INTERNATIONAL SPACE STATION

EXPEDITION 63

SOYUZ MS-16

CHRIS CASSIDY
FLIGHT ENGINEER
Astro_SEAL

ANATOLY IVANISHIN
FLIGHT ENGINEER &
SOYUZ COMMANDER

IVAN VAGNER
FLIGHT ENGINEER

Soyuz MS-16

Soyuz MS-15

Cygnus-13

Progress 74

1
00:00:04,610 --> 00:00:15,669
[Music]

2
00:00:19,269 --> 00:00:17,910
and good morning once again from mission

3
00:00:22,230 --> 00:00:19,279
control houston and welcome to our

4
00:00:24,710 --> 00:00:22,240
continuing coverage of the soyuz ms-16s

5
00:00:26,390 --> 00:00:24,720
trip to the international space station

6
00:00:28,310 --> 00:00:26,400
three crew members are on board and

7
00:00:30,070 --> 00:00:28,320
closing the gap between themselves and

8
00:00:31,910 --> 00:00:30,080
the international space station

9
00:00:34,630 --> 00:00:31,920
everything proceeding smoothly for an

10
00:00:36,150 --> 00:00:34,640
on-time docking today those three crew

11
00:00:38,229 --> 00:00:36,160
members from left to right nasa

12
00:00:40,470 --> 00:00:38,239
astronaut chris cassidy making his third

13
00:00:41,830 --> 00:00:40,480

flight into space today in the middle

14
00:00:44,310 --> 00:00:41,840
the soyuz commander and russian

15
00:00:46,150 --> 00:00:44,320
cosmonaut anatoly ivanishin also on his

16
00:00:48,950 --> 00:00:46,160
third visit and then on the very right

17
00:00:51,029 --> 00:00:48,960
there is yvonne wagner making his first

18
00:00:52,069 --> 00:00:51,039
flight another russian cosmonaut on

19
00:00:54,069 --> 00:00:52,079
board

20
00:00:56,310 --> 00:00:54,079
as of this very moment they are just

21
00:00:58,229 --> 00:00:56,320
about eight kilometers away from the

22
00:00:59,990 --> 00:00:58,239
international space station as both

23
00:01:03,110 --> 00:01:00,000
vehicles are flying over the south

24
00:01:06,390 --> 00:01:03,120
pacific to the southeast of australia

25
00:01:08,469 --> 00:01:06,400
and right now they are about 273 statute

26
00:01:10,870 --> 00:01:08,479
miles in altitude

27
00:01:12,789 --> 00:01:10,880
soyuz already inside of eight kilometers

28
00:01:14,870 --> 00:01:12,799
away from the station it's closing the

29
00:01:16,950 --> 00:01:14,880
gap between itself and the orbiting

30
00:01:18,070 --> 00:01:16,960
laboratory at a rate of about 11 meters

31
00:01:21,270 --> 00:01:18,080
per second

32
00:01:22,469 --> 00:01:21,280
everything has gone smoothly so far with

33
00:01:24,789 --> 00:01:22,479
all of our

34
00:01:26,950 --> 00:01:24,799
different burns our delta velocity burns

35
00:01:28,550 --> 00:01:26,960
four of those done to successfully raise

36
00:01:30,870 --> 00:01:28,560
the station's orbit following a

37
00:01:32,710 --> 00:01:30,880
successful launch earlier today

38
00:01:35,190 --> 00:01:32,720

all the impulse burns fine-tuning the

39
00:01:37,510 --> 00:01:35,200
path towards the station also going

40
00:01:39,350 --> 00:01:37,520
according to plan

41
00:01:41,429 --> 00:01:39,360
so that's our ground track right now

42
00:01:43,109 --> 00:01:41,439
they are in an orbital night time but as

43
00:01:45,350 --> 00:01:43,119
you can see as they continue to cross

44
00:01:47,109 --> 00:01:45,360
over the pacific we'll be getting into

45
00:01:48,550 --> 00:01:47,119
the orbital daytime and we should get

46
00:01:53,510 --> 00:01:48,560
some good views

47
00:01:57,749 --> 00:01:56,069
we're coming to you live now from

48
00:01:59,670 --> 00:01:57,759
another flight control room if you watch

49
00:02:02,069 --> 00:01:59,680
launch you might be noticing a change of

50
00:02:03,990 --> 00:02:02,079
scenery we're now back down the hall in

51
00:02:06,149 --> 00:02:04,000
the international space station's usual

52
00:02:07,990 --> 00:02:06,159
flight control room known as ficker one

53
00:02:09,830 --> 00:02:08,000
flight control room 1.

54
00:02:12,630 --> 00:02:09,840
again this just part of some of the

55
00:02:14,150 --> 00:02:12,640
precautions we're taking here in houston

56
00:02:17,270 --> 00:02:14,160
in mission control

57
00:02:19,750 --> 00:02:17,280
in the current covet 19 environment the

58
00:02:22,150 --> 00:02:19,760
different flight control teams are

59
00:02:23,589 --> 00:02:22,160
alternating rooms between what's known

60
00:02:25,589 --> 00:02:23,599
as handover so

61
00:02:27,910 --> 00:02:25,599
minimizing

62
00:02:29,910 --> 00:02:27,920
any person-to-person contact maintaining

63
00:02:31,910 --> 00:02:29,920

social distancing and maintaining a

64
00:02:33,589 --> 00:02:31,920
healthy flight control team to continue

65
00:02:36,390 --> 00:02:33,599
flying this orbiting laboratory is

66
00:02:38,150 --> 00:02:36,400
they're doing that 24 hours a day

67
00:02:40,309 --> 00:02:38,160
inside the room right now the orbit two

68
00:02:42,150 --> 00:02:40,319
team is led by flight director pooja

69
00:02:44,150 --> 00:02:42,160
jazrani she's there at the bottom of

70
00:02:46,309 --> 00:02:44,160
your screen just above her nasa

71
00:02:48,309 --> 00:02:46,319
astronaut jessica watkins serving as the

72
00:02:50,869 --> 00:02:48,319
capcom this morning she's the voice

73
00:02:52,550 --> 00:02:50,879
between all the teams here in houston

74
00:02:53,830 --> 00:02:52,560
and the crew on board the international

75
00:02:55,430 --> 00:02:53,840
space station

76
00:02:57,190 --> 00:02:55,440
a couple of other key players in the

77
00:02:59,589 --> 00:02:57,200
room right now one of them is the

78
00:03:01,910 --> 00:02:59,599
visiting vehicle officer tom erkenswick

79
00:03:04,390 --> 00:03:01,920
he's overseeing a team both here in

80
00:03:06,949 --> 00:03:04,400
houston and in moscow that has direct

81
00:03:09,110 --> 00:03:06,959
insight into the soyuz systems and how

82
00:03:10,550 --> 00:03:09,120
it's been performing and feeding that to

83
00:03:13,270 --> 00:03:10,560
the flight director and the entire

84
00:03:14,790 --> 00:03:13,280
control team here in houston

85
00:03:17,030 --> 00:03:14,800
puja has

86
00:03:19,350 --> 00:03:17,040
just finished polling the team and they

87
00:03:20,790 --> 00:03:19,360
are go for this docking operation

88
00:03:22,550 --> 00:03:20,800

there's a number of

89
00:03:24,149 --> 00:03:22,560
items that have to get done a number of

90
00:03:25,670 --> 00:03:24,159
configurations that have to get done

91
00:03:27,830 --> 00:03:25,680
with the international space station

92
00:03:29,750 --> 00:03:27,840
before we do a docking

93
00:03:31,509 --> 00:03:29,760
everything from the spartan flight

94
00:03:33,350 --> 00:03:31,519
controller today

95
00:03:34,630 --> 00:03:33,360
configuring the solar arrays to make

96
00:03:36,550 --> 00:03:34,640
sure that they're not going to be moving

97
00:03:38,710 --> 00:03:36,560
around as they get into a docking

98
00:03:40,789 --> 00:03:38,720
attitude that work being done by will

99
00:03:41,990 --> 00:03:40,799
o'connell over there at the spartan

100
00:03:43,670 --> 00:03:42,000
position

101
00:03:45,589 --> 00:03:43,680
and then things like the attitude

102
00:03:47,110 --> 00:03:45,599
control so which way the station is

103
00:03:49,589 --> 00:03:47,120
actually pointing

104
00:03:51,750 --> 00:03:49,599
our adco today james real working to

105
00:03:53,910 --> 00:03:51,760
hand over that control from

106
00:03:56,789 --> 00:03:53,920
the usual u.s control using large

107
00:03:58,630 --> 00:03:56,799
gyroscopes in the station structure over

108
00:04:00,309 --> 00:03:58,640
to the russian segment which can

109
00:04:02,550 --> 00:04:00,319
actually use its thrusters to help

110
00:04:04,470 --> 00:04:02,560
maintain attitude for the international

111
00:04:06,390 --> 00:04:04,480
space station so at this point all of

112
00:04:08,630 --> 00:04:06,400
that work is done

113
00:04:11,750 --> 00:04:08,640

one of the last items we were waiting on

114
00:04:14,149 --> 00:04:11,760
was to acquire tv signal from the soyuz

115
00:04:15,990 --> 00:04:14,159
spacecraft itself and we are starting to

116
00:04:18,390 --> 00:04:16,000
get that down now

117
00:04:20,949 --> 00:04:18,400
we'll be able to bring you that view uh

118
00:04:23,350 --> 00:04:20,959
mixed in with this one with uh the

119
00:04:25,430 --> 00:04:23,360
international or the mission control

120
00:04:27,350 --> 00:04:25,440
moscow out in coryoff they've been

121
00:04:29,030 --> 00:04:27,360
overseeing the mission ever since that

122
00:04:31,909 --> 00:04:29,040
successful launch

123
00:04:33,830 --> 00:04:31,919
earlier this morning

124
00:04:36,070 --> 00:04:33,840
that was controlled initially from a

125
00:04:39,030 --> 00:04:36,080
block house in baikonur and handed over

126
00:04:40,830 --> 00:04:39,040
following that successful separation

127
00:04:42,390 --> 00:04:40,840
over down to

128
00:04:44,790 --> 00:04:42,400
koryoff

129
00:04:47,909 --> 00:04:44,800
that launch was done successfully today

130
00:04:52,390 --> 00:04:47,919
it was done right on time at 305 a.m

131
00:04:54,390 --> 00:04:52,400
central 405 a.m eastern 805 gmt i'm

132
00:04:56,629 --> 00:04:54,400
going to try and throw in gmt as much as

133
00:04:58,310 --> 00:04:56,639
possible have been seen we've got a lot

134
00:05:00,390 --> 00:04:58,320
of our international friends watching

135
00:05:02,310 --> 00:05:00,400
today so i'll try and

136
00:05:05,110 --> 00:05:02,320
throw that in when possible so you can

137
00:05:08,310 --> 00:05:05,120
help track all of our milestones also

138
00:05:11,430 --> 00:05:08,320

but again that launch came right on time

139
00:05:14,150 --> 00:05:11,440
and that was the roughly nine minute

140
00:05:15,350 --> 00:05:14,160
ride into orbit on the soyuz spacecraft

141
00:05:19,350 --> 00:05:15,360
again this was the first flight of

142
00:05:21,909 --> 00:05:19,360
humans on the soyuz 2.1a booster this is

143
00:05:23,590 --> 00:05:21,919
an upgraded variant of the soyuz with

144
00:05:25,189 --> 00:05:23,600
additional

145
00:05:27,590 --> 00:05:25,199
telemetry

146
00:05:29,749 --> 00:05:27,600
so essentially data coming back from the

147
00:05:31,270 --> 00:05:29,759
vehicle some upgrades to the launch

148
00:05:32,070 --> 00:05:31,280
escape system

149
00:05:33,189 --> 00:05:32,080
which

150
00:05:37,830 --> 00:05:33,199
was

151
00:05:40,230 --> 00:05:37,840
used recently back in 2008 2018 during

152
00:05:41,510 --> 00:05:40,240
the flight of nick hague and alexia of

153
00:05:43,189 --> 00:05:41,520
cheney

154
00:05:44,710 --> 00:05:43,199
this was the first time launching on

155
00:05:47,270 --> 00:05:44,720
that booster and also launching from

156
00:05:49,670 --> 00:05:47,280
site 31 at the baikonur cosmodrome it

157
00:05:52,230 --> 00:05:49,680
was a flawless ride uphill the first

158
00:05:54,629 --> 00:05:52,240
stage those four strap boosters firing

159
00:05:56,950 --> 00:05:54,639
for about the first two minutes before

160
00:05:59,430 --> 00:05:56,960
following falling away in the core stage

161
00:06:02,230 --> 00:05:59,440
continuing the climb into orbit

162
00:06:04,550 --> 00:06:02,240
again this is the third time

163
00:06:07,110 --> 00:06:04,560

into space for both cassidy and

164
00:06:09,110 --> 00:06:07,120
ivanishin for cassidy this is his second

165
00:06:11,029 --> 00:06:09,120
ride on the soyuz spacecraft his first

166
00:06:14,469 --> 00:06:11,039
ever flight was on space shuttle

167
00:06:16,390 --> 00:06:14,479
endeavour on sts-127 also a mission to

168
00:06:18,230 --> 00:06:16,400
the international space station

169
00:06:21,670 --> 00:06:18,240
but this time getting his third trip

170
00:06:26,710 --> 00:06:24,390
again it was a flawless flight uh into

171
00:06:28,629 --> 00:06:26,720
orbit for the soyuz spacecraft or for

172
00:06:31,270 --> 00:06:28,639
the soyuz rocket we got some occasional

173
00:06:33,189 --> 00:06:31,280
cabin views inside this looking at

174
00:06:35,590 --> 00:06:33,199
anatoly ivanishin on the bottom of your

175
00:06:37,909 --> 00:06:35,600
screen he's the soyuz commander for all

176
00:06:40,550 --> 00:06:37,919
the operations today and the top there

177
00:06:43,749 --> 00:06:40,560
yvonne wagner who making his first

178
00:06:47,830 --> 00:06:45,990
and this just another view that we were

179
00:06:49,749 --> 00:06:47,840
able to get this a camera right on the

180
00:06:52,150 --> 00:06:49,759
side of the soyuz spacecraft you're able

181
00:06:54,710 --> 00:06:52,160
to see that third stage separate and fly

182
00:06:56,710 --> 00:06:54,720
away and then shortly after one of the

183
00:06:58,230 --> 00:06:56,720
solar arrays there are two of these on

184
00:07:01,270 --> 00:06:58,240
the soyuz spacecraft that provide

185
00:07:03,830 --> 00:07:01,280
electrical power deploying

186
00:07:06,070 --> 00:07:03,840
to begin gathering the sun's energy and

187
00:07:08,309 --> 00:07:06,080
supplying electricity to systems on

188
00:07:10,309 --> 00:07:08,319

board the spacecraft that automated

189
00:07:12,150 --> 00:07:10,319
deployment also happened happening with

190
00:07:14,870 --> 00:07:12,160
a deployment of a number of different

191
00:07:17,670 --> 00:07:14,880
antennas used for navigation and also

192
00:07:20,150 --> 00:07:17,680
the automated rendezvous coming up

193
00:07:25,029 --> 00:07:20,160
that we're going to see in just about

194
00:07:30,230 --> 00:07:27,430
so with the go from the team here in

195
00:07:32,550 --> 00:07:30,240
houston and we are right now about 38

196
00:07:34,629 --> 00:07:32,560
minutes away from the expected docking

197
00:07:36,870 --> 00:07:34,639
time i say expected because it's not

198
00:07:38,710 --> 00:07:36,880
unusual for the soyuz to get there a

199
00:07:40,790 --> 00:07:38,720
little bit early

200
00:07:42,790 --> 00:07:40,800
it is an automated rendezvous so

201
00:07:44,710 --> 00:07:42,800
everything being flown by the cores

202
00:07:47,029 --> 00:07:44,720
automated rendezvous system on the soyuz

203
00:07:48,869 --> 00:07:47,039
spacecraft they will able to do

204
00:07:51,110 --> 00:07:48,879
checkouts of the active system on the

205
00:07:52,950 --> 00:07:51,120
soyuz and the passive system on the

206
00:07:54,150 --> 00:07:52,960
russian service module also known as

207
00:07:57,110 --> 00:07:54,160
zvezda

208
00:08:00,550 --> 00:07:57,120
during the fly or the flight up to our

209
00:08:05,110 --> 00:08:02,550
one of the major milestones we're going

210
00:08:06,869 --> 00:08:05,120
to be tracking now is the fly around so

211
00:08:08,550 --> 00:08:06,879
right now the soyuz is coming in pretty

212
00:08:09,830 --> 00:08:08,560
much right underneath the international

213
00:08:11,670 --> 00:08:09,840

space station

214
00:08:14,070 --> 00:08:11,680
it's eventually going to get close to

215
00:08:16,629 --> 00:08:14,080
what's known as the r bar the radial

216
00:08:19,430 --> 00:08:16,639
vector and then begin to swing its way

217
00:08:21,670 --> 00:08:19,440
up to its docking port which is the

218
00:08:23,270 --> 00:08:21,680
poisk module you're looking at a model

219
00:08:25,430 --> 00:08:23,280
of the international space station the

220
00:08:27,909 --> 00:08:25,440
poisk module is that empty one just

221
00:08:30,710 --> 00:08:27,919
above progress 74 where you see

222
00:08:33,269 --> 00:08:30,720
the ms-16 spacecraft is scheduled to

223
00:08:35,909 --> 00:08:33,279
dock that's on the space-facing side of

224
00:08:40,949 --> 00:08:35,919
the zenith side of the zvezda service

225
00:08:44,310 --> 00:08:43,110
and again we're tracking that docking to

226
00:08:46,949 --> 00:08:44,320
take place

227
00:08:50,790 --> 00:08:46,959
uh on time at about

228
00:08:53,110 --> 00:08:50,800
9 16 a.m central time 10 16 a.m eastern

229
00:08:55,670 --> 00:08:53,120
1416 gmt

230
00:08:57,110 --> 00:08:55,680
and again not unusual for the soyuz to

231
00:08:59,110 --> 00:08:57,120
move through a couple of these steps a

232
00:09:01,030 --> 00:08:59,120
little bit quicker than normal

233
00:09:03,030 --> 00:09:01,040
after they do the fly around they'll

234
00:09:04,710 --> 00:09:03,040
initiate something known as station

235
00:09:06,550 --> 00:09:04,720
keeping that's where they do their kind

236
00:09:08,630 --> 00:09:06,560
of final alignment checks for the

237
00:09:10,949 --> 00:09:08,640
vehicle when they're only about 190

238
00:09:13,030 --> 00:09:10,959

meters away then they'll be able to

239
00:09:15,829 --> 00:09:13,040
execute that final approach begin

240
00:09:16,630 --> 00:09:15,839
driving in slowly towards

241
00:09:21,269 --> 00:09:16,640
the

242
00:09:23,750 --> 00:09:21,279
module also known as mini research

243
00:09:25,670 --> 00:09:23,760
module 2.

244
00:09:27,590 --> 00:09:25,680
that final approach rate will slow all

245
00:09:29,509 --> 00:09:27,600
the way down to about a tenth of a meter

246
00:09:32,870 --> 00:09:29,519
per second so it'll be a slow and steady

247
00:09:34,949 --> 00:09:32,880
crawl into that final docking port

248
00:09:37,509 --> 00:09:34,959
but

249
00:09:39,110 --> 00:09:37,519
it's a slow and steady crawl it's uh

250
00:09:41,509 --> 00:09:39,120
when you're bringing two spacecraft

251
00:09:42,790 --> 00:09:41,519
together slow and steady always wins the

252
00:09:43,509 --> 00:09:42,800
race

253
00:09:44,870 --> 00:09:43,519
but

254
00:09:47,030 --> 00:09:44,880
everything performing great with the

255
00:09:49,030 --> 00:09:47,040
vehicle so far all of its checkouts done

256
00:09:51,350 --> 00:09:49,040
successfully and all the navigation and

257
00:09:54,150 --> 00:09:51,360
that automated rendezvous control

258
00:09:56,150 --> 00:09:54,160
so we'll start to listen in now as we

259
00:09:58,310 --> 00:09:56,160
continue to hear calls between anatoly

260
00:10:00,630 --> 00:09:58,320
venetian the soyuz commander and the

261
00:10:11,670 --> 00:10:00,640
flight controllers over inquiry office

262
00:10:20,550 --> 00:10:14,230
the range is three and the rate is eight

263
00:10:25,190 --> 00:10:23,430

we are standing by for the third

264
00:10:43,430 --> 00:10:25,200
approach burn

265
00:10:50,470 --> 00:10:46,949
now let's do a sims for a

266
00:11:11,269 --> 00:10:50,480
the range is 2.7 and the rate is eight

267
00:11:11,279 --> 00:11:28,630
the range is 2.5 and the rate is 8.

268
00:11:33,990 --> 00:11:30,870
we can see the maneuver

269
00:11:37,829 --> 00:11:34,000
this station has moved

270
00:11:44,230 --> 00:11:37,839
to the right uh practically at 990

271
00:11:50,629 --> 00:11:47,110
maneuver is confirmed

272
00:11:52,870 --> 00:11:50,639
as well we can see it as well

273
00:11:55,910 --> 00:11:52,880
getting a live view of sunrise as the

274
00:11:58,550 --> 00:11:55,920
station 271 statute miles over the south

275
00:12:00,470 --> 00:11:58,560
pacific about to cross the terminator

276
00:12:02,069 --> 00:12:00,480
that line between night and day on the

277
00:12:04,310 --> 00:12:02,079
earth's surface

278
00:12:06,389 --> 00:12:04,320
the soyuz spacecraft coming up on two

279
00:12:07,910 --> 00:12:06,399
kilometers away and closing

280
00:12:17,590 --> 00:12:07,920
right now at about seven and a half

281
00:12:23,750 --> 00:12:21,230
we have a combined gaso in attitude at

282
00:12:27,670 --> 00:12:23,760
1642 11

283
00:12:30,710 --> 00:12:27,680
they're activated at 16 42 17.

284
00:12:32,470 --> 00:12:30,720
1.5 meters 2 meters

285
00:12:35,509 --> 00:12:32,480
three

286
00:12:36,870 --> 00:12:35,519
parameters of cadillac are

287
00:12:41,269 --> 00:12:36,880
nominal

288
00:12:46,310 --> 00:12:41,279

for we have uh observed the escado the

289
00:12:50,629 --> 00:12:47,190
and

290
00:12:55,509 --> 00:12:50,639
oxygen supply

291
00:12:58,150 --> 00:12:55,519
so the burn delta v is five uh zero

292
00:12:59,430 --> 00:12:58,160
six five point zero six meters per

293
00:13:17,430 --> 00:12:59,440
second

294
00:13:20,790 --> 00:13:19,110
i'm not receiving the image right now

295
00:13:40,069 --> 00:13:20,800
could you please provide the running

296
00:13:40,079 --> 00:13:49,990
the range is 1.6 says rate is 4 copy

297
00:13:53,750 --> 00:13:51,670
you're continuing to get those good call

298
00:13:56,310 --> 00:13:53,760
outs from anatoly ivanishin he's giving

299
00:13:58,710 --> 00:13:56,320
the range and the range rate so

300
00:13:59,750 --> 00:13:58,720
they're about 1.6 kilometers away from

301
00:14:01,590 --> 00:13:59,760
station

302
00:14:04,470 --> 00:14:01,600
closing in at about four meters per

303
00:14:07,269 --> 00:14:06,150
that range rate is going to continue to

304
00:14:09,670 --> 00:14:07,279
drop

305
00:14:11,990 --> 00:14:09,680
we'll eventually hit zero after we do

306
00:14:13,590 --> 00:14:12,000
the fly around and hit station keeping

307
00:14:16,230 --> 00:14:13,600
then the soyuz will begin its final

308
00:14:25,509 --> 00:14:16,240
approach coming in at a rate of about a

309
00:14:30,710 --> 00:14:27,990
soyuz is right now executing a couple of

310
00:14:33,829 --> 00:14:30,720
final burns known as impulse burns

311
00:14:38,230 --> 00:14:33,839
these are quick firings of the engines

312
00:14:41,350 --> 00:14:39,990
did you just get a confirmation from the

313
00:14:46,389 --> 00:14:41,360

visiting vehicle officer that the

314
00:14:50,069 --> 00:14:48,069
the impulse 5 burn should be coming up

315
00:14:53,350 --> 00:14:50,079
in about a minute

316
00:14:56,069 --> 00:14:53,360
it will be a 5 and a 6.

317
00:14:58,310 --> 00:14:56,079
and then that will place the soyuz just

318
00:15:00,790 --> 00:14:58,320
about 400 meters away from the station

319
00:15:03,189 --> 00:15:00,800
then it's going to execute a fly around

320
00:15:04,150 --> 00:15:03,199
going from underneath the station up to

321
00:15:06,790 --> 00:15:04,160
the top

322
00:15:09,430 --> 00:15:06,800
looking back down as it's going to be

323
00:15:10,710 --> 00:15:09,440
eventually docking to that space facing

324
00:15:23,189 --> 00:15:10,720
side

325
00:15:23,199 --> 00:15:32,710
the range is 1.2 of the rate is 3.8

326
00:15:38,629 --> 00:15:35,590
and getting our first look now this view

327
00:15:40,310 --> 00:15:38,639
from the soyuz looking up at the station

328
00:15:43,350 --> 00:15:40,320
as it starts to catch a little bit more

329
00:15:45,030 --> 00:15:43,360
sunlight that'll firmly come into view

330
00:15:45,910 --> 00:15:45,040
uh the numbers to really pay attention

331
00:15:52,629 --> 00:15:45,920
to

332
00:15:55,509 --> 00:15:52,639
1.099 kilometers that's the range away

333
00:15:56,230 --> 00:15:55,519
from the station just beneath that

334
00:15:59,990 --> 00:15:56,240
the

335
00:16:20,710 --> 00:16:00,000
rate so right now we're closing at about

336
00:16:25,590 --> 00:16:23,430
the range is one kilometer and the rate

337
00:16:26,629 --> 00:16:25,600
three point four

338
00:16:28,389 --> 00:16:26,639

uh

339
00:16:31,350 --> 00:16:28,399
the power

340
00:16:59,350 --> 00:16:31,360
activation is confirmed and

341
00:17:21,669 --> 00:17:01,990
so the range is 900 meters and the rate

342
00:17:27,829 --> 00:17:22,829
the range is

343
00:17:42,070 --> 00:17:27,839
840 840 and the rate is 2.3

344
00:17:50,070 --> 00:17:46,710
the range is 800 of the rate is 2.2

345
00:17:53,990 --> 00:17:50,080
the braking is complete uh vanya could

346
00:17:56,710 --> 00:17:54,000
you please use agc mode

347
00:18:04,390 --> 00:17:59,990
as well the range is 750 and the rate is

348
00:18:09,750 --> 00:18:07,669
so inside 750 meters another good

349
00:18:11,510 --> 00:18:09,760
confirmation impulse five burn has been

350
00:18:12,630 --> 00:18:11,520
done successfully

351
00:18:15,029 --> 00:18:12,640
eight

352
00:18:20,950 --> 00:18:15,039
zero six uh i am

353
00:18:25,669 --> 00:18:23,750
do you want me to do it again uh yes

354
00:18:27,669 --> 00:18:25,679
let's do it again

355
00:18:30,070 --> 00:18:27,679
and again

356
00:18:34,470 --> 00:18:30,080
well maybe one more

357
00:18:40,470 --> 00:18:38,390
so the range is 660 and the rate is 2.2

358
00:18:42,950 --> 00:18:40,480
copy

359
00:18:46,310 --> 00:18:42,960
and there we have a great view of the

360
00:18:48,070 --> 00:18:46,320
soyuz ms-16 continuing its approach to

361
00:18:50,070 --> 00:18:48,080
the station

362
00:18:53,110 --> 00:18:50,080
this is a camera looking from the bottom

363
00:18:54,870 --> 00:18:53,120

down back towards planet earth

364
00:18:57,110 --> 00:18:54,880
so he's going to continue to approach at

365
00:18:58,950 --> 00:18:57,120
this angle and eventually execute a

366
00:19:06,630 --> 00:18:58,960
fly-around maneuver once it gets about

367
00:19:06,640 --> 00:19:12,070
yes let's leave it like that

368
00:19:12,080 --> 00:19:20,230
the range is 600 as the rate is 1.4

369
00:19:25,510 --> 00:19:23,990
we're standing by four

370
00:19:27,350 --> 00:19:25,520
the

371
00:19:34,230 --> 00:19:27,360
close

372
00:19:34,240 --> 00:19:40,950
and we are standing by for proximity ops

373
00:19:45,029 --> 00:19:42,549
and the visiting vehicle officer here in

374
00:19:47,669 --> 00:19:45,039
houston confirming impulse 6 is done

375
00:19:49,669 --> 00:19:47,679
that's the sixth and final impulse burn

376
00:19:52,310 --> 00:19:49,679
just fine tuning and

377
00:19:54,789 --> 00:19:52,320
beginning to break the soyuz approach to

378
00:19:56,549 --> 00:19:54,799
the station

379
00:19:58,630 --> 00:19:56,559
next milestone is going to be that fly

380
00:19:59,669 --> 00:19:58,640
around once it gets to about 400 meters

381
00:20:03,510 --> 00:19:59,679
away

382
00:20:05,430 --> 00:20:03,520
so the range is 520 the rate is 1.4

383
00:20:09,669 --> 00:20:05,440
it's just 120 meters to go and then

384
00:20:13,430 --> 00:20:12,390
that'll essentially be about a half loop

385
00:20:14,630 --> 00:20:13,440
from

386
00:20:21,590 --> 00:20:14,640
the

387
00:20:23,350 --> 00:20:21,600
eventually orient itself

388
00:20:25,990 --> 00:20:23,360

with the docking probe pointing back

389
00:20:28,549 --> 00:20:26,000
down towards earth as it moves in on the

390
00:20:30,549 --> 00:20:28,559
space-facing side

391
00:20:45,029 --> 00:20:30,559
docking port uh known as poisk or the

392
00:20:45,039 --> 00:21:14,230
the range is 460 the rate is 1.3 copy

393
00:21:21,510 --> 00:21:17,990
the range is 420 and the rate is 1.2

394
00:21:25,110 --> 00:21:23,510
again we're coming up on that 400 meter

395
00:21:30,310 --> 00:21:25,120
point and then right after that we

396
00:21:34,470 --> 00:21:31,430
the range is

397
00:21:44,070 --> 00:21:34,480
400 and the rate is 1.1

398
00:21:47,590 --> 00:21:45,909
and confirmation the fly around has

399
00:21:49,909 --> 00:21:47,600
begun so we're going to see the soyuz

400
00:21:52,549 --> 00:21:49,919
spacecraft begin to swing its way from

401
00:21:54,390 --> 00:21:52,559
the bottom over top of the international

402
00:22:09,990 --> 00:21:54,400
space station

403
00:22:10,000 --> 00:22:35,750
the range is 350 and the rate is 0.8

404
00:22:35,760 --> 00:22:56,530
the range is 330 and the rate is 0.9

405
00:22:56,540 --> 00:23:06,710
[Music]

406
00:23:19,830 --> 00:23:10,870
the range is 310 the rate is 0.75

407
00:23:19,840 --> 00:23:41,350
the range is 300 the rate is 0.75

408
00:23:51,029 --> 00:23:45,070
the range is 280 meters and the rate is

409
00:23:56,230 --> 00:23:52,870
you're just now tuning in you are

410
00:23:58,390 --> 00:23:56,240
looking at the soyuz ms-16 spacecraft

411
00:24:01,350 --> 00:23:58,400
three crew members on board nasa's chris

412
00:24:04,310 --> 00:24:01,360
cassidy and those cosmos cosmos anatoly

413
00:24:08,310 --> 00:24:04,320

ivanishin and yvonne wagner they're in

414
00:24:11,750 --> 00:24:10,390
they closed into 400 meters away from

415
00:24:14,470 --> 00:24:11,760
the station they're still getting a

416
00:24:15,830 --> 00:24:14,480
little bit closer but primarily

417
00:24:18,149 --> 00:24:15,840
this maneuver

418
00:24:20,470 --> 00:24:18,159
is done to bring the soyuz from the

419
00:24:22,789 --> 00:24:20,480
bottom of the station up to the top it's

420
00:24:24,710 --> 00:24:22,799
all the name it's the fly around that'll

421
00:24:27,110 --> 00:24:24,720
eventually line it up with its docking

422
00:24:28,230 --> 00:24:27,120
port known as the poisk module

423
00:24:30,070 --> 00:24:28,240
once it

424
00:24:31,830 --> 00:24:30,080
finishes this fly around we'll enter

425
00:24:33,190 --> 00:24:31,840
into a period of what's known as station

426
00:24:35,350 --> 00:24:33,200
keeping

427
00:24:37,510 --> 00:24:35,360
that gives a chance for the automated

428
00:24:39,430 --> 00:24:37,520
system on board the soyuz to finish

429
00:24:42,190 --> 00:24:39,440
fine-tuning that alignment before they

430
00:24:45,510 --> 00:24:42,200
begin the final approach

431
00:25:00,760 --> 00:24:45,520
250 meters is the range and zero five is

432
00:25:06,950 --> 00:25:03,510
[Music]

433
00:25:24,549 --> 00:25:06,960
the range is 240 meters

434
00:25:38,870 --> 00:25:27,590
the range is 235 meters and the rate is

435
00:25:38,880 --> 00:25:42,710
this is

436
00:26:04,430 --> 00:25:45,510
the range is 230 meters and the rate is

437
00:26:17,510 --> 00:26:13,030
[Music]

438
00:26:22,789 --> 00:26:17,520

220 meters is the range and the rate is

439
00:26:26,549 --> 00:26:24,470
this camera from the very forward end of

440
00:26:28,870 --> 00:26:26,559
the soyuz keeping the station right in

441
00:26:30,470 --> 00:26:28,880
the middle of its crosshairs

442
00:26:32,310 --> 00:26:30,480
and this actually giving us a really

443
00:26:34,470 --> 00:26:32,320
good view of its eventual docking port

444
00:26:36,789 --> 00:26:34,480
if you look just above

445
00:26:38,789 --> 00:26:36,799
uh the the middle of the crosshairs on

446
00:26:40,630 --> 00:26:38,799
that center line it's perfectly

447
00:26:42,870 --> 00:26:40,640
splitting the russian segment of the

448
00:26:45,190 --> 00:26:42,880
station right now to the left is the

449
00:26:47,269 --> 00:26:45,200
piers docking compartment with the 74

450
00:26:49,830 --> 00:26:47,279
progress vehicle currently docked and

451
00:26:52,870 --> 00:26:49,840
just to the right is that empty poised

452
00:26:54,950 --> 00:26:52,880
docking port that's pointing back into

453
00:26:57,590 --> 00:26:54,960
space it's on the zenith side

454
00:27:00,230 --> 00:26:57,600
of the zvezda service module and that

455
00:27:02,470 --> 00:27:00,240
is where this soyuz is bound so it's

456
00:27:04,789 --> 00:27:02,480
going to continue this pirouette around

457
00:27:06,789 --> 00:27:04,799
the station until it has that poisk

458
00:27:08,630 --> 00:27:06,799
right in its crosshairs will be in the

459
00:27:10,950 --> 00:27:08,640
station keeping so it can fine tune its

460
00:27:24,470 --> 00:27:10,960
alignment and then we'll begin the final

461
00:27:45,350 --> 00:27:27,510
210 meters is the range and the rate is

462
00:28:07,590 --> 00:27:46,950
ranges to

463
00:28:33,269 --> 00:28:10,710

the closing range is 208 meters and the

464
00:28:37,990 --> 00:28:36,149
the range is 206 meters and the rate is

465
00:28:55,590 --> 00:28:38,000
0.05

466
00:29:14,070 --> 00:28:58,950
the range is 204 meters and the rate is

467
00:29:18,070 --> 00:29:16,070
so at this point the soyuz has changed

468
00:29:20,950 --> 00:29:18,080
its angle of attack to the station by

469
00:29:23,830 --> 00:29:20,960
about 60 degrees this entire maneuver is

470
00:29:26,230 --> 00:29:23,840
going to change it about 123 degrees so

471
00:29:28,470 --> 00:29:26,240
not a full 180 from one side to the

472
00:29:30,710 --> 00:29:28,480
other as it did approach the station at

473
00:29:32,389 --> 00:29:30,720
a bit of an oblique angle

474
00:29:35,830 --> 00:29:32,399
but by the time it's done with this fly

475
00:29:40,549 --> 00:29:35,840
around it will be right over top of that

476
00:29:44,710 --> 00:29:42,389
seen a couple of thruster firings as it

477
00:29:46,710 --> 00:29:44,720
continues to fine tune in this fly

478
00:29:48,470 --> 00:29:46,720
around maneuver

479
00:29:51,510 --> 00:29:48,480
right now maintaining a distance of

480
00:29:53,510 --> 00:29:51,520
about 200 meters as it begins this

481
00:29:55,430 --> 00:29:53,520
roughly half circle

482
00:29:57,909 --> 00:29:55,440
over top of the station

483
00:29:59,750 --> 00:29:57,919
right now both vehicles flying over the

484
00:30:02,230 --> 00:29:59,760
northern part of south america right

485
00:30:04,710 --> 00:30:02,240
over columbia about to cross over the

486
00:30:06,389 --> 00:30:04,720
border between colombia and venezuela

487
00:30:15,350 --> 00:30:06,399
and then eventually moving out over the

488
00:30:19,750 --> 00:30:17,590

again this entire operation right now

489
00:30:21,669 --> 00:30:19,760
being done automatically

490
00:30:24,149 --> 00:30:21,679
the automated rendezvous system on the

491
00:30:26,630 --> 00:30:24,159
so use the cores communicating with

492
00:30:30,549 --> 00:30:26,640
antennas back on the station itself

493
00:30:30,559 --> 00:30:46,710
copy

494
00:30:50,549 --> 00:30:48,870
thanks to plenty of sunlight getting a

495
00:30:52,630 --> 00:30:50,559
lot of views there

496
00:31:11,750 --> 00:30:52,640
thruster firing says the soyuz continues

497
00:31:31,110 --> 00:31:14,710
range is 200 mirrors range rate is zero

498
00:31:38,149 --> 00:31:34,870
uh approach flag is confirmed

499
00:31:40,710 --> 00:31:38,159
of course 200 meters is the range range

500
00:31:43,509 --> 00:31:40,720
rate is zero point zero two

501
00:31:46,230 --> 00:31:43,519
so the clients are working lower

502
00:31:47,430 --> 00:31:46,240
oh we are completing

503
00:31:50,549 --> 00:31:47,440
the

504
00:31:52,470 --> 00:31:50,559
docking interface

505
00:32:12,389 --> 00:31:52,480
access

506
00:32:17,110 --> 00:32:13,909
yes

507
00:32:18,630 --> 00:32:17,120
approach flag just illuminated and we

508
00:32:21,830 --> 00:32:18,640
are

509
00:32:24,870 --> 00:32:21,840
currently aligned with the docking

510
00:32:26,830 --> 00:32:24,880
interface access okay

511
00:32:31,190 --> 00:32:26,840
okay please send

512
00:32:37,990 --> 00:32:32,549
copy all

513
00:32:39,190 --> 00:32:38,000

command will be executed 1702 32 this is

514
00:32:41,190 --> 00:32:39,200
the time when

515
00:32:44,070 --> 00:32:41,200
approach command was sent

516
00:32:46,149 --> 00:32:44,080
approach flag is set on both vehicles

517
00:32:47,909 --> 00:32:46,159
copy

518
00:32:48,789 --> 00:32:47,919
this

519
00:32:50,470 --> 00:32:48,799
please

520
00:32:52,630 --> 00:32:50,480
move to

521
00:32:54,789 --> 00:32:52,640
page 63

522
00:32:57,830 --> 00:32:54,799
periscope illumination and headlight

523
00:32:59,909 --> 00:32:57,840
headlight headlights on copy

524
00:33:01,669 --> 00:32:59,919
things moving very rapidly we completed

525
00:33:03,110 --> 00:33:01,679
that fly around immediately went into

526
00:33:05,669 --> 00:33:03,120
station keeping

527
00:33:08,470 --> 00:33:05,679
and then they gave the go to resume the

528
00:33:10,149 --> 00:33:08,480
final approach early so we are looking

529
00:33:12,710 --> 00:33:10,159
like we'll probably beat that talking

530
00:33:17,269 --> 00:33:12,720
time that was targeted at 9 16 a.m

531
00:33:19,830 --> 00:33:17,279
central 10 16 a.m eastern 14 16 gmt

532
00:33:25,750 --> 00:33:19,840
as of right now the soyuz spacecraft on

533
00:34:20,790 --> 00:33:27,269
range rate is

534
00:34:20,800 --> 00:34:26,470
copy

535
00:34:41,990 --> 00:34:27,589
solution

536
00:34:42,000 --> 00:34:44,869
110

537
00:34:51,589 --> 00:34:46,829
and range raised

538
00:34:58,630 --> 00:34:54,389

one year to go away yeah

539
00:34:58,640 --> 00:35:03,670
ranges 100 range rate 0.55

540
00:35:03,680 --> 00:35:06,550
copy

541
00:35:10,790 --> 00:35:09,030
so the soyuz now just about 100 meters

542
00:35:13,190 --> 00:35:10,800
away from docking

543
00:35:14,630 --> 00:35:13,200
that range rate continuing to tick down

544
00:35:16,150 --> 00:35:14,640
right now they're closing about half a

545
00:35:18,790 --> 00:35:16,160
meter per second that's going to go all

546
00:35:20,710 --> 00:35:18,800
the way down to about 0.1 meters per

547
00:35:23,109 --> 00:35:20,720
second when they get real close to that

548
00:35:24,870 --> 00:35:23,119
final approach we'll see the contact and

549
00:35:27,270 --> 00:35:24,880
capture the docking probe on the very

550
00:35:29,109 --> 00:35:27,280
front end of the soyuz spacecraft i will

551
00:35:30,870 --> 00:35:29,119
make contact with the docking port of

552
00:35:32,950 --> 00:35:30,880
the poisk module

553
00:35:34,710 --> 00:35:32,960
and once that's been grabbed it'll

554
00:35:37,670 --> 00:35:34,720
retract the docking probe that'll pull

555
00:35:39,589 --> 00:35:37,680
the soyuz in closer and then a series of

556
00:35:42,230 --> 00:35:39,599
hooks will be able to engage to give a

557
00:35:44,550 --> 00:35:42,240
hard mate or really a hard latch

558
00:36:06,310 --> 00:35:44,560
to the soyuz spacecraft firmly attaching

559
00:36:06,320 --> 00:36:27,910
ranges 70 range rate 0.34

560
00:36:42,550 --> 00:36:30,150
we can clearly see the target and

561
00:36:45,990 --> 00:36:44,230
range is 60

562
00:37:29,030 --> 00:36:46,000
and range rate is

563
00:37:34,230 --> 00:37:32,230

and stand by for uh ss weapon dock in an

564
00:37:35,589 --> 00:37:34,240
internal transfer system command

565
00:37:39,589 --> 00:37:35,599
activation

566
00:37:44,150 --> 00:37:42,069
yes the genius i confirm ss weapon

567
00:37:45,510 --> 00:37:44,160
document internal transfer command

568
00:37:49,270 --> 00:37:45,520
activation

569
00:37:51,190 --> 00:37:49,280
probe is extended latches extended

570
00:38:16,710 --> 00:37:51,200
hooks open as the

571
00:38:16,720 --> 00:38:29,109
range of 40 range rate 15.

572
00:38:34,470 --> 00:38:32,230
a little under 50 meters to go the ms-16

573
00:38:36,950 --> 00:38:34,480
spacecraft chris cassidy anatoly

574
00:38:39,349 --> 00:38:36,960
ivanishin and von wagner closing in on

575
00:38:53,109 --> 00:38:39,359
that poise docking module just minutes

576
00:38:53,119 --> 00:39:16,710
range is 35 range rate 15.

577
00:39:16,720 --> 00:39:25,670
visually approximately 25 meters

578
00:39:25,680 --> 00:39:37,700
range rate 0.1

579
00:39:37,710 --> 00:39:41,030
[Music]

580
00:39:45,670 --> 00:39:43,270
in the in this view the top of the soyuz

581
00:39:47,990 --> 00:39:45,680
is uh really on the bottom you can see

582
00:39:50,150 --> 00:39:48,000
that docking probe it's the pointy part

583
00:39:52,550 --> 00:39:50,160
right at the tip

584
00:39:55,030 --> 00:39:52,560
and that's what's going to drive into

585
00:39:56,390 --> 00:39:55,040
the docking port on the poisk module and

586
00:39:58,470 --> 00:39:56,400
that'll get retracted and that'll be

587
00:40:00,790 --> 00:39:58,480
able to pull the soyuz spacecraft in and

588
00:40:02,390 --> 00:40:00,800

a series of hooks around that ring just

589
00:40:03,589 --> 00:40:02,400
outside the docking probe will be able

590
00:40:06,150 --> 00:40:03,599
to engage

591
00:40:08,829 --> 00:40:06,160
and get a hard lock firmly attaching

592
00:40:12,870 --> 00:40:08,839
the soyuz to the international space

593
00:40:13,750 --> 00:40:12,880
station that'll also create a

594
00:40:24,390 --> 00:40:13,760
a

595
00:40:27,270 --> 00:40:24,400
vestibule

596
00:40:29,270 --> 00:40:27,280
that's the area of both the soyuz hatch

597
00:40:31,030 --> 00:40:29,280
and the station hatch typically exposed

598
00:40:32,790 --> 00:40:31,040
to the vacuum of space they'll be able

599
00:40:34,390 --> 00:40:32,800
to pressurize that and then kick off a

600
00:40:37,349 --> 00:40:34,400
series of leak checks

601
00:40:38,870 --> 00:40:37,359
it does take a little while for that to

602
00:40:39,910 --> 00:40:38,880
not only get pressurized but to make

603
00:40:42,550 --> 00:40:39,920
sure that

604
00:40:45,270 --> 00:40:42,560
the hatch or the pressure is equalized

605
00:40:47,670 --> 00:40:45,280
between the soyuz the vestibule and the

606
00:40:49,109 --> 00:40:47,680
station itself it takes about two hours

607
00:40:50,790 --> 00:40:49,119
just you don't want to open up those

608
00:40:52,950 --> 00:40:50,800
hatches until you know for sure you

609
00:40:54,550 --> 00:40:52,960
don't have any leaks and you will it can

610
00:40:55,829 --> 00:40:54,560
be actually pretty difficult to get them

611
00:40:57,190 --> 00:40:55,839
open if you have any pressure

612
00:40:58,630 --> 00:40:57,200
differentials so

613
00:41:00,470 --> 00:40:58,640

they wait for everything to settle out

614
00:41:02,630 --> 00:41:00,480
before they open the hatches typically

615
00:41:05,750 --> 00:41:02,640
takes about two hours

616
00:41:08,309 --> 00:41:05,760
following docking

617
00:41:20,230 --> 00:41:08,319
now though inside 30 meters continuing

618
00:41:46,550 --> 00:41:22,470
meters visually

619
00:41:46,560 --> 00:42:12,850
rate is point one

620
00:42:16,950 --> 00:42:14,630
[Music]

621
00:42:27,270 --> 00:42:16,960
eight meters approximately

622
00:42:27,280 --> 00:42:54,520
6 meters

623
00:43:04,630 --> 00:42:55,829
[Music]

624
00:43:34,550 --> 00:43:06,550
contact

625
00:43:40,470 --> 00:43:37,910
and docking confirmed 9 13 a.m central

626
00:43:43,270 --> 00:43:40,480
time 10 13 a.m

627
00:43:46,550 --> 00:43:43,280
eastern time

628
00:43:48,790 --> 00:43:46,560
1413 gmt as the station was flying just

629
00:43:55,349 --> 00:43:48,800
about 260 statute miles over the

630
00:44:00,630 --> 00:43:58,390
soyuz ms-16 spacecraft docked to the

631
00:44:02,550 --> 00:44:00,640
international space station right now

632
00:44:04,470 --> 00:44:02,560
the docking probe is going to begin to

633
00:44:05,750 --> 00:44:04,480
retract it's going to pull it in and the

634
00:44:08,550 --> 00:44:05,760
hooks are going to start to drive on

635
00:44:11,829 --> 00:44:08,560
both the station and on the docking port

636
00:44:16,390 --> 00:44:14,150
please select the ssp docking internal

637
00:44:21,190 --> 00:44:16,400
transfer system display on input 2

638
00:44:25,910 --> 00:44:23,670

but with that chris cassidy anatoly

639
00:44:27,910 --> 00:44:25,920
ivanishin and ivan wagner's voyage to

640
00:44:31,670 --> 00:44:27,920
the international space station is

641
00:44:38,470 --> 00:44:35,990
this is the hooks and gauge time

642
00:44:57,670 --> 00:44:38,480
17 13 21

643
00:45:04,309 --> 00:45:01,270
elimination led is not eliminated

644
00:45:08,309 --> 00:45:04,319
on the info control panel okay

645
00:45:15,190 --> 00:45:10,230
okay there were parameters

646
00:45:21,190 --> 00:45:16,829
pierrot

647
00:45:23,829 --> 00:45:21,200
story 118 and two to eight these are the

648
00:45:25,589 --> 00:45:23,839
readings for spherical tanks one and two

649
00:45:27,829 --> 00:45:25,599
which are nominal

650
00:45:28,950 --> 00:45:27,839
four seven six this is the current

651
00:45:30,309 --> 00:45:28,960
propellant

652
00:45:36,309 --> 00:45:30,319
reading

653
00:45:45,190 --> 00:45:40,630
please switch to page 67 copy wall

654
00:45:53,750 --> 00:45:48,710
an rs7 command to deactivate the

655
00:45:59,109 --> 00:45:57,270
and i will close airpower one airflow

656
00:46:04,309 --> 00:45:59,119
regulator one

657
00:46:11,270 --> 00:46:06,630
m

658
00:46:12,790 --> 00:46:11,280
is ready

659
00:46:14,630 --> 00:46:12,800
for that

660
00:46:18,069 --> 00:46:14,640
yes let's

661
00:46:22,150 --> 00:46:19,349
and

662
00:46:24,309 --> 00:46:22,160
please turn on

663
00:46:25,270 --> 00:46:24,319

and so with the soyuz spacecraft

664
00:46:27,270 --> 00:46:25,280
now

665
00:46:29,910 --> 00:46:27,280
docked to the international space

666
00:46:31,670 --> 00:46:29,920
station at the at the

667
00:46:34,069 --> 00:46:31,680
moment of that docking uh the station

668
00:46:36,550 --> 00:46:34,079
goes into what's known as free drift so

669
00:46:37,750 --> 00:46:36,560
not under any active attitude control

670
00:46:39,670 --> 00:46:37,760
and that way you're not going to

671
00:46:42,950 --> 00:46:39,680
accidentally impart loads

672
00:46:45,349 --> 00:46:42,960
into the soyuz or the docking port

673
00:46:47,670 --> 00:46:45,359
if the station starts to maneuver

674
00:46:49,030 --> 00:46:47,680
the soyuz hooks will close first that

675
00:46:50,390 --> 00:46:49,040
takes a couple of minutes following

676
00:46:53,430 --> 00:46:50,400
docking and then following that the

677
00:46:55,670 --> 00:46:53,440
hooks on the mini research module 2 or

678
00:46:57,030 --> 00:46:55,680
the poisk module will then close and

679
00:46:58,870 --> 00:46:57,040
then the

680
00:47:00,870 --> 00:46:58,880
space station will once again resume

681
00:47:02,550 --> 00:47:00,880
attitude control that being done right

682
00:47:05,430 --> 00:47:02,560
now on the russian segment using the

683
00:47:18,630 --> 00:47:05,440
thrusters on the service module

684
00:47:23,990 --> 00:47:21,829
so what's the pressure reading

685
00:47:26,630 --> 00:47:24,000
okay again just in case you missed it

686
00:47:29,990 --> 00:47:26,640
the docking did occur

687
00:47:33,589 --> 00:47:30,000
at 9 13 a.m central time 10 13 a.m

688
00:47:36,950 --> 00:47:33,599

eastern 1413 gmt with the station in the

689
00:47:39,990 --> 00:47:36,960
soyuz flying 260 statute miles over the

690
00:47:43,270 --> 00:47:41,829
when you're ready we'll be ready to copy

691
00:48:05,030 --> 00:47:43,280
all the measurements

692
00:48:12,069 --> 00:48:06,790
ear co2

693
00:48:18,390 --> 00:48:16,230
8 4 7 barrel pressure 826

694
00:48:21,589 --> 00:48:18,400
and the assembly compartment pressure is

695
00:48:25,510 --> 00:48:22,390
and

696
00:48:27,670 --> 00:48:25,520
we cannot measure such uh pressure using

697
00:48:42,470 --> 00:48:27,680
and the pressure gauge

698
00:48:47,030 --> 00:48:45,270
and the elegy for electrical connectors

699
00:48:49,750 --> 00:48:47,040
is illuminated

700
00:48:52,790 --> 00:48:49,760
hooks open is not illuminated

701
00:49:16,790 --> 00:48:52,800
standing by four hooks closed

702
00:49:23,589 --> 00:49:19,750
please send get four command at that

703
00:49:26,390 --> 00:49:23,599
time okay copy uh we're going to uh send

704
00:49:27,430 --> 00:49:26,400
get 4 command that's 1720

705
00:49:31,109 --> 00:49:27,440
and the

706
00:49:33,510 --> 00:49:31,119
hooks are closed down our coffee

707
00:49:36,950 --> 00:49:33,520
and what did you say about and the

708
00:49:40,470 --> 00:49:37,829
its

709
00:49:41,510 --> 00:49:40,480
measurement range does not allow us to

710
00:49:43,990 --> 00:49:41,520
use it

711
00:49:45,670 --> 00:49:44,000
to measure a saw descent module pressure

712
00:49:47,910 --> 00:49:45,680
and we heard the call and we just got

713
00:49:50,950 --> 00:49:47,920

confirmation here in houston that the

714
00:49:53,030 --> 00:49:50,960
hooks on the soyuz side have been closed

715
00:49:55,349 --> 00:49:53,040
now standing by for the hooks on the

716
00:49:56,390 --> 00:49:55,359
poised side so on the station side to

717
00:49:57,910 --> 00:49:56,400
close

718
00:50:00,390 --> 00:49:57,920
and then we'll have what's known as hard

719
00:50:03,550 --> 00:50:00,400
dock or really just a firm mate

720
00:50:05,109 --> 00:50:03,560
of the soyuz spacecraft to the station

721
00:50:07,430 --> 00:50:05,119
[Music]

722
00:50:08,549 --> 00:50:07,440
looking like those hooks are now driving

723
00:50:10,829 --> 00:50:08,559
well

724
00:50:13,910 --> 00:50:10,839
you're going to use

725
00:50:15,670 --> 00:50:13,920
any control panel okay so once those

726
00:50:17,910 --> 00:50:15,680
hooks are done driving they'll be able

727
00:50:19,510 --> 00:50:17,920
to re-enable the attitude control on the

728
00:50:21,510 --> 00:50:19,520
space station

729
00:50:23,510 --> 00:50:21,520
able to stay in free drift

730
00:50:30,230 --> 00:50:23,520
for quite a while before it would begin

731
00:50:34,069 --> 00:50:32,710
then after that we'll enter into the

732
00:50:36,309 --> 00:50:34,079
what's known as the post docking

733
00:50:38,470 --> 00:50:36,319
procedures the crew will kick off a

734
00:50:40,390 --> 00:50:38,480
series of leak checks on the soyuz

735
00:50:42,870 --> 00:50:40,400
modules and then between the hatches of

736
00:50:46,069 --> 00:50:42,880
the soyuz and the station itself

737
00:50:47,990 --> 00:50:46,079
this will also be the opportunity for

738
00:50:49,589 --> 00:50:48,000

cassidy ivanishin and wagner to get out

739
00:50:51,190 --> 00:50:49,599
of their circle lunch and entry suits

740
00:50:56,950 --> 00:50:51,200
that they've been wearing

741
00:51:01,910 --> 00:51:00,230
and it typically takes about two hours

742
00:51:03,829 --> 00:51:01,920
following the docking for the hatches to

743
00:51:05,190 --> 00:51:03,839
be open right now we were tracking the

744
00:51:08,950 --> 00:51:05,200
hatch open

745
00:51:13,910 --> 00:51:08,960
to take place at about 11 15 a.m central

746
00:51:15,349 --> 00:51:13,920
12 15 p.m eastern 16 15 gmt

747
00:51:17,190 --> 00:51:15,359
this is

748
00:51:19,829 --> 00:51:17,200
one

749
00:51:53,829 --> 00:51:19,839
and latches are retracted

750
00:51:57,430 --> 00:51:55,030
moscow

751
00:51:58,870 --> 00:51:57,440
at 17 21

752
00:52:01,750 --> 00:51:58,880
50

753
00:52:04,470 --> 00:52:01,760
probe is retracted and ssvp mode has

754
00:52:07,510 --> 00:52:04,480
been executed for payroll

755
00:52:10,309 --> 00:52:07,520
uh we will deactivate the asset mode

756
00:52:14,710 --> 00:52:12,230
i'm sending the eight command to

757
00:52:15,910 --> 00:52:14,720
deactivate ssl dock and an internal

758
00:52:19,430 --> 00:52:15,920
transfer

759
00:52:21,190 --> 00:52:19,440
system at 17 22. and we just got

760
00:52:24,470 --> 00:52:21,200
confirmation that the hooks have now

761
00:52:26,790 --> 00:52:24,480
closed on the mrm2 the poisk module so

762
00:52:28,309 --> 00:52:26,800
we now have a hard dock of the soyuz

763
00:52:29,589 --> 00:52:28,319

spacecraft to the international space

764
00:52:31,589 --> 00:52:29,599
station

765
00:52:32,950 --> 00:52:31,599
for cassidy ivanishin and wagner this is

766
00:52:34,470 --> 00:52:32,960
going to kick off a couple of hours of

767
00:52:36,549 --> 00:52:34,480
leak checks getting out of those suits

768
00:52:40,470 --> 00:52:36,559
and getting ready to open up the hatch

769
00:52:42,309 --> 00:52:40,480
and join the expedition 62 crew of mir

770
00:52:44,470 --> 00:52:42,319
morgan and skripochka on board the

771
00:52:45,990 --> 00:52:44,480
international space station

772
00:52:47,510 --> 00:52:46,000
so while they go through those leak

773
00:52:50,390 --> 00:52:47,520
checks we are going to take a quick

774
00:52:52,150 --> 00:52:50,400
break but we will be back in time for

775
00:52:54,150 --> 00:52:52,160
that hatch opening

776
00:52:56,950 --> 00:52:54,160
so we're going to pick our coverage back

777
00:52:58,630 --> 00:52:56,960
up in just about two hours from now

778
00:53:02,870 --> 00:52:58,640
we'll be back on the air at 11 a.m

779
00:53:04,630 --> 00:53:02,880
central 12 p.m eastern 1600 gmt the

780
00:53:07,270 --> 00:53:04,640
hatch should be open

781
00:53:09,030 --> 00:53:07,280
we have 11 30 on here but we did dock a

782
00:53:12,470 --> 00:53:09,040
little bit early and we are tracking

783
00:53:15,030 --> 00:53:12,480
that hatch open to come around 11 15 or

784
00:53:16,870 --> 00:53:15,040
so but we will obviously keep you

785
00:53:18,150 --> 00:53:16,880
updated as we step through those

786
00:53:20,230 --> 00:53:18,160
procedures

787
00:53:22,230 --> 00:53:20,240
and then after all of our stuff is done

788
00:53:23,829 --> 00:53:22,240

today we'll be doing a video file here

789
00:53:25,750 --> 00:53:23,839
on nasa tv

790
00:53:27,829 --> 00:53:25,760
just showing you all the best views

791
00:53:29,910 --> 00:53:27,839
which there were many for the docking

792
00:53:31,670 --> 00:53:29,920
and we'll be sure to have many during

793
00:53:34,069 --> 00:53:31,680
the hatch opening and that'll that

794
00:53:35,589 --> 00:53:34,079
coming up at 2 pm central time 3 pm

795
00:53:37,829 --> 00:53:35,599
eastern

796
00:53:40,309 --> 00:53:37,839
so successful docking

797
00:53:42,230 --> 00:53:40,319
one more box checked our next one will

798
00:53:44,230 --> 00:53:42,240
be getting the hatches open seeing the

799
00:53:46,230 --> 00:53:44,240
faces of these three crew members as

800
00:53:47,829 --> 00:53:46,240
they make their way onto the station

801
00:53:50,150 --> 00:53:47,839
they're home for the next six months in

802
00:53:51,670 --> 00:53:50,160
low earth orbit so thanks for joining

803
00:53:54,630 --> 00:53:51,680
for the docking station that's our

804
00:53:56,790 --> 00:53:54,640
second one of three for the day

805
00:53:58,549 --> 00:53:56,800
and we'll be back with hatch opening in

806
00:54:01,430 --> 00:53:58,559
just a little while

807
00:54:03,349 --> 00:54:01,440
so stick around tune back in soon for