1
00:00:04,789 --> 00:00:02,950
good morning from mission control

2
00:00:06,070 --> 00:00:04,799
houston and welcome inside of the

3
00:00:08,150 --> 00:00:06,080
international space station flight

4
00:00:10,629 --> 00:00:08,160
control room for this friday's edition

5
00:00:12,789 --> 00:00:10,639
of iss update you're looking down as the

6
00:00:14,629 --> 00:00:12,799
orbit 2 team is manning their consoles

7
00:00:17,189 --> 00:00:14,639
monitoring all the systems on board this

8
00:00:19,029 --> 00:00:17,199
orbiting laboratory that team being led

9
00:00:21,029 --> 00:00:19,039
for the final time in his career today

10
00:00:23,990 --> 00:00:21,039
by veteran flight director paul died

11
00:00:27,029 --> 00:00:24,000
there wrapping up an over 15-year career

12
00:00:30,470 --> 00:00:27,039
as a flight director started off on sts

13
00:00:32,790 --> 00:00:30,480

63 back in 1995 and today will be his

14
00:00:35,110 --> 00:00:32,800
final shift as a flight director for the

15
00:00:37,430 --> 00:00:35,120
human space flight program

16
00:00:39,190 --> 00:00:37,440
joining him at the capcom position there

17
00:00:41,110 --> 00:00:39,200
will be anna fisher serving as the

18
00:00:43,030 --> 00:00:41,120
communication link between all of our

19
00:00:45,670 --> 00:00:43,040
teams here down in the ground and our

20
00:00:48,069 --> 00:00:45,680
astronauts up in space

21
00:00:50,229 --> 00:00:48,079
those astronauts right now engaged in a

22
00:00:52,950 --> 00:00:50,239
number of experiments are the crew of

23
00:00:54,790 --> 00:00:52,960
expedition 34. they're being led by nasa

24
00:00:56,150 --> 00:00:54,800
astronaut kevin ford there in the front

25
00:00:58,869 --> 00:00:56,160
row on the left

26
00:01:01,189 --> 00:00:58,879
this is his second flight into space

27
00:01:02,790 --> 00:01:01,199
immediately behind him are the russian

28
00:01:04,869 --> 00:01:02,800
cosmonauts that flew with him on his

29
00:01:06,950 --> 00:01:04,879
soyuz craft back in october to the

30
00:01:08,070 --> 00:01:06,960
station oleg novitskiy and evgeny

31
00:01:09,270 --> 00:01:08,080
tarelkin

32
00:01:10,789 --> 00:01:09,280
over there on the right side are our

33
00:01:12,390 --> 00:01:10,799
three newest crew members on board the

34
00:01:14,070 --> 00:01:12,400
international space station arriving

35
00:01:15,990 --> 00:01:14,080
back in december

36
00:01:18,149 --> 00:01:16,000
they are russian cosmonaut roman

37
00:01:19,590 --> 00:01:18,159
romanenko canadian space agency

38
00:01:21,590 --> 00:01:19,600

astronaut chris hadfield there in the

39
00:01:23,190 --> 00:01:21,600
front row on the right finally all the

40
00:01:25,590 --> 00:01:23,200
way on the right there a second nasa

41
00:01:27,429 --> 00:01:25,600
astronaut rounding out this six-man crew

42
00:01:29,030 --> 00:01:27,439
tom marshburn

43
00:01:30,870 --> 00:01:29,040
so a week that started off with the

44
00:01:33,109 --> 00:01:30,880
holiday is filled up quickly for these

45
00:01:35,270 --> 00:01:33,119
expedition 34 astronauts

46
00:01:36,550 --> 00:01:35,280
starting off on monday commander kevin

47
00:01:38,230 --> 00:01:36,560
ford was

48
00:01:40,390 --> 00:01:38,240
checking out a few relief

49
00:01:41,990 --> 00:01:40,400
relief valves and one of the clean bench

50
00:01:44,469 --> 00:01:42,000
experiment facilities in the japanese

51
00:01:46,550 --> 00:01:44,479
kobo module also holding a conference

52
00:01:49,030 --> 00:01:46,560
that day with a future crew member

53
00:01:50,870 --> 00:01:49,040
nasa astronaut chris cassidy while he

54
00:01:52,630 --> 00:01:50,880
was working on that our three russian

55
00:01:54,950 --> 00:01:52,640
cosmonauts novitskiy tarelkin and

56
00:01:56,230 --> 00:01:54,960
romanenko enjoyed an off-duty day as

57
00:01:58,709 --> 00:01:56,240
they were celebrating the russian

58
00:02:00,230 --> 00:01:58,719
christmas holiday

59
00:02:02,310 --> 00:02:00,240
meanwhile chris hadfield and tom

60
00:02:04,630 --> 00:02:02,320
marshburn were busy collecting

61
00:02:06,469 --> 00:02:04,640
biological samples for the ongoing human

62
00:02:08,309 --> 00:02:06,479
research facility

63
00:02:10,309 --> 00:02:08,319

those samples include things like blood

64
00:02:12,550 --> 00:02:10,319
urine and saliva that these astronauts

65
00:02:14,949 --> 00:02:12,560
collect and then store in any number of

66
00:02:16,630 --> 00:02:14,959
cryogenic freezers on board the station

67
00:02:19,670 --> 00:02:16,640
they were working with the melfi or the

68
00:02:20,949 --> 00:02:19,680
minus 80 degrees laboratory freezer

69
00:02:23,670 --> 00:02:20,959
aside from that they were doing some

70
00:02:26,790 --> 00:02:23,680
periodic health status checks and also

71
00:02:29,190 --> 00:02:26,800
reaction self-tests

72
00:02:30,309 --> 00:02:29,200
moving on to tuesday commander ford was

73
00:02:33,430 --> 00:02:30,319
doing

74
00:02:34,869 --> 00:02:33,440
his own biological experiments and body

75
00:02:37,110 --> 00:02:34,879
monitoring he was doing a monthly

76
00:02:38,790 --> 00:02:37,120
periodic fitness evaluation on the

77
00:02:41,190 --> 00:02:38,800
station sevis which is one of the

78
00:02:43,350 --> 00:02:41,200
stationary cycles used for exercise on

79
00:02:45,110 --> 00:02:43,360
board aside from that he was gathering

80
00:02:46,229 --> 00:02:45,120
up some hardware for some work he'd be

81
00:02:47,670 --> 00:02:46,239
doing

82
00:02:50,390 --> 00:02:47,680
the following day inside of the

83
00:02:52,390 --> 00:02:50,400
combustion integrated rack

84
00:02:55,110 --> 00:02:52,400
meanwhile russian cosmonaut

85
00:02:56,630 --> 00:02:55,120
oleg novitskiy was emptying what's known

86
00:02:59,910 --> 00:02:56,640
as the soft tank over in the russian

87
00:03:01,750 --> 00:02:59,920
segment also doing a few cable

88
00:03:04,149 --> 00:03:01,760

running operations inside of the russian

89
00:03:06,149 --> 00:03:04,159
zvezda service module for upcoming

90
00:03:08,869 --> 00:03:06,159
multi-purpose laboratory module

91
00:03:11,589 --> 00:03:10,790
fellow russian cosmonaut evgeny tarelkin

92
00:03:13,430 --> 00:03:11,599
was

93
00:03:14,710 --> 00:03:13,440
doing some maintenance activity

94
00:03:16,949 --> 00:03:14,720
throughout the russian segment on

95
00:03:18,710 --> 00:03:16,959
tuesday cleaning some of the panel vent

96
00:03:20,790 --> 00:03:18,720
screens and replacing the dust filters

97
00:03:23,430 --> 00:03:20,800
throughout the russian segment's air

98
00:03:25,110 --> 00:03:23,440
revitalization system is also doing some

99
00:03:26,869 --> 00:03:25,120
routine replacement work inside of the

100
00:03:29,589 --> 00:03:26,879
russian toilets

101
00:03:31,430 --> 00:03:29,599
meanwhile roman romanenko started up the

102
00:03:34,070 --> 00:03:31,440
plasmid crystal experiment which would

103
00:03:36,550 --> 00:03:34,080
be run throughout this week that is a

104
00:03:38,550 --> 00:03:36,560
fairly complex look at the study of

105
00:03:42,070 --> 00:03:38,560
the growth of plasma dust structures in

106
00:03:44,070 --> 00:03:42,080
microgravity hoping to look at how the

107
00:03:45,910 --> 00:03:44,080
particle clouds behave in their internal

108
00:03:47,110 --> 00:03:45,920
flow structure and plasma dust crystals

109
00:03:48,229 --> 00:03:47,120
are affected

110
00:03:49,750 --> 00:03:48,239
during

111
00:03:50,710 --> 00:03:49,760
trips into space

112
00:03:52,630 --> 00:03:50,720
also

113
00:03:54,710 --> 00:03:52,640

alongside with efgenie tarokin he was

114
00:03:57,110 --> 00:03:54,720
busy making a documentary about life on

115
00:03:58,229 --> 00:03:57,120
board the international space station

116
00:04:00,229 --> 00:03:58,239
meanwhile

117
00:04:02,070 --> 00:04:00,239
again on tuesday chris hadfield was

118
00:04:04,309 --> 00:04:02,080
collecting a few more biological samples

119
00:04:06,470 --> 00:04:04,319
for the human research facility and also

120
00:04:08,630 --> 00:04:06,480
running his first uh instance of the in

121
00:04:10,229 --> 00:04:08,640
space 3 experiment which would also be

122
00:04:12,470 --> 00:04:10,239
run throughout this week

123
00:04:14,470 --> 00:04:12,480
in space standing for investigating the

124
00:04:16,390 --> 00:04:14,480
structure of paramagnetic aggregates

125
00:04:18,390 --> 00:04:16,400
from colloidal emulsions

126
00:04:20,310 --> 00:04:18,400
it's looking to obtain data on different

127
00:04:22,950 --> 00:04:20,320
fluids containing ellipsoid shaped

128
00:04:24,230 --> 00:04:22,960
particles that then change the physical

129
00:04:26,390 --> 00:04:24,240
properties of the fluids they're

130
00:04:29,189 --> 00:04:26,400
suspended in in response to varying

131
00:04:30,469 --> 00:04:29,199
magnetic fields six crew member tom

132
00:04:31,909 --> 00:04:30,479
marshburn was

133
00:04:33,670 --> 00:04:31,919
doing some work for the environmental

134
00:04:35,909 --> 00:04:33,680
health system setting up acoustic

135
00:04:37,270 --> 00:04:35,919
dosimeters which look to monitor sound

136
00:04:39,909 --> 00:04:37,280
loads throughout the station to make

137
00:04:41,510 --> 00:04:39,919
sure they're acceptable for crew health

138
00:04:45,670 --> 00:04:41,520

also working inside of the internal

139
00:04:49,909 --> 00:04:47,430
moving on to wednesday commander ford

140
00:04:52,230 --> 00:04:49,919
was busy inside the biolab glove box

141
00:04:53,590 --> 00:04:52,240
changing out some of the gloves inside

142
00:04:55,670 --> 00:04:53,600
he was also

143
00:04:58,150 --> 00:04:55,680
back in that on thursday as he was doing

144
00:04:59,030 --> 00:04:58,160
an ozone sensor check aside from that he

145
00:05:00,710 --> 00:04:59,040
was

146
00:05:02,790 --> 00:05:00,720
also working on the combustion

147
00:05:05,590 --> 00:05:02,800
integrated rack he was removing the

148
00:05:07,590 --> 00:05:05,600
multi-user droplet combustion apparatus

149
00:05:09,270 --> 00:05:07,600
doing a few hardware replacement works

150
00:05:11,590 --> 00:05:09,280
on that

151
00:05:13,670 --> 00:05:11,600
meanwhile oleg novitskiy was busy with

152
00:05:17,189 --> 00:05:13,680
the russian bar experiment alongside

153
00:05:19,350 --> 00:05:17,199
evgeny tarelkin that looks to develop

154
00:05:21,510 --> 00:05:19,360
different selection and testing methods

155
00:05:23,590 --> 00:05:21,520
for detecting any depressurization

156
00:05:25,830 --> 00:05:23,600
onboard the international space station

157
00:05:28,070 --> 00:05:25,840
aside from that he was working on some

158
00:05:29,990 --> 00:05:28,080
maintenance ops inside of the russian

159
00:05:34,070 --> 00:05:30,000
zvezda service module replacing some of

160
00:05:38,230 --> 00:05:36,230
meanwhile evgeny tarelkin assisted

161
00:05:40,550 --> 00:05:38,240
nowitzki with that bar experiment and

162
00:05:43,110 --> 00:05:40,560
those overlay panels and was also on

163
00:05:45,590 --> 00:05:43,120

photography duty for that plasma crystal

164
00:05:46,629 --> 00:05:45,600
experiment which was uh then being run

165
00:05:49,350 --> 00:05:46,639
by his

166
00:05:50,710 --> 00:05:49,360
fellow russian cosmonaut roman romanenko

167
00:05:52,310 --> 00:05:50,720
who again will be

168
00:05:54,550 --> 00:05:52,320
running that experiment throughout the

169
00:05:57,110 --> 00:05:54,560
week aside from that plasma crystal

170
00:05:59,830 --> 00:05:57,120
romanenko on wednesday was inside of the

171
00:06:02,230 --> 00:05:59,840
49 progress cargo vehicle taking some of

172
00:06:04,550 --> 00:06:02,240
the cargo out and loading in a number of

173
00:06:07,510 --> 00:06:04,560
different trash items you can see the

174
00:06:09,749 --> 00:06:07,520
station structure and makeup right here

175
00:06:12,309 --> 00:06:09,759
currently two unmanned cargo progress

176
00:06:13,909 --> 00:06:12,319
vehicles docked alongside with the two

177
00:06:15,670 --> 00:06:13,919
soyuz craft that carried these six

178
00:06:17,830 --> 00:06:15,680
astronauts to their home on board the

179
00:06:19,909 --> 00:06:17,840
station

180
00:06:22,070 --> 00:06:19,919
meanwhile on wednesday chris hadfield

181
00:06:24,710 --> 00:06:22,080
was working inside of the water hygiene

182
00:06:25,990 --> 00:06:24,720
compartment he was doing some annual

183
00:06:28,309 --> 00:06:26,000
overhaul

184
00:06:29,430 --> 00:06:28,319
performance work he was replacing a

185
00:06:32,309 --> 00:06:29,440
number of

186
00:06:34,710 --> 00:06:32,319
items inside of the whc

187
00:06:35,430 --> 00:06:34,720
that are used to process urine he was in

188
00:06:37,029 --> 00:06:35,440

there

189
00:06:39,590 --> 00:06:37,039
taking out the urine valve block and a

190
00:06:41,510 --> 00:06:39,600
number of the lines and pressure sensors

191
00:06:44,070 --> 00:06:41,520
and also replacing the flush

192
00:06:44,790 --> 00:06:44,080
water tank empty pressure sensor you can

193
00:06:46,629 --> 00:06:44,800
see

194
00:06:48,790 --> 00:06:46,639
hadfield working here again this taking

195
00:06:50,870 --> 00:06:48,800
place on wednesday inside that water

196
00:06:52,309 --> 00:06:50,880
hygiene compartment doing some annual

197
00:06:54,629 --> 00:06:52,319
replacement work

198
00:06:56,710 --> 00:06:54,639
aside from that maintenance activity on

199
00:06:58,629 --> 00:06:56,720
wednesday hadfield was also

200
00:07:01,029 --> 00:06:58,639
conducting the reversible figures

201
00:07:02,629 --> 00:07:01,039
experiment which looks to investigate

202
00:07:04,870 --> 00:07:02,639
how microgravity affects these

203
00:07:07,350 --> 00:07:04,880
astronauts perception of various

204
00:07:09,189 --> 00:07:07,360
ambiguous figures

205
00:07:12,150 --> 00:07:09,199
our sixth crew member on wednesday tom

206
00:07:14,790 --> 00:07:12,160
marshburn was recharging and setting up

207
00:07:16,710 --> 00:07:14,800
a few more acoustic dosimeters for the

208
00:07:18,469 --> 00:07:16,720
environmental health system and also

209
00:07:21,110 --> 00:07:18,479
getting his first shot at running the

210
00:07:23,110 --> 00:07:21,120
capillary flow experiment this is a

211
00:07:24,790 --> 00:07:23,120
fluid physics experiment onboard the

212
00:07:27,029 --> 00:07:24,800
international space station that looks

213
00:07:29,909 --> 00:07:27,039

to investigate how fluids move up

214
00:07:32,309 --> 00:07:29,919
surfaces in microgravity

215
00:07:33,990 --> 00:07:32,319
the results are hoping to approve any

216
00:07:36,070 --> 00:07:34,000
computer models that are used down here

217
00:07:38,230 --> 00:07:36,080
on the earth by future spacecraft

218
00:07:40,469 --> 00:07:38,240
designers as they continue to develop

219
00:07:43,430 --> 00:07:40,479
new low gravity and microgravity fluid

220
00:07:45,589 --> 00:07:43,440
systems hoping to improve improve on all

221
00:07:48,230 --> 00:07:45,599
fluid transfer systems for both water

222
00:07:50,230 --> 00:07:48,240
and fuel on future spacecrafts

223
00:07:52,710 --> 00:07:50,240
moving on to thursday commander kevin

224
00:07:54,070 --> 00:07:52,720
ford back inside that biolab glove box

225
00:07:57,589 --> 00:07:54,080
doing a

226
00:07:58,869 --> 00:07:57,599
check on the ozone sensor inside and

227
00:08:01,350 --> 00:07:58,879
you can see the

228
00:08:02,629 --> 00:08:01,360
bio life glove box here it's used for

229
00:08:04,309 --> 00:08:02,639
conducting a number of different

230
00:08:06,150 --> 00:08:04,319
biological experiments inside of the

231
00:08:08,629 --> 00:08:06,160
station's columbus module

232
00:08:09,430 --> 00:08:08,639
with various microorganisms fungi and

233
00:08:11,350 --> 00:08:09,440
also

234
00:08:13,510 --> 00:08:11,360
small invertebrates haven't been flown

235
00:08:16,230 --> 00:08:13,520
to the station they are then able to

236
00:08:18,950 --> 00:08:16,240
subject them to various conditions also

237
00:08:19,990 --> 00:08:18,960
a centrifuge inside to simulate gravity

238
00:08:22,950 --> 00:08:20,000

and

239
00:08:24,309 --> 00:08:22,960
compare the two results side by side

240
00:08:26,790 --> 00:08:24,319
also

241
00:08:28,950 --> 00:08:26,800
allowing these astronauts to not only

242
00:08:31,189 --> 00:08:28,960
expose different microorganisms and

243
00:08:34,310 --> 00:08:31,199
biological samples to microgravity but

244
00:08:36,790 --> 00:08:34,320
also the radiation experienced in space

245
00:08:39,430 --> 00:08:36,800
aside from that he was busy most of the

246
00:08:41,589 --> 00:08:39,440
day alongside his fellow usos crew

247
00:08:43,990 --> 00:08:41,599
members hadfield at marshburn as they

248
00:08:46,550 --> 00:08:44,000
were manipulating the station's robotic

249
00:08:48,949 --> 00:08:46,560
arm also known as canada arm 2.

250
00:08:50,310 --> 00:08:48,959
ford was inside the cupola and the three

251
00:08:53,509 --> 00:08:50,320
astronauts

252
00:08:56,070 --> 00:08:53,519
reviewed all the safety and procedural

253
00:08:57,430 --> 00:08:56,080
items before each getting a chance to

254
00:09:00,630 --> 00:08:57,440
get their hands on the controls and

255
00:09:02,630 --> 00:09:00,640
perform a walk off of the robotic arm

256
00:09:05,269 --> 00:09:02,640
and while they were doing that oleg

257
00:09:07,190 --> 00:09:05,279
novitskiy was inside of the russian

258
00:09:09,509 --> 00:09:07,200
service module finishing up some work on

259
00:09:10,710 --> 00:09:09,519
those overlay plates it was the second

260
00:09:12,710 --> 00:09:10,720
day of that

261
00:09:15,670 --> 00:09:12,720
following that he moved on to the

262
00:09:17,269 --> 00:09:15,680
eurogan experiment which is an ongoing

263
00:09:18,790 --> 00:09:17,279

russian

264
00:09:21,190 --> 00:09:18,800
monitoring

265
00:09:23,350 --> 00:09:21,200
project to observe and photograph both

266
00:09:25,829 --> 00:09:23,360
natural and man-made disasters and

267
00:09:27,110 --> 00:09:25,839
hopefully assist in any responses down

268
00:09:30,070 --> 00:09:27,120
on the ground

269
00:09:31,670 --> 00:09:30,080
meanwhile evgeny tarelkin was doing

270
00:09:33,670 --> 00:09:31,680
calm sub-system

271
00:09:36,550 --> 00:09:33,680
maintenance work alongside he was

272
00:09:38,150 --> 00:09:36,560
assisted by novitskiy also

273
00:09:40,790 --> 00:09:38,160
a little bit later in the day tarelkin

274
00:09:41,910 --> 00:09:40,800
was doing a russian biological

275
00:09:44,230 --> 00:09:41,920
experiment

276
00:09:46,470 --> 00:09:44,240
looking at the cardiovascular system as

277
00:09:49,030 --> 00:09:46,480
he exposed himself to various physical

278
00:09:50,949 --> 00:09:49,040
loads while on the the velo which is the

279
00:09:53,750 --> 00:09:50,959
russian version of the sevis one of the

280
00:09:56,070 --> 00:09:53,760
stationary bicycles on board the station

281
00:09:57,590 --> 00:09:56,080
roman romanenko on thursday was inside

282
00:09:59,430 --> 00:09:57,600
of the 48

283
00:10:01,910 --> 00:09:59,440
progress having previously been inside

284
00:10:03,910 --> 00:10:01,920
the 49 progress vehicle doing some more

285
00:10:06,389 --> 00:10:03,920
cargo operations and updating the

286
00:10:07,990 --> 00:10:06,399
station's inventory management system

287
00:10:10,389 --> 00:10:08,000
aside from that he was

288
00:10:13,110 --> 00:10:10,399

working on the station's electron which

289
00:10:15,190 --> 00:10:13,120
is one of two oxygen generating devices

290
00:10:17,509 --> 00:10:15,200
on board which

291
00:10:19,750 --> 00:10:17,519
derives oxygen

292
00:10:21,750 --> 00:10:19,760
from water and then pumps it into the

293
00:10:24,470 --> 00:10:21,760
station's atmosphere giving these

294
00:10:26,710 --> 00:10:24,480
astronauts a safe breathing environment

295
00:10:28,389 --> 00:10:26,720
meanwhile chris hadfield was conducting

296
00:10:30,630 --> 00:10:28,399
another run of that in space 3

297
00:10:32,710 --> 00:10:30,640
experiment and also

298
00:10:35,750 --> 00:10:32,720
participating in that

299
00:10:37,509 --> 00:10:35,760
robotic arm control activity meanwhile

300
00:10:39,509 --> 00:10:37,519
tom marshburn aside from doing the

301
00:10:41,509 --> 00:10:39,519
robotic arm activity on thursday was

302
00:10:44,389 --> 00:10:41,519
inside of the station's

303
00:10:46,470 --> 00:10:44,399
quest airlock you can see him here

304
00:10:48,389 --> 00:10:46,480
surrounded by the emu's or extra

305
00:10:50,069 --> 00:10:48,399
vehicular mobility units that these

306
00:10:53,030 --> 00:10:50,079
astronauts will wear

307
00:10:54,470 --> 00:10:53,040
us astronauts and

308
00:10:56,069 --> 00:10:54,480
some international partner astronauts

309
00:10:58,230 --> 00:10:56,079
will wear whenever they conduct

310
00:10:59,829 --> 00:10:58,240
spacewalks on board the station he was

311
00:11:02,069 --> 00:10:59,839
inside of that quest airlock doing some

312
00:11:04,310 --> 00:11:02,079
maintenance on the pistol grip tool as

313
00:11:06,710 --> 00:11:04,320

you can see in his hand there it's the

314
00:11:08,470 --> 00:11:06,720
multi-purpose drill and

315
00:11:11,269 --> 00:11:08,480
ratchet tool used by these astronauts

316
00:11:14,710 --> 00:11:11,279
when working on the external station

317
00:11:16,550 --> 00:11:14,720
structure for all of their spacewalks

318
00:11:18,949 --> 00:11:16,560
and all of that

319
00:11:21,430 --> 00:11:18,959
leads into today friday the end of the

320
00:11:24,230 --> 00:11:21,440
week for these expedition 34 astronauts

321
00:11:26,630 --> 00:11:24,240
kevin ford began his day working on the

322
00:11:28,389 --> 00:11:26,640
slammed or the space linear acceleration

323
00:11:30,150 --> 00:11:28,399
mass measurement device

324
00:11:32,710 --> 00:11:30,160
it's a device using

325
00:11:34,870 --> 00:11:32,720
known forces and

326
00:11:37,190 --> 00:11:34,880
in order to measure the astronauts body

327
00:11:39,590 --> 00:11:37,200
masses they can't just step on a scale

328
00:11:41,269 --> 00:11:39,600
due to that lack of gravity

329
00:11:43,030 --> 00:11:41,279
aside from that he'll be spending a lot

330
00:11:45,750 --> 00:11:43,040
of his time today including right now

331
00:11:49,030 --> 00:11:45,760
working on the spheres project the

332
00:11:51,030 --> 00:11:49,040
spheres zero robotics is a an ongoing

333
00:11:53,030 --> 00:11:51,040
competition of over 20 teams of high

334
00:11:53,829 --> 00:11:53,040
school students who are gathered at mit

335
00:11:55,509 --> 00:11:53,839
today

336
00:11:56,710 --> 00:11:55,519
students develop different algorithms

337
00:11:58,550 --> 00:11:56,720
for

338
00:11:59,990 --> 00:11:58,560

maneuvering these small bowling ball

339
00:12:01,590 --> 00:12:00,000
size satellites throughout the

340
00:12:03,750 --> 00:12:01,600
microgravity environment of the

341
00:12:05,509 --> 00:12:03,760
international space station so he'll be

342
00:12:07,910 --> 00:12:05,519
assisted by that by tom marshburn

343
00:12:09,829 --> 00:12:07,920
throughout the day today as they run

344
00:12:10,790 --> 00:12:09,839
through the competition and are

345
00:12:12,310 --> 00:12:10,800
currently

346
00:12:13,670 --> 00:12:12,320
talking with the students and the

347
00:12:17,750 --> 00:12:13,680
organizers

348
00:12:22,150 --> 00:12:20,310
meanwhile oleg novitskiy is continuing

349
00:12:22,949 --> 00:12:22,160
his work with the eurogan experiment

350
00:12:25,750 --> 00:12:22,959
that

351
00:12:28,069 --> 00:12:25,760
man-made natural disaster monitoring set

352
00:12:29,670 --> 00:12:28,079
up on board the station also

353
00:12:32,389 --> 00:12:29,680
running another session of the bar

354
00:12:34,069 --> 00:12:32,399
experiment alongside with genny tarelkin

355
00:12:36,310 --> 00:12:34,079
looking at different methods for

356
00:12:37,269 --> 00:12:36,320
identifying depressurization onboard the

357
00:12:38,710 --> 00:12:37,279
station

358
00:12:40,230 --> 00:12:38,720
aside from that tarelkin will be

359
00:12:42,230 --> 00:12:40,240
photographing a number of the windows

360
00:12:45,190 --> 00:12:42,240
throughout the russian segment as they

361
00:12:47,190 --> 00:12:45,200
are always checking the quality of these

362
00:12:49,350 --> 00:12:47,200
throughout their space flights the third

363
00:12:51,030 --> 00:12:49,360

russian cosmonaut roman romanenko will

364
00:12:53,750 --> 00:12:51,040
be conducting one more run of that

365
00:12:56,069 --> 00:12:53,760
plasma crystal experience experiment for

366
00:12:59,030 --> 00:12:56,079
getting into a couple of maintenance

367
00:13:00,949 --> 00:12:59,040
activities over in the russian segment

368
00:13:02,870 --> 00:13:00,959
meanwhile chris hadfield

369
00:13:04,790 --> 00:13:02,880
running one more

370
00:13:07,829 --> 00:13:04,800
instance of the in space 3 experiment

371
00:13:09,829 --> 00:13:07,839
and also taking a few samples from the

372
00:13:12,069 --> 00:13:09,839
internal thermal control system onboard

373
00:13:14,150 --> 00:13:12,079
the international space station then our

374
00:13:15,670 --> 00:13:14,160
final crew member today tom marshburn

375
00:13:17,509 --> 00:13:15,680
working with those fears and also a

376
00:13:19,190 --> 00:13:17,519
little bit earlier this morning

377
00:13:21,350 --> 00:13:19,200
participating in another run of the

378
00:13:22,710 --> 00:13:21,360
reversible figures experiment and