35,360  
in front of the

182  
00:10:40,470 --> 00:10:38,640  
dining table we had and that wound up

183  
00:10:42,069 --> 00:10:40,480  
being pretty much the center of activity

184  
00:10:43,910 --> 00:10:42,079  
if you needed to write anything down or

185  
00:10:45,670 --> 00:10:43,920  
do planning and a lot of the experiments

186  
00:10:45,990 --> 00:10:45,680  
i conducted were conducted right from

187  
00:10:48,630 --> 00:10:46,000  
that

188  
00:10:49,990 --> 00:10:48,640

place and also when we held our video

189

00:10:51,670 --> 00:10:50,000

conferences during the course of the

190

00:10:53,670 --> 00:10:51,680

mission we were usually

191

00:10:56,069 --> 00:10:53,680

pictured just as you see there in front

192

00:11:00,710 --> 00:10:56,079

of the the dining table with the camera

193

00:11:03,750 --> 00:11:00,720

looking in that direction

194

00:11:06,949 --> 00:11:03,760

and uh veloja and gennady here

195

00:11:08,150 --> 00:11:06,959

uh are preparing for their eva and i saw

196

00:11:10,870 --> 00:11:08,160

a lot of this

197

00:11:11,750 --> 00:11:10,880

there is an actual model of the mir

198

00:11:15,269 --> 00:11:11,760

station

199

00:11:15,670 --> 00:11:15,279

and they would on the eve of the evas of

200

00:11:18,069 --> 00:11:15,680

their

201  
00:11:19,430 --> 00:11:18,079  
spacewalks get out the model and discuss

202  
00:11:20,630 --> 00:11:19,440  
among themselves and

203  
00:11:22,230 --> 00:11:20,640  
how they were going to do it what

204  
00:11:23,590 --> 00:11:22,240  
handrails they would use what paths they

205  
00:11:25,030 --> 00:11:23,600  
would choose to get there

206  
00:11:27,509 --> 00:11:25,040  
they had trained it for that of course

207  
00:11:28,949 --> 00:11:27,519  
before flight but by the time the evas

208  
00:11:29,829 --> 00:11:28,959  
occurred it had already been a couple of

209  
00:11:31,910 --> 00:11:29,839  
months and

210  
00:11:33,509 --> 00:11:31,920  
it was necessary to do these sorts of

211  
00:11:35,190 --> 00:11:33,519  
reviews and apparently it worked out

212  
00:11:37,829 --> 00:11:35,200  
very well because the evas of course

213  
00:11:39,750 --> 00:11:37,839

were successful

214

00:11:46,150 --> 00:11:39,760

and perhaps beloji'd like to comment a

215

00:11:46,160 --> 00:11:51,350

yes i completely agree with norman

216

00:11:55,430 --> 00:11:54,310

prior to an eva we had to model

217

00:11:59,110 --> 00:11:55,440

everything

218

00:12:03,670 --> 00:11:59,120

and simulated a few times because

219

00:12:07,430 --> 00:12:03,680

with time after a certain period of time

220

00:12:10,790 --> 00:12:07,440

a certain part certain details

221

00:12:14,870 --> 00:12:10,800

you forget and in order to

222

00:12:19,829 --> 00:12:14,880

remember them again we had to simulate

223

00:12:23,190 --> 00:12:21,990

also during the whole period of time we

224

00:12:26,470 --> 00:12:23,200

were able

225

00:12:29,269 --> 00:12:26,480

to perform five evas

226

00:12:31,190 --> 00:12:29,279

the most difficult were the first three

227

00:12:34,790 --> 00:12:31,200

evs where we had to

228

00:12:37,670 --> 00:12:34,800

retract the solar rays and relocate it

229

00:12:40,069 --> 00:12:37,680

with this boom cargo boom to another

230

00:12:42,710 --> 00:12:40,079

module

231

00:12:43,990 --> 00:12:42,720

and the following deployment of the

232

00:12:47,190 --> 00:12:44,000

solar array

233

00:12:51,110 --> 00:12:47,200

is as shown on this slide

234

00:12:52,870 --> 00:12:51,120

so it would be able to operate normally

235

00:12:57,350 --> 00:12:52,880

within the whole complex but on a

236

00:13:01,350 --> 00:12:59,110

gennady might want to comment on this

237

00:13:03,190 --> 00:13:01,360

one i found this fascinating uh

238

00:13:05,030 --> 00:13:03,200

gennady basically is using a metal can

239

00:13:15,110 --> 00:13:05,040

lid for one of the schematics for work

240

00:13:15,120 --> 00:13:30,069

we were proposed to perform a job

241

00:13:37,990 --> 00:13:32,470

after we relocated the solar arrays to

242

00:13:42,470 --> 00:13:40,949

routing electrical cables for power

243

00:13:58,389 --> 00:13:42,480

transfer

244

00:13:58,399 --> 00:14:13,750

unusual parts

245

00:14:18,629 --> 00:14:16,230

and as you can see on the slides we were

246

00:14:22,150 --> 00:14:18,639

not even able to

247

00:14:25,430 --> 00:14:22,160

install it and activate it

248

00:14:28,949 --> 00:14:25,440

this yellow part is a mirror

249

00:14:30,150 --> 00:14:28,959

equipment which is going to be installed

250

00:14:34,550 --> 00:14:30,160

by a mere 19

251  
00:14:37,829 --> 00:14:34,560  
crew by anatoly silvia nikolai budaran

252  
00:14:39,509 --> 00:14:37,839  
when they perform an eva yeah i'm guilty

253  
00:14:43,269 --> 00:14:39,519  
of putting this slide in there the

254  
00:14:43,990 --> 00:14:43,279  
the sts-70 crew 71 crew actually never

255  
00:14:46,470 --> 00:14:44,000  
saw this view

256  
00:14:47,509 --> 00:14:46,480  
this is the base block the core module

257  
00:14:49,350 --> 00:14:47,519  
and it's

258  
00:14:50,870 --> 00:14:49,360  
basically taken from that dining table

259  
00:14:52,550 --> 00:14:50,880  
that you saw before looking toward the

260  
00:14:55,430 --> 00:14:52,560  
central post which is the post from

261  
00:14:57,750 --> 00:14:55,440  
which the entire complex is controlled

262  
00:14:59,350 --> 00:14:57,760  
and we went through and did a bit of

263  
00:15:00,310 --> 00:14:59,360

housekeeping just before the shuttle

264

00:15:03,269 --> 00:15:00,320

arrived

265

00:15:03,910 --> 00:15:03,279

but uh in the course of many months

266

00:15:06,389 --> 00:15:03,920

mission

267

00:15:08,230 --> 00:15:06,399

you do things for convenience and that

268

00:15:09,750 --> 00:15:08,240

is if you use an object you place it

269

00:15:10,470 --> 00:15:09,760

back in a place that's convenient for

270

00:15:14,069 --> 00:15:10,480

you

271

00:15:17,189 --> 00:15:14,079

however uh because we wanted to be good

272

00:15:19,030 --> 00:15:17,199

good host and uh present a nice clean

273

00:15:20,710 --> 00:15:19,040

station the 71 crew never saw this

274

00:15:21,430 --> 00:15:20,720

because the day before they arrived we

275

00:15:23,829 --> 00:15:21,440

went through

276

00:15:25,350 --> 00:15:23,839

especially velocia in the core module

277

00:15:27,509 --> 00:15:25,360

and cleaned everything up

278

00:15:28,629 --> 00:15:27,519

and that's the slides i think we have a

279

00:15:30,790 --> 00:15:28,639

bit of a video

280

00:15:43,990 --> 00:15:30,800

perhaps about 15 minutes so maybe we can

281

00:15:44,000 --> 00:15:50,949

that is the mere 18 crew of course

282

00:15:54,470 --> 00:15:52,710

you could see the world and in the

283

00:15:56,150 --> 00:15:54,480

course of three months we got to see a

284

00:15:57,910 --> 00:15:56,160

lot of the world however we thought we'd

285

00:16:01,110 --> 00:15:57,920

show one that's familiar to a lot of our

286

00:16:03,110 --> 00:16:01,120

viewers that is houston

287

00:16:04,710 --> 00:16:03,120

we had many passes over houston this was

288

00:16:06,550 --> 00:16:04,720

one of the better passes it was almost

289

00:16:08,069 --> 00:16:06,560

directly over the city and as you can

290

00:16:11,590 --> 00:16:08,079

see it's virtually a cloudless

291

00:16:15,910 --> 00:16:13,430

and as a floridian i couldn't resist

292

00:16:18,310 --> 00:16:15,920

sticking this one in there

293

00:16:19,030 --> 00:16:18,320

we also had a lot of nice passes over

294

00:16:20,790 --> 00:16:19,040

russia

295

00:16:22,870 --> 00:16:20,800

we didn't get so many good pictures over

296

00:16:24,790 --> 00:16:22,880

russia simply because in those passes we

297

00:16:27,910 --> 00:16:24,800

were usually on communications with

298

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

mission control center in moscow

299

00:16:31,990 --> 00:16:30,320

there is a i always wondered how do the

300

00:16:34,310 --> 00:16:32,000

cosmonauts come back looking like

301

00:16:36,069 --> 00:16:34,320

they're in reasonably

302

00:16:41,430 --> 00:16:36,079

good condition and their hair is all

303

00:16:41,440 --> 00:16:48,310

and gennady's prices were reasonable too

304

00:16:48,320 --> 00:16:58,710

i didn't

305

00:17:07,270 --> 00:17:02,829

i had to pay him with beer with a

306

00:17:07,280 --> 00:17:11,429

you have seen this picture already

307

00:17:15,429 --> 00:17:13,189

gennady claims he doesn't play but

308

00:17:16,789 --> 00:17:15,439

actually he did a very nice job

309

00:17:18,630 --> 00:17:16,799

we did a lot of science during the

310

00:17:20,309 --> 00:17:18,640

flight this was early on i think the

311

00:17:21,429 --> 00:17:20,319

first metabolic session we tried to

312

00:17:23,429 --> 00:17:21,439

document as much

313

00:17:24,549 --> 00:17:23,439

of the of the science as we could with

314

00:17:26,390 --> 00:17:24,559

video

315

00:17:28,870 --> 00:17:26,400

gennady we had to give him a certificate

316

00:17:30,950 --> 00:17:28,880

he's basically a qualified doctor now he

317

00:17:36,390 --> 00:17:30,960

did all of my blood draws

318

00:17:39,270 --> 00:17:37,909

there was never a time when we didn't

319

00:17:41,350 --> 00:17:39,280

get the blood that we were supposed to

320

00:17:44,950 --> 00:17:41,360

get so i guess that's testimony to his

321

00:17:49,110 --> 00:17:47,750

we had i don't know if i would have

322

00:17:51,029 --> 00:17:49,120

fully comment on that or not

323

00:17:53,110 --> 00:17:51,039

that was another one of our science

324

00:17:53,510 --> 00:17:53,120

experiments which involved a collection

325

00:17:56,310 --> 00:17:53,520

of

326

00:17:57,909 --> 00:17:56,320

biological samples and that bag was a

327

00:17:58,630 --> 00:17:57,919

biological samples floating about in

328

00:18:00,630 --> 00:17:58,640

mid-air

329

00:18:02,870 --> 00:18:00,640

these were some of the air sampling

330

00:18:04,310 --> 00:18:02,880

slides no i guess actually these

331

00:18:05,909 --> 00:18:04,320

these are the air sampling slides here

332

00:18:08,150 --> 00:18:05,919

the others were surface sampling

333

00:18:09,750 --> 00:18:08,160

but you can see the mirror station while

334

00:18:11,669 --> 00:18:09,760

clean

335

00:18:13,350 --> 00:18:11,679

still you can grow a few organisms

336

00:18:14,150 --> 00:18:13,360

spongy and the light but that would be

337

00:18:15,669 --> 00:18:14,160

true

338

00:18:17,830 --> 00:18:15,679

almost any place you picked here on

339

00:18:20,390 --> 00:18:17,840

earth

340

00:18:21,990 --> 00:18:20,400

in any event i can say that no one

341

00:18:23,909 --> 00:18:22,000

suffered from any infectious disease

342

00:18:26,070 --> 00:18:23,919

during the whole course of the flight

343

00:18:27,510 --> 00:18:26,080

again a little slight that bicycle i

344

00:18:28,070 --> 00:18:27,520

showed you before that i was sitting on

345

00:18:30,390 --> 00:18:28,080

could also

346

00:18:31,909 --> 00:18:30,400

be used for upper body exercises just by

347

00:18:38,310 --> 00:18:31,919

turning it around just as the load is

348

00:18:43,510 --> 00:18:41,510

especially prior to nva we had to work

349

00:18:45,909 --> 00:18:43,520

with our hands a lot

350

00:18:47,669 --> 00:18:45,919

so we should we would maintain our

351  
00:18:52,789 --> 00:18:47,679  
bullets

352  
00:18:56,630 --> 00:18:55,750  
very often using their garmenter with

353  
00:19:00,390 --> 00:18:56,640  
the hands

354  
00:19:02,950 --> 00:19:00,400  
exercises also twice a day

355  
00:19:03,430 --> 00:19:02,960  
we were exercising on the treadmill and

356  
00:19:07,590 --> 00:19:03,440  
once

357  
00:19:07,600 --> 00:19:15,510  
of course we were using the expanders

358  
00:19:15,520 --> 00:19:18,789  
muscular strength

359  
00:19:18,799 --> 00:19:30,150  
we had to exercise a lot

360  
00:19:34,230 --> 00:19:32,630  
you can exercise in two places on board

361  
00:19:35,590 --> 00:19:34,240  
of the mirror station and also in the

362  
00:19:38,870 --> 00:19:35,600  
crystal module

363  
00:19:41,190 --> 00:19:38,880

there are two treadmills

364

00:19:42,549 --> 00:19:41,200

i mentioned before the progress resupply

365

00:19:43,190 --> 00:19:42,559

vehicle that came up there this is the

366

00:19:45,430 --> 00:19:43,200

progress

367

00:19:46,950 --> 00:19:45,440

and i apologize uh it probably would

368

00:19:49,350 --> 00:19:46,960

have been a lot more spectacular in the

369

00:19:50,630 --> 00:19:49,360

daytime however the system of docking is

370

00:19:52,230 --> 00:19:50,640

fully automated

371

00:19:53,990 --> 00:19:52,240

and it works very well in fact it works

372

00:19:55,669 --> 00:19:54,000

well enough that you can do it in the

373

00:19:57,190 --> 00:19:55,679

light or the dark depending on which is

374

00:19:58,789 --> 00:19:57,200

more convenient in this case it was more

375

00:20:00,950 --> 00:19:58,799

convenient to do it at dark

376

00:20:02,789 --> 00:20:00,960

so the entire docking sequence the final

377

00:20:03,270 --> 00:20:02,799

approach and docking were conducted in

378

00:20:06,310 --> 00:20:03,280

the dark

379

00:20:07,830 --> 00:20:06,320

i it it did seem to me however that we

380

00:20:09,350 --> 00:20:07,840

got some pretty good photos when it got

381

00:20:10,950 --> 00:20:09,360

close in even though it was dark

382

00:20:12,950 --> 00:20:10,960

now this is the mere station as seen

383

00:20:14,310 --> 00:20:12,960

from that progress vehicle there is a

384

00:20:16,789 --> 00:20:14,320

television camera mounted on the

385

00:20:18,710 --> 00:20:16,799

progress and here it is at this point it

386

00:20:21,830 --> 00:20:18,720

probably was no more than i would guess

387

00:20:23,350 --> 00:20:21,840

25 or 30 feet away

388

00:20:24,950 --> 00:20:23,360

when it actually doc i took these

389

00:20:26,789 --> 00:20:24,960

pictures but when it actually docked i

390

00:20:28,390 --> 00:20:26,799

was uh within i was probably about where

391

00:20:30,070 --> 00:20:28,400

gennady is located there from the

392

00:20:31,830 --> 00:20:30,080

docking node this is the docking node to

393

00:20:33,909 --> 00:20:31,840

which the progress is attached and we're

394

00:20:35,350 --> 00:20:33,919

opening the inner hatch

395

00:20:37,909 --> 00:20:35,360

i was going to say there was no

396

00:20:40,950 --> 00:20:37,919

vibration nothing sensed or heard

397

00:20:42,710 --> 00:20:40,960

during the docking so it was very gentle

398

00:20:44,870 --> 00:20:42,720

and now you're looking at the docking

399

00:20:48,070 --> 00:20:44,880

cone

400

00:20:50,310 --> 00:20:48,080

of the progress vehicle itself and what

401  
00:20:52,390 --> 00:20:50,320  
we just opened there was again a hatch

402  
00:20:54,070 --> 00:20:52,400  
located on the station itself

403  
00:20:59,029 --> 00:20:54,080  
which is the receiving cone for that

404  
00:21:02,870 --> 00:21:01,029  
and it's pretty surprising how easy it

405  
00:21:04,549 --> 00:21:02,880  
is to open all of that and get access

406  
00:21:05,990 --> 00:21:04,559  
you do have to verify of course the

407  
00:21:07,270 --> 00:21:06,000  
pressure seals before you can start

408  
00:21:08,310 --> 00:21:07,280  
opening hatches all of that went

409  
00:21:10,630 --> 00:21:08,320  
normally

410  
00:21:12,630 --> 00:21:10,640  
and you have a little tool that you use

411  
00:21:12,950 --> 00:21:12,640  
to unlatch the latch so that you can

412  
00:21:15,669 --> 00:21:12,960  
then

413  
00:21:16,549 --> 00:21:15,679

open the hatch to the progress vehicle

414

00:21:18,870 --> 00:21:16,559

itself

415

00:21:21,350 --> 00:21:18,880

and i think after the hatch opens uh you

416

00:21:25,430 --> 00:21:21,360

can probably see a little bit of the

417

00:21:28,950 --> 00:21:25,440

wears that were stored inside we each

418

00:21:32,230 --> 00:21:28,960

for our benefit and to our joy received

419

00:21:34,789 --> 00:21:32,240

i think about five kilograms a piece of

420

00:21:36,950 --> 00:21:34,799

candies and foods and photographs and

421

00:21:38,789 --> 00:21:36,960

letters things from home

422

00:21:50,070 --> 00:21:38,799

so the resupply vehicles everyone looks

423

00:21:53,190 --> 00:21:51,590

many of the systems on board the mir

424

00:21:55,110 --> 00:21:53,200

station are regenerable but there will

425

00:21:56,950 --> 00:21:55,120

never be a station i suspect completely

426  
00:21:59,029 --> 00:21:56,960  
regenerable so it's still necessary to

427  
00:22:00,630 --> 00:21:59,039  
send up some supplies

428  
00:22:04,149 --> 00:22:00,640  
to the station using the progress

429  
00:22:08,710 --> 00:22:06,950  
those things amount to of course

430  
00:22:10,470 --> 00:22:08,720  
replenishment of the food supplies

431  
00:22:11,990 --> 00:22:10,480  
fuel because the station requires fuel

432  
00:22:15,909 --> 00:22:12,000  
to maintain attitude from time to

433  
00:22:17,510 --> 00:22:15,919  
time and water and again we're back into

434  
00:22:18,710 --> 00:22:17,520  
the eva so we'll turn this over to

435  
00:22:26,549 --> 00:22:18,720  
velojo to

436  
00:22:28,789 --> 00:22:26,559  
take you through the eva sequences

437  
00:22:30,950 --> 00:22:28,799  
we had to spend a lot of time to prepare

438  
00:22:34,390 --> 00:22:30,960

the spacesuits for an eva

439

00:22:36,390 --> 00:22:34,400

to check all systems

440

00:22:37,750 --> 00:22:36,400

of the space suit before an eva and of

441

00:22:40,789 --> 00:22:37,760

course norm

442

00:22:43,110 --> 00:22:40,799

has helped us a lot as a third remember

443

00:22:46,789 --> 00:22:43,120

especially before an eva when you have

444

00:22:50,149 --> 00:22:49,350

it is very hard to work in it especially

445

00:22:54,230 --> 00:22:50,159

when you

446

00:22:57,029 --> 00:22:54,240

have to close the hedge

447

00:22:57,590 --> 00:22:57,039

that kind of works always we would put

448

00:23:00,870 --> 00:22:57,600

on

449

00:23:04,149 --> 00:23:00,880

a spacesuit norm would help us

450

00:23:24,310 --> 00:23:04,159

he would close all hatches and then

451  
00:23:24,320 --> 00:23:45,430  
where the solar rays were retracted

452  
00:23:49,430 --> 00:23:48,950  
usually when we go eva we take with us a

453  
00:23:52,549 --> 00:23:49,440  
little

454  
00:24:04,630 --> 00:23:52,559  
more of toast than we plan on the ground

455  
00:24:08,390 --> 00:24:04,640  
just in case for some unexpected events

456  
00:24:11,909 --> 00:24:08,400  
here you can see certain elements of dva

457  
00:24:30,070 --> 00:24:11,919  
when we had to fix the cargo boom

458  
00:24:33,750 --> 00:24:32,630  
we're going to retract the solar array

459  
00:24:37,029 --> 00:24:33,760  
norman

460  
00:24:39,510 --> 00:24:37,039  
is initiating a command to retract

461  
00:24:41,269 --> 00:24:39,520  
an electrical drive and we're just

462  
00:24:45,430 --> 00:24:41,279  
helping

463  
00:24:48,710 --> 00:24:45,440

to hold the solar rays accurately

464

00:24:49,350 --> 00:24:48,720

books so they would fit into a certain

465

00:25:11,269 --> 00:24:49,360

box

466

00:25:14,870 --> 00:25:13,510

it was not a difficult job to retract

467

00:25:17,029 --> 00:25:14,880

the solar rays

468

00:25:19,350 --> 00:25:17,039

we were just helping the electrical

469

00:25:23,990 --> 00:25:19,360

drive

470

00:25:26,390 --> 00:25:24,000

hard work was after we

471

00:25:28,549 --> 00:25:26,400

undocked the solar array from the module

472

00:25:31,510 --> 00:25:28,559

and started relocating it

473

00:25:32,710 --> 00:25:31,520

as you see on the end of the cargo boom

474

00:25:37,909 --> 00:25:32,720

you see the battery

475

00:25:43,990 --> 00:25:40,830

plus a cosmonaut is on the same cargo

476

00:25:49,990 --> 00:25:46,710

cosmonauts weighed together with a space

477

00:25:53,990 --> 00:25:50,000

suit is approximately 150 kilograms

478

00:25:57,590 --> 00:25:54,000

all together the mass is usually one ton

479

00:26:01,029 --> 00:26:00,390

it was hard to control it because there

480

00:26:03,669 --> 00:26:01,039

were

481

00:26:05,830 --> 00:26:03,679

large moments of inertia and when you

482

00:26:11,269 --> 00:26:05,840

stop to control the cargo bomb

483

00:26:14,789 --> 00:26:11,279

it still continues to move

484

00:26:19,269 --> 00:26:14,799

very strong oscillation momentums and

485

00:26:24,710 --> 00:26:22,830

well of course the public probably

486

00:26:26,710 --> 00:26:24,720

actually

487

00:26:28,310 --> 00:26:26,720

received more attention or got more

488

00:26:32,630 --> 00:26:28,320

attention from the

489

00:26:34,789 --> 00:26:32,640

the docking and the the approach

490

00:26:36,549 --> 00:26:34,799

however i think as you have seen from

491

00:26:38,390 --> 00:26:36,559

the video that proceeded before a lot

492

00:26:40,630 --> 00:26:38,400

went on before the shuttle could come up

493

00:26:43,029 --> 00:26:40,640

there those five evas had to take place

494

00:26:46,230 --> 00:26:43,039

and had to be successful and they were

495

00:26:47,510 --> 00:26:46,240

we had to move the modules from node to

496

00:26:49,510 --> 00:26:47,520

node because the

497

00:26:51,430 --> 00:26:49,520

crystal module needed to be located on

498

00:26:53,190 --> 00:26:51,440

what we call the minus x axis because

499

00:26:54,149 --> 00:26:53,200

that is the axis to which the shuttle

500

00:26:58,070 --> 00:26:54,159

will dock

501  
00:27:01,190 --> 00:26:58,080  
that all went beautifully thanks

502  
00:27:03,510 --> 00:27:01,200  
to good help from the soup and to a lot

503  
00:27:05,269 --> 00:27:03,520  
of hard work by beloja and gennady

504  
00:27:06,789 --> 00:27:05,279  
it's amazing i could not believe that

505  
00:27:08,470 --> 00:27:06,799  
you could sustain that much

506  
00:27:09,750 --> 00:27:08,480  
of a workload for that longer period of

507  
00:27:10,789 --> 00:27:09,760  
time but they did and they did

508  
00:27:13,190 --> 00:27:10,799  
beautifully

509  
00:27:15,430 --> 00:27:13,200  
however i think at the last we were all

510  
00:27:19,029 --> 00:27:15,440  
glad to see the shuttle come up there

511  
00:27:21,350 --> 00:27:19,039  
and not the least of the reason was just

512  
00:27:23,269 --> 00:27:21,360  
the sure the sheer beauty

513  
00:27:25,510 --> 00:27:23,279

of seeing the shuttle because it is a

514

00:27:27,990 --> 00:27:25,520

beautiful vehicle no question about it

515

00:27:29,590 --> 00:27:28,000

and to look out through a window someone

516

00:27:30,149 --> 00:27:29,600

asked me well did you watch the docking

517

00:27:34,310 --> 00:27:30,159

on

518

00:27:36,950 --> 00:27:34,320

it through the window and

519

00:27:38,470 --> 00:27:36,960

that is a thrill i'll never forget so we

520

00:27:40,870 --> 00:27:38,480

managed to get a lot of good video as

521

00:27:43,350 --> 00:27:40,880

the shuttle came up there

522

00:27:45,110 --> 00:27:43,360

at times actually uh the behavior of the

523

00:27:45,909 --> 00:27:45,120

shuttle was too good because what

524

00:27:49,830 --> 00:27:45,919

happens is

525

00:27:52,310 --> 00:27:49,840

the movements are so precise and so

526  
00:27:53,909 --> 00:27:52,320  
controlled that it looks as though there

527  
00:27:55,430 --> 00:27:53,919  
is no motion

528  
00:27:57,830 --> 00:27:55,440  
and that you're looking at a model and

529  
00:27:59,830 --> 00:27:57,840  
not a real shuttle

530  
00:28:01,029 --> 00:27:59,840  
i mentioned before when the progress

531  
00:28:02,310 --> 00:28:01,039  
came up and docked

532  
00:28:04,070 --> 00:28:02,320  
i heard her felt nothing when the

533  
00:28:05,590 --> 00:28:04,080  
specter module came up we heard nothing

534  
00:28:06,630 --> 00:28:05,600  
but we could feel just a very slight

535  
00:28:08,230 --> 00:28:06,640  
vibration

536  
00:28:10,070 --> 00:28:08,240  
however in the shuttle we're looking at

537  
00:28:11,510 --> 00:28:10,080  
a 100 ton vehicle and when it docked

538  
00:28:12,789 --> 00:28:11,520

with the station there was definite

539

00:28:14,789 --> 00:28:12,799

motion of the station

540

00:28:16,389 --> 00:28:14,799

and perhaps at the end you can actually

541

00:28:18,230 --> 00:28:16,399

see a little bit of camera motion at the

542

00:28:20,310 --> 00:28:18,240

moment of docking

543

00:28:22,070 --> 00:28:20,320

again so well control that the only way

544

00:28:23,669 --> 00:28:22,080

you could tell that there was a relative

545

00:28:24,549 --> 00:28:23,679

motion between the station and the

546

00:28:27,590 --> 00:28:24,559

shuttle

547

00:28:29,269 --> 00:28:27,600

was uh the vertical tail has a

548

00:28:30,630 --> 00:28:29,279

tile separation lines and you could

549

00:28:33,990 --> 00:28:30,640

gradually see those

550

00:28:35,510 --> 00:28:34,000

tile separation lines disappear under

551  
00:28:38,470 --> 00:28:35,520  
the docking node on the

552  
00:28:40,149 --> 00:28:38,480  
crystal module but it was as though we

553  
00:28:40,789 --> 00:28:40,159  
had it on a fishing line and we're just

554  
00:28:43,110 --> 00:28:40,799  
slowly

555  
00:28:44,230 --> 00:28:43,120  
reeling it in very controlled very

556  
00:28:46,070 --> 00:28:44,240  
precise

557  
00:28:47,830 --> 00:28:46,080  
i had thought beforehand that we'd all

558  
00:28:49,510 --> 00:28:47,840  
be a bit nervous looking out and seeing

559  
00:28:52,870 --> 00:28:49,520  
two large objects

560  
00:28:54,789 --> 00:28:52,880  
so close in space but when you saw how

561  
00:28:56,149 --> 00:28:54,799  
well controlled it was all of that went

562  
00:28:56,630 --> 00:28:56,159  
away i don't think any of us were

563  
00:28:59,350 --> 00:28:56,640

nervous

564

00:29:00,870 --> 00:28:59,360

except hoot might want to comment about

565

00:29:02,070 --> 00:29:00,880

sweaty palms or something while he was

566

00:29:03,750 --> 00:29:02,080

operating the controls

567

00:29:09,669 --> 00:29:03,760

but from our side though we never had a

568

00:29:20,710 --> 00:29:13,510

in a smiling face of charlie

569

00:29:25,669 --> 00:29:24,070

and i think yes that was actually

570

00:29:27,110 --> 00:29:25,679

the moment because it did move us a

571

00:29:28,389 --> 00:29:27,120

little bit and i was trying to brace