
PAO

1
00:00:03,429 --> 00:00:02,149
good morning welcome to the

2
00:00:04,870 --> 00:00:03,439
international space station flight

3
00:00:07,590 --> 00:00:04,880
control room where we have with us a

4
00:00:09,910 --> 00:00:07,600
guest today uh this is dory tomaiko who

5
00:00:12,230 --> 00:00:09,920
is the lead uh visiting vehicle officer

6
00:00:14,310 --> 00:00:12,240
for the spacex2 mission that's coming up

7
00:00:16,070 --> 00:00:14,320
scheduled to launch on march 1st the

8
00:00:18,230 --> 00:00:16,080
crew is doing some work to get ready for

9
00:00:19,349 --> 00:00:18,240
that yesterday so we asked dory to come

10
00:00:20,630 --> 00:00:19,359
in and talk with us a little bit about

11
00:00:22,630 --> 00:00:20,640
what was going on with those

12
00:00:24,870 --> 00:00:22,640
preparations and what would uh be

13
00:00:26,630 --> 00:00:24,880

happening on march 2nd when

14
00:00:28,150 --> 00:00:26,640
the dragon docks to the space station

15
00:00:29,990 --> 00:00:28,160
thanks so much for coming dory glad to

16
00:00:31,509 --> 00:00:30,000
be here okay so let's see i think

17
00:00:33,750 --> 00:00:31,519
yesterday the crew was practicing with

18
00:00:35,030 --> 00:00:33,760
robotics is that right that's correct so

19
00:00:35,910 --> 00:00:35,040
what it what do they need to do to get

20
00:00:37,590 --> 00:00:35,920
ready

21
00:00:39,110 --> 00:00:37,600
so we do several different kinds of

22
00:00:40,790 --> 00:00:39,120
preparation for the crew and on the

23
00:00:42,310 --> 00:00:40,800
ground as well what the crew was doing

24
00:00:44,310 --> 00:00:42,320
yesterday is they did two different

25
00:00:47,029 --> 00:00:44,320
kinds the first one is they were just

26
00:00:49,590 --> 00:00:47,039
practicing the capture itself so we have

27
00:00:51,670 --> 00:00:49,600
a simulator called robot which is kind

28
00:00:52,869 --> 00:00:51,680
of a representation of what they'll use

29
00:00:54,470 --> 00:00:52,879
the real day when they're actually

30
00:00:56,470 --> 00:00:54,480
controlling the arm but it's all

31
00:00:58,229 --> 00:00:56,480
graphics and simulated and so they were

32
00:00:59,670 --> 00:00:58,239
running that yesterday and they started

33
00:01:01,189 --> 00:00:59,680
at the capture point which is where

34
00:01:03,189 --> 00:01:01,199
dragon will stop its approach it's about

35
00:01:04,710 --> 00:01:03,199
10 meters away from iss and the crew

36
00:01:06,469 --> 00:01:04,720
takes it from there and takes the arm in

37
00:01:08,230 --> 00:01:06,479
and goes and captures so they do a lot

38
00:01:09,910 --> 00:01:08,240

of runs like that to practice both

39
00:01:11,429 --> 00:01:09,920
nominal runs and then we have some runs

40
00:01:13,270 --> 00:01:11,439
where maybe dragon is moving a little

41
00:01:14,550 --> 00:01:13,280
bit or where

42
00:01:16,230 --> 00:01:14,560
they have to come in from kind of an

43
00:01:17,910 --> 00:01:16,240
offset where dragon isn't set up quite

44
00:01:20,390 --> 00:01:17,920
where it was expected to be

45
00:01:22,630 --> 00:01:20,400
yesterday was a nominal run and then we

46
00:01:24,630 --> 00:01:22,640
did a 30 meter run which is a lot

47
00:01:26,950 --> 00:01:24,640
farther out and that involves all three

48
00:01:28,550 --> 00:01:26,960
crew members and so you've got one crew

49
00:01:30,390 --> 00:01:28,560
member who is in charge of watching the

50
00:01:32,069 --> 00:01:30,400
vehicle another crew member who's

51
00:01:33,429 --> 00:01:32,079
running the arm and then a third crew

52
00:01:35,990 --> 00:01:33,439
member who's kind of there to help

53
00:01:37,429 --> 00:01:36,000
overall especially in case of anomalies

54
00:01:39,190 --> 00:01:37,439
or malfunctions and so that was what

55
00:01:40,390 --> 00:01:39,200
they did yesterday they had a 30 meter

56
00:01:42,389 --> 00:01:40,400
in run

57
00:01:44,789 --> 00:01:42,399
and then we simulated a problem on

58
00:01:46,310 --> 00:01:44,799
dragon with its communication system and

59
00:01:47,510 --> 00:01:46,320
that required all three crew members to

60
00:01:49,190 --> 00:01:47,520
work together to figure out what the

61
00:01:50,630 --> 00:01:49,200
correct operation was

62
00:01:52,469 --> 00:01:50,640
and i guess you know of course we don't

63
00:01:54,630 --> 00:01:52,479

really expect anything to go wrong but

64
00:01:56,630 --> 00:01:54,640
we always at nasa train for that pretty

65
00:01:58,230 --> 00:01:56,640
extensively just exactly yeah our

66
00:01:59,429 --> 00:01:58,240
simulations are always much harder than

67
00:02:00,789 --> 00:01:59,439
real life and that's the way you want it

68
00:02:02,789 --> 00:02:00,799
to be prepared for everything and then

69
00:02:04,789 --> 00:02:02,799
not have to use that preparation well i

70
00:02:06,709 --> 00:02:04,799
guess now the team on the ground has one

71
00:02:09,669 --> 00:02:06,719
run of this under its belt from spacex

72
00:02:11,029 --> 00:02:09,679
one um but the crew has not uh done this

73
00:02:12,550 --> 00:02:11,039
in real life that's correct and we

74
00:02:14,229 --> 00:02:12,560
actually had a spacex demo mission so

75
00:02:15,830 --> 00:02:14,239
we've gotten to see dragon come up twice

76
00:02:17,589 --> 00:02:15,840
now which is great from a ground

77
00:02:19,990 --> 00:02:17,599
perspective and then the crew of course

78
00:02:21,750 --> 00:02:20,000
is new every six months and so this crew

79
00:02:23,190 --> 00:02:21,760
hasn't seen one yet but they get a lot

80
00:02:25,030 --> 00:02:23,200
of training on the ground both from the

81
00:02:26,309 --> 00:02:25,040
robotics community and from the vvo

82
00:02:27,670 --> 00:02:26,319
community

83
00:02:29,190 --> 00:02:27,680
in watching the vehicle approach and

84
00:02:30,470 --> 00:02:29,200
then also the capture operations so

85
00:02:31,750 --> 00:02:30,480
they're very familiar with it this

86
00:02:33,589 --> 00:02:31,760
onboard training is really just a

87
00:02:35,270 --> 00:02:33,599
refresher all the hardcore training

88
00:02:36,790 --> 00:02:35,280

happens on the ground before they go up

89
00:02:38,710 --> 00:02:36,800
okay and do you feel like they're ready

90
00:02:40,390 --> 00:02:38,720
for it definitely yeah this crew is well

91
00:02:42,229 --> 00:02:40,400
prepared and they ask really great

92
00:02:43,509 --> 00:02:42,239
questions and and call us out on things

93
00:02:44,710 --> 00:02:43,519
sometimes so they're definitely on the

94
00:02:46,949 --> 00:02:44,720
ball i think we'll have a really good

95
00:02:48,630 --> 00:02:46,959
capture good good so um tell us a little

96
00:02:50,150 --> 00:02:48,640
bit about why it works like that why did

97
00:02:51,509 --> 00:02:50,160
we capture it with a robotic arm rather

98
00:02:53,830 --> 00:02:51,519
than letting it just

99
00:02:55,910 --> 00:02:53,840
come fly all the way up like say a soyuz

100
00:02:57,190 --> 00:02:55,920
does right so you kind of have two

101
00:02:58,470 --> 00:02:57,200
different kinds of vehicles that come to

102
00:03:00,470 --> 00:02:58,480
space station like you mentioned the

103
00:03:02,070 --> 00:03:00,480
soyuz and that is a docking vehicle and

104
00:03:04,149 --> 00:03:02,080
so it will come up all the way up to

105
00:03:05,589 --> 00:03:04,159
station and actually attach itself it'll

106
00:03:07,110 --> 00:03:05,599
line itself up with its port and go

107
00:03:08,869 --> 00:03:07,120
ahead and connect

108
00:03:11,750 --> 00:03:08,879
these vehicles and these

109
00:03:13,830 --> 00:03:11,760
include htv which is japan's vehicle and

110
00:03:15,270 --> 00:03:13,840
then also dragon and cygnus in the

111
00:03:16,229 --> 00:03:15,280
future which will be orbital sciences

112
00:03:19,589 --> 00:03:16,239
vehicle

113
00:03:20,949 --> 00:03:19,599

they come over to the u.s side and

114
00:03:22,390 --> 00:03:20,959
they're not built to go ahead and

115
00:03:24,630 --> 00:03:22,400
connect directly so they come up

116
00:03:26,070 --> 00:03:24,640
underneath the iss and then we grab them

117
00:03:27,270 --> 00:03:26,080
with robotics arm and attach them

118
00:03:29,030 --> 00:03:27,280
ourselves

119
00:03:30,949 --> 00:03:29,040
okay and um we've

120
00:03:32,390 --> 00:03:30,959
you know like you said a few

121
00:03:34,550 --> 00:03:32,400
runs of this one and then also some

122
00:03:36,390 --> 00:03:34,560
experience with other vehicles and

123
00:03:38,470 --> 00:03:36,400
should be should be good to go on march

124
00:03:40,550 --> 00:03:38,480
2nd definitely looking forward to it can

125
00:03:41,670 --> 00:03:40,560
you tell us anything about what um

126
00:03:42,789 --> 00:03:41,680
dragon will be bringing up to the

127
00:03:44,949 --> 00:03:42,799
station

128
00:03:46,470 --> 00:03:44,959
you know i'm not fully sure i don't want

129
00:03:48,470 --> 00:03:46,480
the cargo side of things i can tell you

130
00:03:50,070 --> 00:03:48,480
that we do have some external cargo for

131
00:03:51,910 --> 00:03:50,080
the first time which is very exciting

132
00:03:53,509 --> 00:03:51,920
from a robotics community perspective

133
00:03:55,429 --> 00:03:53,519
because they get to take the arm and

134
00:03:56,869 --> 00:03:55,439
have to pull stuff out of the trunk part

135
00:03:58,309 --> 00:03:56,879
of dragon which we haven't gotten to do

136
00:03:59,750 --> 00:03:58,319
yet we did some preparation in the last

137
00:04:01,190 --> 00:03:59,760
mission to get some views and see what

138
00:04:02,470 --> 00:04:01,200

it would look like but that's a first

139
00:04:04,390 --> 00:04:02,480
for this mission so i know there's a lot

140
00:04:05,589 --> 00:04:04,400
of work going into that oh i'm sure and

141
00:04:06,550 --> 00:04:05,599
it'll be up there for a while so the

142
00:04:08,789 --> 00:04:06,560
crew will probably need to practice a

143
00:04:10,630 --> 00:04:08,799
little bit for that as well exactly yeah

144
00:04:12,309 --> 00:04:10,640
they have a little bit of work they do

145
00:04:13,910 --> 00:04:12,319
just for cargo transfer figuring out

146
00:04:16,229 --> 00:04:13,920
what we take off what we put back on

147
00:04:17,830 --> 00:04:16,239
dragon dragon is full of science which

148
00:04:19,349 --> 00:04:17,840
is great and so there's a lot of science

149
00:04:21,349 --> 00:04:19,359
work that they'll be doing while it's up

150
00:04:23,270 --> 00:04:21,359
there and then the crew also do some

151
00:04:25,270 --> 00:04:23,280
training before we do dragon departure

152
00:04:26,710 --> 00:04:25,280
again for how they watch dragon leave

153
00:04:28,230 --> 00:04:26,720
and like you said a lot of training

154
00:04:29,749 --> 00:04:28,240
involving getting the cargo out of the

155
00:04:31,189 --> 00:04:29,759
trunk there with the arm sure and i

156
00:04:32,950 --> 00:04:31,199
think we're seeing here some animation

157
00:04:35,590 --> 00:04:32,960
of uh first of its journey to the

158
00:04:38,390 --> 00:04:35,600
station and now it's uh landing back in

159
00:04:40,550 --> 00:04:38,400
the ocean um just showing you how how

160
00:04:42,070 --> 00:04:40,560
that mission will work a little bit but

161
00:04:43,350 --> 00:04:42,080
again the crew plays a big part of it

162
00:04:45,430 --> 00:04:43,360
and they're already getting ready and

163
00:04:47,510 --> 00:04:45,440

have just about a week more to finish up

164
00:04:50,629 --> 00:04:47,520
their preparations and i'm assuming do

165
00:04:52,230 --> 00:04:50,639
some more off nominal um simulations

166
00:04:53,350 --> 00:04:52,240
that's right yeah we have some more

167
00:04:55,670 --> 00:04:53,360
training at the end of this week and

168
00:04:57,590 --> 00:04:55,680
early next um all the way up until right

169
00:04:59,110 --> 00:04:57,600
the day before capture we do some last

170
00:05:01,110 --> 00:04:59,120
minute training and like i said this is

171
00:05:02,710 --> 00:05:01,120
all just refresher for them and they

172
00:05:04,310 --> 00:05:02,720
also have the ability with the robot

173
00:05:06,070 --> 00:05:04,320
system that i mentioned to go ahead and

174
00:05:07,590 --> 00:05:06,080
do training anytime they want on board

175
00:05:09,110 --> 00:05:07,600
so they can set it up in their free time

176
00:05:10,469 --> 00:05:09,120
and do some runs and so you'll see them

177
00:05:11,830 --> 00:05:10,479
doing that a lot where they just go over

178
00:05:13,510 --> 00:05:11,840
and they've got 10 minutes here or there

179
00:05:15,590 --> 00:05:13,520
and they'll go capture some dragons get

180
00:05:17,189 --> 00:05:15,600
some extra credit points exactly yeah

181
00:05:18,550 --> 00:05:17,199
well who's doing what in the actual

182
00:05:20,310 --> 00:05:18,560
capture

183
00:05:22,629 --> 00:05:20,320
so uh like i mentioned we have three

184
00:05:25,110 --> 00:05:22,639
crew members uh two crew members who

185
00:05:26,790 --> 00:05:25,120
from our perspective we call vv1 and vb2

186
00:05:30,070 --> 00:05:26,800
are involved all the way from when

187
00:05:32,950 --> 00:05:30,080
dragon is at 250 meters the vv1 crew

188
00:05:34,710 --> 00:05:32,960

member and that's tom marshburn is the

189
00:05:36,870 --> 00:05:34,720
lead from a video perspective so he's

190
00:05:38,629 --> 00:05:36,880
watching the vehicle come up and he's

191
00:05:40,150 --> 00:05:38,639
making calls to the ground which if you

192
00:05:41,749 --> 00:05:40,160
listen during the capture and the

193
00:05:43,670 --> 00:05:41,759
approach you'll hear we call those block

194
00:05:45,830 --> 00:05:43,680
bravos and he's giving us a feel for

195
00:05:48,310 --> 00:05:45,840
what he sees the vehicle doing at any

196
00:05:50,230 --> 00:05:48,320
time we've got a diagram here of uh the

197
00:05:52,950 --> 00:05:50,240
different points of of its approach to

198
00:05:55,270 --> 00:05:52,960
the space station and then the second

199
00:05:56,950 --> 00:05:55,280
crew member who we call vb2 uh he's the

200
00:05:58,469 --> 00:05:56,960
lead robotics crew member and so that's

201
00:06:00,230 --> 00:05:58,479
kevin ford he's the one who'll be

202
00:06:01,909 --> 00:06:00,240
actually doing the capturing so he's

203
00:06:03,670 --> 00:06:01,919
going to be manning the arm that day and

204
00:06:05,189 --> 00:06:03,680
then at 30 meters

205
00:06:07,510 --> 00:06:05,199
chris hadfield will come in as kind of

206
00:06:08,550 --> 00:06:07,520
the overall help for the last 45 minutes

207
00:06:10,150 --> 00:06:08,560
or so

208
00:06:11,510 --> 00:06:10,160
and just kind of be the you know

209
00:06:13,029 --> 00:06:11,520
everybody's getting real involved in

210
00:06:14,950 --> 00:06:13,039
what's happening and he can kind of step

211
00:06:16,710 --> 00:06:14,960
back and keep a bigger picture view and

212
00:06:18,070 --> 00:06:16,720
be ready in case there were some sort of

213
00:06:20,550 --> 00:06:18,080

malfunctions which of course we don't

214
00:06:22,309 --> 00:06:20,560
expect to happen okay but um it sounds

215
00:06:24,790 --> 00:06:22,319
like everybody will be busy that day and

216
00:06:26,790 --> 00:06:24,800
uh it should be exciting to see the

217
00:06:28,390 --> 00:06:26,800
second spacex or third really come to

218
00:06:30,469 --> 00:06:28,400
the space station exactly yeah it'll be

219
00:06:31,670 --> 00:06:30,479
a good day and a nice long day all right

220
00:06:33,029 --> 00:06:31,680
thank you so much for talking with a

221
00:06:34,550 --> 00:06:33,039
story we really appreciate it and again

222
00:06:36,790 --> 00:06:34,560
she is the lead

223
00:06:38,309 --> 00:06:36,800
visiting vehicle officer for spacex 2