
PAO

1
00:00:06,070 --> 00:00:03,750
the next delivery of cargo to the

2
00:00:08,470 --> 00:00:06,080
international space station is due on a

3
00:00:11,110 --> 00:00:08,480
dragon spacecraft that is targeted to

4
00:00:12,709 --> 00:00:11,120
launch on march 16th

5
00:00:14,390 --> 00:00:12,719
that will contain a lot of experiments

6
00:00:16,870 --> 00:00:14,400
that are going to do their work inside

7
00:00:18,710 --> 00:00:16,880
the station and one big experiment that

8
00:00:21,189 --> 00:00:18,720
will be doing its work on the outside of

9
00:00:23,429 --> 00:00:21,199
the station the high definition earth

10
00:00:26,790 --> 00:00:23,439
viewing experiment is part of the next

11
00:00:28,630 --> 00:00:26,800
dragon payload and the hdev lead

12
00:00:31,349 --> 00:00:28,640
engineer lori moats is with us this

13
00:00:33,910 --> 00:00:31,359

morning to talk about that you're flying

14
00:00:35,830 --> 00:00:33,920
four high definition cameras what's the

15
00:00:37,190 --> 00:00:35,840
story behind all that tell me where they

16
00:00:39,190 --> 00:00:37,200
go and

17
00:00:41,830 --> 00:00:39,200
things like that that's right we're

18
00:00:44,869 --> 00:00:41,840
flying four different commercial high

19
00:00:46,150 --> 00:00:44,879
definition video cameras and our team

20
00:00:48,549 --> 00:00:46,160
designed the

21
00:00:50,470 --> 00:00:48,559
enclosure and the avionics to integrate

22
00:00:52,790 --> 00:00:50,480
the experiment on orbit

23
00:00:53,750 --> 00:00:52,800
we'll be flying in the spacex dragon

24
00:00:55,830 --> 00:00:53,760
trunk

25
00:00:58,709 --> 00:00:55,840
that's their exposed

26
00:01:00,790 --> 00:00:58,719
facility and we're the first exposed

27
00:01:02,709 --> 00:01:00,800
payload and the first powered payload

28
00:01:05,030 --> 00:01:02,719
that spacex is flying so it's been

29
00:01:07,910 --> 00:01:05,040
exciting to be integrated with them as

30
00:01:09,830 --> 00:01:07,920
they've gone through those challenges

31
00:01:12,070 --> 00:01:09,840
yes this is a picture of us um

32
00:01:13,429 --> 00:01:12,080
integrated in the spacex trunk as

33
00:01:15,749 --> 00:01:13,439
they've gone gone through some of our

34
00:01:18,550 --> 00:01:15,759
challenges that's our enclosure and you

35
00:01:20,469 --> 00:01:18,560
can see several pockets on on either

36
00:01:22,789 --> 00:01:20,479
side of the camera where the windows

37
00:01:24,710 --> 00:01:22,799
where the cameras peek out

38
00:01:27,670 --> 00:01:24,720

the close-up view of the the payload

39
00:01:29,590 --> 00:01:27,680
itself if you could describe for us uh

40
00:01:32,069 --> 00:01:29,600
what where it's a big box that has the

41
00:01:33,429 --> 00:01:32,079
cameras inside it correct that's correct

42
00:01:34,310 --> 00:01:33,439
um

43
00:01:36,469 --> 00:01:34,320
since we

44
00:01:39,030 --> 00:01:36,479
no that's that's a pretty easy way to

45
00:01:42,230 --> 00:01:39,040
describe it we have um so you can see

46
00:01:44,469 --> 00:01:42,240
the on the bottom right picture there's

47
00:01:46,310 --> 00:01:44,479
two small two windows and then on the

48
00:01:49,030 --> 00:01:46,320
left hand side and then one window that

49
00:01:51,270 --> 00:01:49,040
you can see on the right hand side and

50
00:01:53,590 --> 00:01:51,280
when we pick these commercial cameras um

51
00:01:56,469 --> 00:01:53,600
they aren't designed for space

52
00:01:58,789 --> 00:01:56,479
exposure so we've kind of protected them

53
00:02:00,709 --> 00:01:58,799
from the vacuum and the thermal

54
00:02:03,190 --> 00:02:00,719
environments of space with

55
00:02:05,030 --> 00:02:03,200
part of our design and so

56
00:02:08,550 --> 00:02:05,040
that's what the the box and you saw the

57
00:02:10,790 --> 00:02:08,560
silver exp covering is for is for

58
00:02:12,710 --> 00:02:10,800
protecting the cameras from that part of

59
00:02:15,030 --> 00:02:12,720
the space environment

60
00:02:17,350 --> 00:02:15,040
and when you get there where is this

61
00:02:19,750 --> 00:02:17,360
apparatus going to end up

62
00:02:22,150 --> 00:02:19,760
when when we when spacex

63
00:02:24,710 --> 00:02:22,160

docks on orbit the robotic arm will

64
00:02:26,869 --> 00:02:24,720
remove us from the spacex trunk and then

65
00:02:30,070 --> 00:02:26,879
take us over to the european space

66
00:02:30,949 --> 00:02:30,080
agency's columbus module and then

67
00:02:33,270 --> 00:02:30,959
this is

68
00:02:36,390 --> 00:02:33,280
a great picture on the will be installed

69
00:02:38,390 --> 00:02:36,400
on the bottom location um that you see

70
00:02:40,070 --> 00:02:38,400
there on their external payload facility

71
00:02:41,589 --> 00:02:40,080
there's like four different platforms

72
00:02:43,990 --> 00:02:41,599
that you can see there

73
00:02:47,190 --> 00:02:44,000
and the bottom platform is the nader

74
00:02:49,589 --> 00:02:47,200
location is pointing earth towards earth

75
00:02:51,270 --> 00:02:49,599
so our all four of our cameras

76
00:02:53,430 --> 00:02:51,280
will be pointed at different angles

77
00:02:56,550 --> 00:02:53,440
towards earth we have one camera that

78
00:02:58,949 --> 00:02:56,560
will be pointing forward so i'm looking

79
00:03:00,470 --> 00:02:58,959
where the iss is traveling

80
00:03:03,110 --> 00:03:00,480
and then we have one camera they'll be

81
00:03:05,110 --> 00:03:03,120
pointing straight down into

82
00:03:07,270 --> 00:03:05,120
exactly towards earth and two cameras

83
00:03:09,270 --> 00:03:07,280
that will be pointed kind of towards uh

84
00:03:10,790 --> 00:03:09,280
the back where to see where the iss has

85
00:03:12,630 --> 00:03:10,800
been traveling and they're but they're

86
00:03:14,630 --> 00:03:12,640
all tracking they're all pointed on

87
00:03:16,550 --> 00:03:14,640
essentially the same path so they could

88
00:03:18,949 --> 00:03:16,560

track exactly where the station is

89
00:03:21,270 --> 00:03:18,959
flying so if there was a

90
00:03:24,390 --> 00:03:21,280
weather event say like a hurricane that

91
00:03:27,190 --> 00:03:24,400
we wanted to see or or track

92
00:03:29,830 --> 00:03:27,200
we could see if the iss was going over

93
00:03:31,190 --> 00:03:29,840
that event we could watch it as iss is

94
00:03:33,030 --> 00:03:31,200
approaching

95
00:03:35,110 --> 00:03:33,040
transfer to the camera then watch it as

96
00:03:37,750 --> 00:03:35,120
the iss is over the event and then

97
00:03:40,309 --> 00:03:37,760
transfer and watch as diocese passes

98
00:03:43,030 --> 00:03:40,319
is the goal here to get a lot of

99
00:03:44,229 --> 00:03:43,040
beautiful hd video of the earth now

100
00:03:45,190 --> 00:03:44,239
that's certainly

101
00:03:46,710 --> 00:03:45,200
a good

102
00:03:47,830 --> 00:03:46,720
side effect but it's really an

103
00:03:49,350 --> 00:03:47,840
experiment

104
00:03:51,830 --> 00:03:49,360
the reason we have four different

105
00:03:52,630 --> 00:03:51,840
commercial cameras is we want to see not

106
00:03:53,429 --> 00:03:52,640
just

107
00:03:55,830 --> 00:03:53,439
how

108
00:03:58,309 --> 00:03:55,840
these commercial products respond to the

109
00:04:00,309 --> 00:03:58,319
radiation environment the the cameras

110
00:04:02,070 --> 00:04:00,319
themselves their sensors and also the

111
00:04:03,429 --> 00:04:02,080
integrated system

112
00:04:05,270 --> 00:04:03,439
the products weren't designed to be

113
00:04:07,830 --> 00:04:05,280

exposed to the radiation environment of

114
00:04:10,390 --> 00:04:07,840
space so we want to see how

115
00:04:12,470 --> 00:04:10,400
as we move forward with part as nasa's

116
00:04:15,190 --> 00:04:12,480
partnering with more commercial entities

117
00:04:17,509 --> 00:04:15,200
and with um as we try to move forward

118
00:04:18,629 --> 00:04:17,519
and achieve our goals i want to see how

119
00:04:20,710 --> 00:04:18,639
that's

120
00:04:22,710 --> 00:04:20,720
how robust we can be and to make more

121
00:04:24,870 --> 00:04:22,720
intelligent decisions as we move forward

122
00:04:25,670 --> 00:04:24,880
you described earlier that the enclosure

123
00:04:27,350 --> 00:04:25,680
is in

124
00:04:29,270 --> 00:04:27,360
is protecting these cameras to some

125
00:04:31,350 --> 00:04:29,280
extent but but not completely that's

126
00:04:32,790 --> 00:04:31,360
true yes um i mean we

127
00:04:34,790 --> 00:04:32,800
still need

128
00:04:36,469 --> 00:04:34,800
a more robust design would be to put it

129
00:04:37,830 --> 00:04:36,479
in a completely enclosed box but then

130
00:04:40,390 --> 00:04:37,840
you wouldn't get very good video would

131
00:04:41,909 --> 00:04:40,400
you so um so it has to be able to see

132
00:04:43,270 --> 00:04:41,919
outside so

133
00:04:45,510 --> 00:04:43,280
outside of the space station you still

134
00:04:47,590 --> 00:04:45,520
have the radiation effects and that's um

135
00:04:48,950 --> 00:04:47,600
the the video sensors are really

136
00:04:51,189 --> 00:04:48,960
sensitive particularly sensitive to

137
00:04:53,909 --> 00:04:51,199
radiation exposure so we're actually

138
00:04:55,510 --> 00:04:53,919

partnering with uh university students

139
00:04:57,030 --> 00:04:55,520
and and they'll be looking at some of

140
00:04:58,870 --> 00:04:57,040
taking recording some pieces of the

141
00:05:00,629 --> 00:04:58,880
video data over time from the different

142
00:05:03,590 --> 00:05:00,639
cameras and

143
00:05:05,749 --> 00:05:03,600
developing ways to examine how the video

144
00:05:07,830 --> 00:05:05,759
is degrading as the cameras are exposed

145
00:05:09,270 --> 00:05:07,840
to more and more radiation i want to ask

146
00:05:11,510 --> 00:05:09,280
you about the student involvement but

147
00:05:12,710 --> 00:05:11,520
there is a way for people to see the

148
00:05:15,749 --> 00:05:12,720
video

149
00:05:17,590 --> 00:05:15,759
as it's shot right or relatively soon

150
00:05:19,110 --> 00:05:17,600
one of our kind of key

151
00:05:21,110 --> 00:05:19,120
uh

152
00:05:23,029 --> 00:05:21,120
missions here is it's basically live

153
00:05:24,870 --> 00:05:23,039
video streaming

154
00:05:27,110 --> 00:05:24,880
the the only delay in the system is the

155
00:05:30,150 --> 00:05:27,120
delay in downlinking the video from the

156
00:05:33,270 --> 00:05:30,160
station to earth there is a website that

157
00:05:34,629 --> 00:05:33,280
is being set up uh ustream website where

158
00:05:36,950 --> 00:05:34,639
there's the link there

159
00:05:39,110 --> 00:05:36,960
that once were installed and powered it

160
00:05:41,110 --> 00:05:39,120
will be streaming the video essentially

161
00:05:43,270 --> 00:05:41,120
24 7

162
00:05:46,070 --> 00:05:43,280
down and so anybody from the public can

163
00:05:48,710 --> 00:05:46,080

come in and see the video and link to

164
00:05:51,029 --> 00:05:48,720
and see just where the station is

165
00:05:53,990 --> 00:05:51,039
eventually there's a they want to have

166
00:05:55,430 --> 00:05:54,000
kind of a graphic of the world with a an

167
00:05:57,670 --> 00:05:55,440
image so you can see oh this is where

168
00:05:59,430 --> 00:05:57,680
iss is now and then you can see the

169
00:06:01,670 --> 00:05:59,440
actual video and you see where it's

170
00:06:04,710 --> 00:06:01,680
headed to correlated to where it's going

171
00:06:06,309 --> 00:06:04,720
yeah um so that's uh that's kind of the

172
00:06:09,029 --> 00:06:06,319
image i think the the link if you go to

173
00:06:12,550 --> 00:06:09,039
the link now it's just as video from the

174
00:06:14,390 --> 00:06:12,560
nasa website but uh um but it's it's

175
00:06:16,070 --> 00:06:14,400
gonna be pretty exciting you mentioned

176
00:06:17,270 --> 00:06:16,080
students a moment ago there are students

177
00:06:19,830 --> 00:06:17,280
involved in

178
00:06:21,430 --> 00:06:19,840
both the preparation and the and then

179
00:06:22,790 --> 00:06:21,440
the in the experiment after it arrives

180
00:06:24,150 --> 00:06:22,800
yes that's true we have um we've

181
00:06:26,390 --> 00:06:24,160
partnered with the university of houston

182
00:06:28,230 --> 00:06:26,400
clear lake to um they'll be maintaining

183
00:06:29,909 --> 00:06:28,240
the website and also operating the

184
00:06:32,870 --> 00:06:29,919
payload when it's on orbit it's the

185
00:06:34,629 --> 00:06:32,880
payload's pretty autonomous meaning once

186
00:06:36,469 --> 00:06:34,639
uh once it's installed on orbit and we

187
00:06:38,390 --> 00:06:36,479
turn it on it just kind of cycles

188
00:06:40,390 --> 00:06:38,400

through the four different cameras on

189
00:06:42,950 --> 00:06:40,400
its own

190
00:06:45,110 --> 00:06:42,960
but you we do have the option that if we

191
00:06:47,270 --> 00:06:45,120
want to change the order that the

192
00:06:49,589 --> 00:06:47,280
cameras cycle or how long we sit on any

193
00:06:51,990 --> 00:06:49,599
one camera they can do that and make

194
00:06:53,749 --> 00:06:52,000
that change and as time progresses if

195
00:06:55,909 --> 00:06:53,759
say one camera finally

196
00:06:57,189 --> 00:06:55,919
stops working we can cycle between three

197
00:06:58,469 --> 00:06:57,199
cameras and we can make those sorts of

198
00:07:00,309 --> 00:06:58,479
changes and the students would be doing

199
00:07:01,909 --> 00:07:00,319
that effort as well as analyzing the

200
00:07:03,830 --> 00:07:01,919
video to see how it's degrading over

201
00:07:05,670 --> 00:07:03,840
time

202
00:07:08,550 --> 00:07:05,680
in the actual hardware development

203
00:07:10,550 --> 00:07:08,560
itself we actually involved the hunch

204
00:07:13,110 --> 00:07:10,560
program which is high school students

205
00:07:14,469 --> 00:07:13,120
united with nasa creating hardware of

206
00:07:15,990 --> 00:07:14,479
course

207
00:07:19,430 --> 00:07:16,000
it's a hunch program so it's a high

208
00:07:21,909 --> 00:07:19,440
school kids um that they are coming in

209
00:07:23,350 --> 00:07:21,919
with uh i mean it's amazing they're so

210
00:07:26,309 --> 00:07:23,360
young but they're creating hardware

211
00:07:28,070 --> 00:07:26,319
software and electronics um that we

212
00:07:30,790 --> 00:07:28,080
actually have brackets

213
00:07:32,950 --> 00:07:30,800

we used they had some mechanical design

214
00:07:35,909 --> 00:07:32,960
and they actually built hardware that is

215
00:07:38,230 --> 00:07:35,919
in our box and about to fly so it's part

216
00:07:39,510 --> 00:07:38,240
of how what made us work so we'll be

217
00:07:40,950 --> 00:07:39,520
looking forward to seeing that that

218
00:07:43,270 --> 00:07:40,960
ought to be very interesting to see that

219
00:07:45,029 --> 00:07:43,280
once it what it does the hdf payload

220
00:07:47,110 --> 00:07:45,039
scheduled to fly on the dragon

221
00:07:49,270 --> 00:07:47,120
spacecraft it's launching in march 16th