
PAO
NASA
Sean O'Rourke
SPACEX DRAGON LEAD VVO
Amiko Kauderer
NASA PUBLIC AFFAIRS

1
00:00:08,070 --> 00:00:04,870
this is uh aminko calder and i'm here

2
00:00:09,830 --> 00:00:08,080
today with uh sean o'rourke is the lead

3
00:00:11,589 --> 00:00:09,840
visiting vehicle officer for space

4
00:00:13,589 --> 00:00:11,599
dragon we are inside the international

5
00:00:15,110 --> 00:00:13,599
space station flight control room in

6
00:00:17,109 --> 00:00:15,120
this room is where the

7
00:00:18,870 --> 00:00:17,119
team's orbit 2 team has been monitoring

8
00:00:21,349 --> 00:00:18,880
the assistance aboard the space station

9
00:00:23,269 --> 00:00:21,359
meanwhile there is a vehicle that is

10
00:00:26,470 --> 00:00:23,279
scheduled to launch tomorrow morning at

11
00:00:28,870 --> 00:00:26,480
3 55 a.m this is the spacex dragon and

12
00:00:30,150 --> 00:00:28,880
so again um we're here to talk with sean

13
00:00:31,269 --> 00:00:30,160

welcome and thank you for joining us

14
00:00:33,270 --> 00:00:31,279
sean

15
00:00:35,110 --> 00:00:33,280
good so um first let's just talk about

16
00:00:37,510 --> 00:00:35,120
your a little personal background just

17
00:00:39,510 --> 00:00:37,520
tell me you know what is your background

18
00:00:41,950 --> 00:00:39,520
and education background and how did you

19
00:00:44,950 --> 00:00:41,960
get find your way here to

20
00:00:47,110 --> 00:00:44,960
nasa rhode island i went to clarkson

21
00:00:50,069 --> 00:00:47,120
university in upstate new york potsdam

22
00:00:51,830 --> 00:00:50,079
new york i came down here right out of

23
00:00:53,830 --> 00:00:51,840
college and hired on at united space

24
00:00:55,189 --> 00:00:53,840
alliance doing trajectory design work in

25
00:00:57,189 --> 00:00:55,199
the pre-flight

26
00:00:59,349 --> 00:00:57,199
analysis for space shuttle

27
00:01:01,110 --> 00:00:59,359
uh and then i moved into the front room

28
00:01:03,270 --> 00:01:01,120
as a

29
00:01:04,469 --> 00:01:03,280
shuttle rendezvous officer i worked a

30
00:01:06,310 --> 00:01:04,479
lot of the space station assembly

31
00:01:08,469 --> 00:01:06,320
flights and got to work hubble repair

32
00:01:10,469 --> 00:01:08,479
missions and had a lot of fun doing that

33
00:01:13,030 --> 00:01:10,479
and now that that is over i'm over in

34
00:01:15,830 --> 00:01:13,040
the visiting vehicle office and our

35
00:01:18,870 --> 00:01:15,840
office are the trajectory experts for

36
00:01:20,230 --> 00:01:18,880
the space station um in

37
00:01:22,870 --> 00:01:20,240
dealing with the visiting vehicles that

38
00:01:24,390 --> 00:01:22,880

come up and bring cargo and crew

39
00:01:27,030 --> 00:01:24,400
okay great well we're happy to have you

40
00:01:29,350 --> 00:01:27,040
here so first tell me what um

41
00:01:31,350 --> 00:01:29,360
explain your role as a visiting vehicle

42
00:01:33,109 --> 00:01:31,360
officer what does that mean

43
00:01:35,429 --> 00:01:33,119
so our group

44
00:01:38,149 --> 00:01:35,439
we have expertise in guidance and

45
00:01:41,350 --> 00:01:38,159
navigation and trajectory and uh our

46
00:01:42,950 --> 00:01:41,360
role is to talk to the partners that

47
00:01:44,469 --> 00:01:42,960
are sending the vehicles up to the space

48
00:01:45,350 --> 00:01:44,479
station and

49
00:01:47,109 --> 00:01:45,360
we

50
00:01:48,389 --> 00:01:47,119
help them interface with the space

51
00:01:49,910 --> 00:01:48,399
station and let them know what the space

52
00:01:51,910 --> 00:01:49,920
station is going on

53
00:01:52,870 --> 00:01:51,920
the two vehicles coming together there's

54
00:01:54,149 --> 00:01:52,880
a lot of

55
00:01:55,590 --> 00:01:54,159
vehicle-to-vehicle coordination that has

56
00:01:57,990 --> 00:01:55,600
to go on there so

57
00:02:00,550 --> 00:01:58,000
we help monitor that make sure that all

58
00:02:02,069 --> 00:02:00,560
links up together really well

59
00:02:03,590 --> 00:02:02,079
there's two different kinds there's

60
00:02:04,789 --> 00:02:03,600
docking vehicles and there's grappling

61
00:02:06,389 --> 00:02:04,799
vehicles

62
00:02:09,190 --> 00:02:06,399
and i'm in the grappling vehicle side

63
00:02:10,949 --> 00:02:09,200

and so things like the htv vehicle and

64
00:02:13,190 --> 00:02:10,959
now the two new cots vehicles they'll be

65
00:02:14,710 --> 00:02:13,200
grappled by the space station arm

66
00:02:17,190 --> 00:02:14,720
so we also have to know a fair amount

67
00:02:18,790 --> 00:02:17,200
about the tools that the crew uses to

68
00:02:21,030 --> 00:02:18,800
monitor the vehicle as it approaches

69
00:02:22,949 --> 00:02:21,040
from below

70
00:02:25,110 --> 00:02:22,959
and is there more um because you just

71
00:02:26,630 --> 00:02:25,120
talked about some of the one of the you

72
00:02:28,710 --> 00:02:26,640
know some of the vehicles are like the

73
00:02:30,949 --> 00:02:28,720
automatic ones that don't require you

74
00:02:32,229 --> 00:02:30,959
know the cruise help and pulling the you

75
00:02:34,630 --> 00:02:32,239
know the with the grapple and that sort

76
00:02:36,070 --> 00:02:34,640
of thing and but also with this one the

77
00:02:37,430 --> 00:02:36,080
spacex dragon this is going to be one

78
00:02:39,830 --> 00:02:37,440
that's going to require some robotics

79
00:02:41,670 --> 00:02:39,840
operations so if you will just explain

80
00:02:44,630 --> 00:02:41,680
to me i mean are you is there more

81
00:02:45,509 --> 00:02:44,640
involvement if it's a uh a grapple

82
00:02:47,110 --> 00:02:45,519
type

83
00:02:48,470 --> 00:02:47,120
well really the bulk of our work and

84
00:02:50,309 --> 00:02:48,480
really this is true for all of space

85
00:02:52,070 --> 00:02:50,319
flight 99 of the work happens before

86
00:02:54,150 --> 00:02:52,080
launch

87
00:02:55,589 --> 00:02:54,160
making sure that the vehicle is built to

88
00:02:58,070 --> 00:02:55,599

the requirements

89
00:02:59,670 --> 00:02:58,080
making sure that the plan that is on

90
00:03:01,750 --> 00:02:59,680
board the vehicle the vehicle is going

91
00:03:03,830 --> 00:03:01,760
to execute these maneuvers autonomously

92
00:03:05,030 --> 00:03:03,840
with ground monitoring and making sure

93
00:03:06,790 --> 00:03:05,040
that that all meets the safety

94
00:03:08,630 --> 00:03:06,800
requirements and then making sure that

95
00:03:10,309 --> 00:03:08,640
we have the proper insight to verify

96
00:03:11,750 --> 00:03:10,319
that even though the plan may have been

97
00:03:13,110 --> 00:03:11,760
safe that we need to make sure that

98
00:03:14,869 --> 00:03:13,120
we're watching the vehicle as it's

99
00:03:17,509 --> 00:03:14,879
happening to make sure it continues to

100
00:03:19,350 --> 00:03:17,519
be safe sure and so with this particular

101
00:03:21,430 --> 00:03:19,360
vehicle what has your experience been i

102
00:03:23,670 --> 00:03:21,440
mean how long have you been working

103
00:03:25,270 --> 00:03:23,680
specifically for this particular vehicle

104
00:03:27,589 --> 00:03:25,280
i've been on this team for about two

105
00:03:29,030 --> 00:03:27,599
years or so so i've got to know a fair

106
00:03:31,350 --> 00:03:29,040
amount about how the vehicle works which

107
00:03:32,789 --> 00:03:31,360
has been really interesting um you know

108
00:03:34,149 --> 00:03:32,799
compared to the space shuttle that these

109
00:03:36,149 --> 00:03:34,159
newer vehicles they're much more

110
00:03:37,910 --> 00:03:36,159
autonomous they're you know they have so

111
00:03:39,910 --> 00:03:37,920
much more computing power and they can

112
00:03:43,030 --> 00:03:39,920
you know encode a lot more automated

113
00:03:44,470 --> 00:03:43,040

decision making into the vehicle um so

114
00:03:46,149 --> 00:03:44,480
being able to learn how that all works

115
00:03:47,910 --> 00:03:46,159
has been really interesting good well

116
00:03:49,270 --> 00:03:47,920
i'm glad to know that you you have some

117
00:03:51,190 --> 00:03:49,280
insight on the vehicle because i do have

118
00:03:53,990 --> 00:03:51,200
some questions about it if you will just

119
00:03:56,149 --> 00:03:54,000
explain to um to me

120
00:03:58,309 --> 00:03:56,159
what is the significance of this vehicle

121
00:04:00,229 --> 00:03:58,319
um as opposed to other vehicles have

122
00:04:01,429 --> 00:04:00,239
that have flown before and docked to the

123
00:04:03,270 --> 00:04:01,439
international space station what is the

124
00:04:06,309 --> 00:04:03,280
significance of this one

125
00:04:08,949 --> 00:04:06,319
sure well in in first of all in a lot of

126
00:04:11,429 --> 00:04:08,959
respects it's fairly similar to htv

127
00:04:12,710 --> 00:04:11,439
uh but it was kind of built you know the

128
00:04:13,990 --> 00:04:12,720
dragon team i think probably learned a

129
00:04:15,670 --> 00:04:14,000
lot and we learned a lot from our

130
00:04:17,189 --> 00:04:15,680
experience with htv that has gone into

131
00:04:20,789 --> 00:04:17,199
the planning for dragon

132
00:04:22,790 --> 00:04:20,799
so it approaches from below um

133
00:04:24,550 --> 00:04:22,800
and is grappled by the arm similar to

134
00:04:27,430 --> 00:04:24,560
htv the really neat thing about dragon

135
00:04:29,030 --> 00:04:27,440
is uh compared to other cargo vehicles

136
00:04:30,629 --> 00:04:29,040
anyway dragon is the first vehicle that

137
00:04:32,629 --> 00:04:30,639
actually bring things down to earth from

138
00:04:34,310 --> 00:04:32,639

us uh some of the most all the other

139
00:04:35,670 --> 00:04:34,320
cargo vehicles basically burn up on

140
00:04:37,270 --> 00:04:35,680
re-entry so we can use it for trash

141
00:04:39,270 --> 00:04:37,280
disposal and stuff but this is our first

142
00:04:41,510 --> 00:04:39,280
opportunity to be able to bring things

143
00:04:42,710 --> 00:04:41,520
home on a cargo vehicle right and so

144
00:04:45,749 --> 00:04:42,720
that's going to add some great

145
00:04:47,749 --> 00:04:45,759
capability i'm sure especially for um

146
00:04:50,150 --> 00:04:47,759
hardware experiments and whatnot that we

147
00:04:52,150 --> 00:04:50,160
are very to and from the international

148
00:04:53,749 --> 00:04:52,160
space station right the capability we

149
00:04:55,350 --> 00:04:53,759
lost with the space shuttle that uh it

150
00:04:57,510 --> 00:04:55,360
would be anxious to get back and also

151
00:04:59,510 --> 00:04:57,520
there is the commercial

152
00:05:00,469 --> 00:04:59,520
part of this vehicle can you talk about

153
00:05:02,950 --> 00:05:00,479
that

154
00:05:05,510 --> 00:05:02,960
different about the whole commercial

155
00:05:07,110 --> 00:05:05,520
program is that uh we try and stay out

156
00:05:09,350 --> 00:05:07,120
of the details of how the problems are

157
00:05:11,350 --> 00:05:09,360
solved we levy the requirements then you

158
00:05:13,270 --> 00:05:11,360
first start the safety requirements and

159
00:05:14,629 --> 00:05:13,280
then it really delegated a lot of the

160
00:05:17,110 --> 00:05:14,639
responsibility to figure out how to

161
00:05:18,150 --> 00:05:17,120
solve that to the commercial uh teams

162
00:05:19,830 --> 00:05:18,160
and

163
00:05:21,270 --> 00:05:19,840

it'd be really you know they have a

164
00:05:23,110 --> 00:05:21,280
different perspective and

165
00:05:24,629 --> 00:05:23,120
they want to take this vehicle and use

166
00:05:26,629 --> 00:05:24,639
it to

167
00:05:28,070 --> 00:05:26,639
provide services to other customers as

168
00:05:29,590 --> 00:05:28,080
well so they have to weigh our

169
00:05:30,790 --> 00:05:29,600
requirements against what other markets

170
00:05:32,550 --> 00:05:30,800
they see out there which would be great

171
00:05:34,870 --> 00:05:32,560
because if they can take this vehicle

172
00:05:36,310 --> 00:05:34,880
and make money other ways then that

173
00:05:37,189 --> 00:05:36,320
should bring our costs down in the long

174
00:05:39,430 --> 00:05:37,199
run

175
00:05:42,070 --> 00:05:39,440
okay great that's interesting so um if

176
00:05:43,909 --> 00:05:42,080
you would also go through just the

177
00:05:45,189 --> 00:05:43,919
series of um

178
00:05:47,189 --> 00:05:45,199
what you know what's going to take place

179
00:05:49,590 --> 00:05:47,199
after it launches so it launches

180
00:05:51,749 --> 00:05:49,600
it's in orbit and then what happens next

181
00:05:53,990 --> 00:05:51,759
sure well the spacex team has done a lot

182
00:05:55,749 --> 00:05:54,000
of verification work pre-launch

183
00:05:57,189 --> 00:05:55,759
after they get on orbit though we also

184
00:05:58,790 --> 00:05:57,199
have some additional gates they have to

185
00:06:00,710 --> 00:05:58,800
go through which are to demonstrate some

186
00:06:02,710 --> 00:06:00,720
basic capabilities before we'll agree to

187
00:06:04,309 --> 00:06:02,720
let it come to the space station

188
00:06:06,950 --> 00:06:04,319

after launch they'll be collecting some

189
00:06:08,309 --> 00:06:06,960
absolute navigation data using gps and

190
00:06:09,590 --> 00:06:08,319
the spacex team will take a look at that

191
00:06:10,950 --> 00:06:09,600
and make sure it's

192
00:06:12,230 --> 00:06:10,960
performing further requirements and

193
00:06:14,070 --> 00:06:12,240
they'll give us that data and we'll take

194
00:06:15,270 --> 00:06:14,080
a look at it and make sure so that'll be

195
00:06:16,550 --> 00:06:15,280
one of the first gates that we go

196
00:06:18,390 --> 00:06:16,560
through is after they get on orbit just

197
00:06:20,390 --> 00:06:18,400
the basic vehicle's capability to figure

198
00:06:21,990 --> 00:06:20,400
out where it is and where it's going

199
00:06:24,150 --> 00:06:22,000
also some safety critical functions like

200
00:06:25,510 --> 00:06:24,160
the abort functionality so they'll test

201
00:06:27,110 --> 00:06:25,520
that out where it's much further away

202
00:06:29,430 --> 00:06:27,120
from the space station and we don't have

203
00:06:31,830 --> 00:06:29,440
to rely on it and so we can watch it in

204
00:06:33,510 --> 00:06:31,840
orbit see how it really does perform per

205
00:06:34,870 --> 00:06:33,520
all the analysis and we'll get

206
00:06:36,469 --> 00:06:34,880
comfortable with that before we let them

207
00:06:38,469 --> 00:06:36,479
come in

208
00:06:40,950 --> 00:06:38,479
another big one would be on the day

209
00:06:42,950 --> 00:06:40,960
before grapple they will do a flyby

210
00:06:44,870 --> 00:06:42,960
below the space station and a little

211
00:06:47,350 --> 00:06:44,880
more accurate navigation capability is

212
00:06:49,749 --> 00:06:47,360
for the space station to send gps data

213
00:06:51,589 --> 00:06:49,759

of to out to the dragon vehicle and it

214
00:06:53,110 --> 00:06:51,599
will calculate a good solution that is

215
00:06:54,870 --> 00:06:53,120
much more accurate

216
00:06:56,710 --> 00:06:54,880
of the dragon's position relative to the

217
00:06:58,309 --> 00:06:56,720
space station and so

218
00:06:59,990 --> 00:06:58,319
we'll take a look at that data overnight

219
00:07:01,270 --> 00:07:00,000
before capture day and make sure that is

220
00:07:03,350 --> 00:07:01,280
all performing

221
00:07:05,189 --> 00:07:03,360
how we expect and then we'll come in and

222
00:07:07,110 --> 00:07:05,199
let them come grapple on the next day

223
00:07:08,390 --> 00:07:07,120
okay great and now you mentioned demo

224
00:07:09,430 --> 00:07:08,400
flight

225
00:07:10,230 --> 00:07:09,440
so

226
00:07:12,230 --> 00:07:10,240
what

227
00:07:14,390 --> 00:07:12,240
explain demo flight form for me if you

228
00:07:17,830 --> 00:07:14,400
will and then also explain

229
00:07:19,189 --> 00:07:17,840
when does it become the vehicle that we

230
00:07:21,029 --> 00:07:19,199
approve and say that this is going to be

231
00:07:22,790 --> 00:07:21,039
the vehicle that's going to ferry

232
00:07:24,550 --> 00:07:22,800
uh cargo to and from the space station

233
00:07:27,270 --> 00:07:24,560
sure well spacex already has the the

234
00:07:29,029 --> 00:07:27,280
next vehicle is uh is being built at the

235
00:07:30,870 --> 00:07:29,039
spacex facilities in fact it may be

236
00:07:33,510 --> 00:07:30,880
completed i can't remember the schedule

237
00:07:34,230 --> 00:07:33,520
but uh so this flight is a demonstration

238
00:07:35,909 --> 00:07:34,240

flight where they're going to

239
00:07:37,749 --> 00:07:35,919
demonstrate their capability to get to

240
00:07:39,270 --> 00:07:37,759
the iss so we do have some cargo on

241
00:07:40,550 --> 00:07:39,280
board but it's if something were to go

242
00:07:42,550 --> 00:07:40,560
wrong it's stuff that we can live

243
00:07:44,230 --> 00:07:42,560
without for quite a while

244
00:07:46,070 --> 00:07:44,240
assuming everything goes well on this

245
00:07:48,869 --> 00:07:46,080
flight if they get uh up to the space

246
00:07:50,710 --> 00:07:48,879
station and home again um the very next

247
00:07:52,550 --> 00:07:50,720
flight which i believe is sometime mid

248
00:07:54,469 --> 00:07:52,560
to late summer i forget the schedule but

249
00:07:57,510 --> 00:07:54,479
uh that will be a real cargo flight that

250
00:07:59,029 --> 00:07:57,520
starts their crs commercial resupply uh

251
00:08:01,670 --> 00:07:59,039
services contract

252
00:08:03,029 --> 00:08:01,680
so this uh assuming all goes well this

253
00:08:04,309 --> 00:08:03,039
will be the one demonstration flight and

254
00:08:06,469 --> 00:08:04,319
then we'll jump right into the to the

255
00:08:08,070 --> 00:08:06,479
commercial resupply uh if something you

256
00:08:09,270 --> 00:08:08,080
know this is a test flight things are

257
00:08:11,110 --> 00:08:09,280
you know

258
00:08:12,070 --> 00:08:11,120
very possible things can go wrong

259
00:08:13,510 --> 00:08:12,080
if they don't get all the way to the

260
00:08:15,110 --> 00:08:13,520
space station then we'll try again

261
00:08:16,950 --> 00:08:15,120
another time sure well they say space

262
00:08:18,550 --> 00:08:16,960
flight is a sport so we have to be

263
00:08:20,629 --> 00:08:18,560

flexible with it right

264
00:08:22,070 --> 00:08:20,639
so um and so you just answered my next

265
00:08:24,469 --> 00:08:22,080
question was going to be that you know

266
00:08:25,749 --> 00:08:24,479
assuming the mission is a success what

267
00:08:27,029 --> 00:08:25,759
are the what's the next step and that

268
00:08:29,350 --> 00:08:27,039
would be it right there that you

269
00:08:32,550 --> 00:08:29,360
mentioned so um if you will real quick

270
00:08:35,029 --> 00:08:32,560
just give us a um the last update of the

271
00:08:37,509 --> 00:08:35,039
launch it is again scheduled to take off

272
00:08:39,350 --> 00:08:37,519
from the kennedy space center at 3 55

273
00:08:41,589 --> 00:08:39,360
a.m central time

274
00:08:43,190 --> 00:08:41,599
and so do you have anything new to uh

275
00:08:45,110 --> 00:08:43,200
actually on the launch side that's

276
00:08:46,710 --> 00:08:45,120
really the commercial partners field and

277
00:08:48,150 --> 00:08:46,720
i know they had an internal flight

278
00:08:49,509 --> 00:08:48,160
readiness review yesterday and they

279
00:08:51,670 --> 00:08:49,519
rolled out to the pad this morning so it

280
00:08:53,829 --> 00:08:51,680
sounds like everything's on schedule

281
00:08:55,670 --> 00:08:53,839
so we'll pick up uh tomorrow tomorrow

282
00:08:58,230 --> 00:08:55,680
morning on console and

283
00:08:59,750 --> 00:08:58,240
hopefully it'll go great great thank you

284
00:09:01,990 --> 00:08:59,760
very much for coming out and talking

285
00:09:03,829 --> 00:09:02,000
with us again the spacex dragon is

286
00:09:05,910 --> 00:09:03,839
scheduled to launch tomorrow morning at

287
00:09:07,910 --> 00:09:05,920
3 55 a.m

288
00:09:09,829 --> 00:09:07,920

from the kennedy space center we will

289
00:09:13,110 --> 00:09:09,839
have live coverage for you here on nasa

290
00:09:16,470 --> 00:09:13,120
television at 2 30 a.m central time and

291
00:09:17,910 --> 00:09:16,480
uh also up next after following our iss

292
00:09:20,269 --> 00:09:17,920
update today at

293
00:09:22,470 --> 00:09:20,279
noon will be a uh

294
00:09:24,470 --> 00:09:22,480
pre-pre-launch briefing and so you can

295
00:09:26,389 --> 00:09:24,480
tune in here at nasa television for that