
ELaN
NASA

1
00:00:09,470 --> 00:00:06,650
good afternoon once again we're back

2
00:00:12,259 --> 00:00:09,480
down with our a lot of CubeSat briefing

3
00:00:14,530 --> 00:00:12,269
cube SATs also on our Delta two rocket

4
00:00:17,450 --> 00:00:14,540
to be launched on Friday morning and

5
00:00:20,420 --> 00:00:17,460
here to discuss the cube sets and their

6
00:00:22,490 --> 00:00:20,430
mission is garrett's crow bot the Alana

7
00:00:24,380 --> 00:00:22,500
mission manager from the NASA law

8
00:00:29,240 --> 00:00:24,390
services program at the Kennedy Space

9
00:00:31,490 --> 00:00:29,250
Center and Roland Coelho the peapod

10
00:00:34,160 --> 00:00:31,500
program lead from the california

11
00:00:37,040 --> 00:00:34,170
polytechnic state university in san luis

12
00:00:39,319 --> 00:00:37,050
obispo california and we'll begin first

13
00:00:41,750 --> 00:00:39,329

with our project our mission manager

14
00:00:44,299 --> 00:00:41,760
Garrett's cravat Garrett thank you

15
00:00:46,459 --> 00:00:44,309
George good afternoon everyone and that

16
00:00:48,560 --> 00:00:46,469
you can make it out what an incredible

17
00:00:51,740 --> 00:00:48,570
opportunity we have on Friday morning to

18
00:00:52,970 --> 00:00:51,750
be able to launch Alana three Alana is

19
00:00:56,119 --> 00:00:52,980
educational launch of NATO satellite

20
00:00:58,939 --> 00:00:56,129
this our third in a series we have right

21
00:01:00,950 --> 00:00:58,949
now we look at it from the point of

22
00:01:04,009 --> 00:01:00,960
we're educating enhancing education

23
00:01:06,560 --> 00:01:04,019
through space flight the mission has six

24
00:01:10,700 --> 00:01:06,570
cube sets of which are five missions and

25
00:01:13,250 --> 00:01:10,710
if we go to the first slide nice

26
00:01:19,850 --> 00:01:13,260
actually the second slide but we'll go

27
00:01:25,350 --> 00:01:21,719
okay go back go ahead and look about

28
00:01:26,760 --> 00:01:25,360
their previous slide the you know one of

29
00:01:29,419 --> 00:01:26,770
NASA's missions and goals is to be able

30
00:01:31,319 --> 00:01:29,429
to retain students in the mathematics

31
00:01:33,899 --> 00:01:31,329
science mathematics engineering

32
00:01:35,819 --> 00:01:33,909
disciplines and through the coop set

33
00:01:38,460 --> 00:01:35,829
projects we were able to create a

34
00:01:42,569 --> 00:01:38,470
program to acidify students drink to

35
00:01:44,340 --> 00:01:42,579
strengthen NASA and the resources to do

36
00:01:46,109 --> 00:01:44,350
this Alana program we had what we call

37
00:01:48,630 --> 00:01:46,119
we developed dia to keep set initiative

38
00:01:50,820 --> 00:01:48,640

to day just been to calls for cube sets

39
00:01:52,469 --> 00:01:50,830
throughout the educational community

40
00:01:53,609 --> 00:01:52,479
nonprofits and the third one is

41
00:01:57,210 --> 00:01:53,619
currently on the streets and the

42
00:01:58,770 --> 00:01:57,220
proposals are due in November 14th from

43
00:02:00,210 --> 00:01:58,780
these calls we've received 32 cubesat

44
00:02:02,460 --> 00:02:00,220
missions have been selected to fly so

45
00:02:04,740 --> 00:02:02,470
far and of these 32 we have 26

46
00:02:08,699 --> 00:02:04,750
manifested and a part of these are on

47
00:02:10,259 --> 00:02:08,709
the MPP mission the Alana three I put

48
00:02:12,360 --> 00:02:10,269
together this graphic area of the United

49
00:02:15,050 --> 00:02:12,370
States basically showing the states

50
00:02:17,130 --> 00:02:15,060
where the Alana project has touched two

51
00:02:19,410 --> 00:02:17,140
cubes that's being developed and has

52
00:02:21,270 --> 00:02:19,420
been selected currently there's 18 and

53
00:02:25,740 --> 00:02:21,280
we're hoping to be able to one day had

54
00:02:29,190 --> 00:02:25,750
this whole map completely filled out the

55
00:02:31,680 --> 00:02:29,200
next chart next slide please here's our

56
00:02:33,750 --> 00:02:31,690
mission patch Alana 3 we have like I

57
00:02:39,750 --> 00:02:33,760
said we have five missions on board

58
00:02:42,900 --> 00:02:39,760
Montana the one prime all be set for

59
00:02:45,140 --> 00:02:42,910
University of Auburn University M cubed

60
00:02:47,819 --> 00:02:45,150
from Michigan University of Michigan

61
00:02:49,349 --> 00:02:47,829
racks to will also be from the

62
00:02:52,080 --> 00:02:49,359
University of Michigan and dice from

63
00:02:54,090 --> 00:02:52,090

Utah State University none of this could

64
00:02:56,069 --> 00:02:54,100
be possible without the Cal Poly and the

65
00:02:59,039 --> 00:02:56,079
cube into poly Pico orbital employer and

66
00:03:00,720 --> 00:02:59,049
there are what will the keep Seth will

67
00:03:04,349 --> 00:03:00,730
be fitted into and we'll show you that

68
00:03:06,479 --> 00:03:04,359
in a little bit so and here we have our

69
00:03:09,030 --> 00:03:06,489
patches indicating the educational

70
00:03:12,180 --> 00:03:09,040
launch of Netta satellite so if we go to

71
00:03:15,180 --> 00:03:12,190
the next image well that was the first

72
00:03:16,589 --> 00:03:15,190
image we talked about but this is where

73
00:03:21,870 --> 00:03:16,599
we talk i'll go ahead and go back we

74
00:03:23,520 --> 00:03:21,880
talked to it anyway well what ok yeah

75
00:03:25,680 --> 00:03:23,530
that's right here basically showing the

76
00:03:27,479 --> 00:03:25,690
the word the international the national

77
00:03:29,670 --> 00:03:27,489
concept of being able to go out and

78
00:03:32,490 --> 00:03:29,680
recruit students students working on the

79
00:03:35,220 --> 00:03:32,500
cubes themselves maintaining the science

80
00:03:37,290 --> 00:03:35,230
knowledge engineering and launching a

81
00:03:39,030 --> 00:03:37,300
key element as launching education into

82
00:03:42,720 --> 00:03:39,040
space for these students and given the

83
00:03:44,310 --> 00:03:42,730
hands-on experience flying touching and

84
00:03:47,370 --> 00:03:44,320
actually building flight hardware for a

85
00:03:49,380 --> 00:03:47,380
commission which really makes them a key

86
00:03:51,780 --> 00:03:49,390
entity going into the aerospace

87
00:03:54,150 --> 00:03:51,790
workforce so now if you go to the next

88
00:03:56,370 --> 00:03:54,160

image we'll take a look at the some of

89
00:03:59,460 --> 00:03:56,380
the students here epic Cal Poly actually

90
00:04:01,920 --> 00:03:59,470
integrating the Alana three missions you

91
00:04:04,170 --> 00:04:01,930
see the peapod there on the lower right

92
00:04:06,150 --> 00:04:04,180
hand corner fully integrated and end up

93
00:04:10,830 --> 00:04:06,160
above the three cubes right before going

94
00:04:12,270 --> 00:04:10,840
in with any of the project the students

95
00:04:14,490 --> 00:04:12,280
act just like system engineers they do

96
00:04:16,050 --> 00:04:14,500
testing they verify they check and they

97
00:04:18,800 --> 00:04:16,060
ensure that everything is proper before

98
00:04:24,480 --> 00:04:18,810
it goes into a if not into the vehicle

99
00:04:25,710 --> 00:04:24,490
so we went to the next image the amount

100
00:04:28,170 --> 00:04:25,720
of three missions is going to be flight

101
00:04:30,540 --> 00:04:28,180
upon the second stage of the Delta Q

102
00:04:33,659 --> 00:04:30,550
vehicle here it's enclosed into the

103
00:04:35,460 --> 00:04:33,669
payload fairing this verse image shows

104
00:04:37,380 --> 00:04:35,470
the Delta to this would be look like on

105
00:04:39,120 --> 00:04:37,390
Friday night Friday morning and then

106
00:04:40,890 --> 00:04:39,130
down on the second stage there on the

107
00:04:43,230 --> 00:04:40,900
struts and then we blow it up with the

108
00:04:45,600 --> 00:04:43,240
3p pods on the next image up there in

109
00:04:47,750 --> 00:04:45,610
the upper right-hand corner so we go to

110
00:04:50,010 --> 00:04:47,760
the next one we showed where the actual

111
00:04:52,590 --> 00:04:50,020
ula engineer is actually installing the

112
00:04:54,330 --> 00:04:52,600
the pea pod onto the vehicle here we

113
00:04:58,050 --> 00:04:54,340

showed a pea pod number three with dice

114
00:05:00,480 --> 00:04:58,060
and pea pod number one with e 1 prime

115
00:05:02,550 --> 00:05:00,490
flight to all be sad and M cube co and

116
00:05:04,800 --> 00:05:02,560
then peapod number two there by itself

117
00:05:09,090 --> 00:05:04,810
on the other side of the vehicles racks

118
00:05:12,420 --> 00:05:09,100
too so if we go to the next next image

119
00:05:14,490 --> 00:05:12,430
this is just a layout of the the flight

120
00:05:16,890 --> 00:05:14,500
profile of the first two orbits once the

121
00:05:21,270 --> 00:05:16,900
peapod separate approximately about 1

122
00:05:23,010 --> 00:05:21,280
minute 38 seconds after t0 along this

123
00:05:25,920 --> 00:05:23,020
flight path you'll see we start seeing

124
00:05:28,950 --> 00:05:25,930
circles around South Africa Europe we

125
00:05:30,270 --> 00:05:28,960
have a whole network of student ground

126
00:05:33,180 --> 00:05:30,280
stations throughout the world that will

127
00:05:34,950 --> 00:05:33,190
be collecting data to determine the

128
00:05:38,250 --> 00:05:34,960
likeness of the spacecraft to cube sads

129
00:05:39,300 --> 00:05:38,260
as they fly around the earth to make

130
00:05:41,010 --> 00:05:39,310
sure we get health and so when the

131
00:05:44,430 --> 00:05:41,020
primary station starts commanding they

132
00:05:49,720 --> 00:05:48,070
thank you there so you know another part

133
00:05:51,910 --> 00:05:49,730
of the Alana project is has been a

134
00:05:54,430 --> 00:05:51,920
continuing challenge for students to fly

135
00:05:57,160 --> 00:05:54,440
spacecraft of this type and in the past

136
00:05:59,020 --> 00:05:57,170
that the keeps s had been built by many

137
00:06:01,060 --> 00:05:59,030
universities across America and they've

138
00:06:02,440 --> 00:06:01,070

been sitting on the shelf the Alana

139
00:06:05,040 --> 00:06:02,450
program has now given two cubes

140
00:06:07,240 --> 00:06:05,050
opportunities a continual basis to fly

141
00:06:09,040 --> 00:06:07,250
right now this is a lot of three

142
00:06:10,810 --> 00:06:09,050
currently a lot of four five and six

143
00:06:12,640 --> 00:06:10,820
they're already manifested on button on

144
00:06:16,240 --> 00:06:12,650
the books and we'd be flying those out

145
00:06:18,700 --> 00:06:16,250
through twenty twelve and thirteen so

146
00:06:21,130 --> 00:06:18,710
when we wended engines light up on

147
00:06:23,380 --> 00:06:21,140
friday morning hundreds of students

148
00:06:25,210 --> 00:06:23,390
across America be ready sitting at

149
00:06:27,220 --> 00:06:25,220
ground stations all across around the

150
00:06:30,210 --> 00:06:27,230
world waiting for the first indication

151
00:06:32,980 --> 00:06:30,220
of separation and the first data and

152
00:06:35,980 --> 00:06:32,990
being able to get the signs down for the

153
00:06:37,480 --> 00:06:35,990
different organizations I do want to

154
00:06:39,010 --> 00:06:37,490
make a couple notes here that this is a

155
00:06:41,580 --> 00:06:39,020
very unique mission compared to the

156
00:06:43,660 --> 00:06:41,590
Llano one with we flew last bag marched

157
00:06:45,640 --> 00:06:43,670
we're partnership with the National

158
00:06:48,550 --> 00:06:45,650
Science Foundation on this mission the

159
00:06:50,020 --> 00:06:48,560
Jet Propulsion Laboratory s RI and a

160
00:06:53,140 --> 00:06:50,030
stream are also part of our partners

161
00:06:55,090 --> 00:06:53,150
illness and it's very unique a couple

162
00:06:57,220 --> 00:06:55,100
thank-yous that I like to throw out

163
00:06:58,420 --> 00:06:57,230

there is our LSP management team you

164
00:07:01,120 --> 00:06:58,430
know they've been very supportive and

165
00:07:03,070 --> 00:07:01,130
believed in the Alana project and has

166
00:07:05,350 --> 00:07:03,080
moved forward and also a deep

167
00:07:07,210 --> 00:07:05,360
appreciation to the NPP project for

168
00:07:10,180 --> 00:07:07,220
allowing us to attach a hitch a ride on

169
00:07:13,420 --> 00:07:10,190
their vehicle so thank you Thank You

170
00:07:16,120 --> 00:07:13,430
Garrett and now to roll in coello say

171
00:07:18,970 --> 00:07:16,130
pea pod program lead from the california

172
00:07:21,580 --> 00:07:18,980
polytechnic state university in san luis

173
00:07:24,370 --> 00:07:21,590
obispo rollin thanks George thanks

174
00:07:27,940 --> 00:07:24,380
Garrett so this is my first press

175
00:07:29,560 --> 00:07:27,950
conference it's extremely exciting I'm

176
00:07:33,580 --> 00:07:29,570
probably smiling from here to here right

177
00:07:36,850 --> 00:07:33,590
now this is an amazing opportunity that

178
00:07:39,790 --> 00:07:36,860
nASA has given to us to to to the

179
00:07:41,770 --> 00:07:39,800
students I just want to give a brief

180
00:07:44,620 --> 00:07:41,780
overview of the CubeSat program it

181
00:07:47,460 --> 00:07:44,630
started in nineteen ninety nine so we've

182
00:07:51,310 --> 00:07:47,470
been at this for about 12 years now and

183
00:07:54,390 --> 00:07:51,320
the original goal of the CubeSat program

184
00:07:56,620 --> 00:07:54,400
and the CubeSat standard was to give

185
00:07:59,170 --> 00:07:56,630
students access to space

186
00:08:04,030 --> 00:07:59,180
routine affordable access and prior to

187
00:08:06,820 --> 00:08:04,040
that it really wasn't there and so it

188
00:08:09,070 --> 00:08:06,830

all started with Bob twigs and dr.

189
00:08:11,890 --> 00:08:09,080
Geordie poots woori came up with the

190
00:08:15,910 --> 00:08:11,900
idea concept came believe it or not from

191
00:08:19,180 --> 00:08:15,920
a beanie baby box they had the size of

192
00:08:22,240 --> 00:08:19,190
the box and actually this is a satellite

193
00:08:24,940 --> 00:08:22,250
this is a CubeSat it's a one you when

194
00:08:26,770 --> 00:08:24,950
was the last time have you ever had a

195
00:08:31,690 --> 00:08:26,780
real satellite at a press conference

196
00:08:33,610 --> 00:08:31,700
before real scale so they figured out

197
00:08:35,770 --> 00:08:33,620
that they could get about one watt

198
00:08:38,440 --> 00:08:35,780
on-orbit average power with the one you

199
00:08:41,500 --> 00:08:38,450
cots components you can get them off

200
00:08:44,050 --> 00:08:41,510
line something very easy and simple that

201
00:08:49,180 --> 00:08:44,060
students can go ahead and build these

202
00:08:51,490 --> 00:08:49,190
satellites so currently we have over 150

203
00:08:54,700 --> 00:08:51,500
CubeSat developers worldwide it's truly

204
00:08:56,470 --> 00:08:54,710
global and so we are working with

205
00:08:59,200 --> 00:08:56,480
international partners to launch their

206
00:09:01,360 --> 00:08:59,210
satellites and here in the US it's

207
00:09:05,970 --> 00:09:01,370
really Ben Garratt you know in his group

208
00:09:09,460 --> 00:09:05,980
here launching us universities so these

209
00:09:11,980 --> 00:09:09,470
cube SATs get integrated into the poly

210
00:09:15,880 --> 00:09:11,990
Pico satellite orbital deployer or or

211
00:09:19,150 --> 00:09:15,890
pea pod built by Cal Poly which is this

212
00:09:22,180 --> 00:09:19,160
you can see here this is full-scale this

213
00:09:25,240 --> 00:09:22,190

mounts to the V struts on the Delta two

214
00:09:27,220 --> 00:09:25,250
upper stage I will be showing you guys a

215
00:09:29,800 --> 00:09:27,230
video of CubeSat integration actually at

216
00:09:31,600 --> 00:09:29,810
Cal Poly in a little bit but this pea

217
00:09:33,250 --> 00:09:31,610
pod was developed to protect the launch

218
00:09:36,970 --> 00:09:33,260
vehicle on the primary payload I mean

219
00:09:38,860 --> 00:09:36,980
that was the big intent deploying cube

220
00:09:40,990 --> 00:09:38,870
SATs and getting them into space was

221
00:09:43,570 --> 00:09:41,000
secondary but really we had to show the

222
00:09:44,800 --> 00:09:43,580
US launch community that we put the

223
00:09:47,650 --> 00:09:44,810
launch vehicle on the primary payload

224
00:09:51,280 --> 00:09:47,660
first to reduce as much risk as possible

225
00:09:54,130 --> 00:09:51,290
and so one of the interesting stories

226
00:09:56,460 --> 00:09:54,140
about the sizing of the peapod actually

227
00:09:59,590 --> 00:09:56,470
came from a delta to launch vehicle

228
00:10:01,330 --> 00:09:59,600
there was about 99 2000 we are

229
00:10:03,040 --> 00:10:01,340
developing the peapod and we actually

230
00:10:05,950 --> 00:10:03,050
went out and looked at all of the launch

231
00:10:07,840 --> 00:10:05,960
vehicle accommodations out there delta 2

232
00:10:09,940 --> 00:10:07,850
was one of the only ones that actually

233
00:10:13,270 --> 00:10:09,950
had a secondary payload accommodate

234
00:10:15,790 --> 00:10:13,280
in their users guide so you can actually

235
00:10:18,970 --> 00:10:15,800
fit three of these cube sets into the

236
00:10:22,120 --> 00:10:18,980
peapod and the length of this pea pod is

237
00:10:24,250 --> 00:10:22,130
actually about the length of the Delta

238
00:10:28,030 --> 00:10:24,260

two secondary payload accommodations and

239
00:10:31,960 --> 00:10:28,040
so that's where the form factor came

240
00:10:35,380 --> 00:10:31,970
about and so over the years over the

241
00:10:39,240 --> 00:10:35,390
last 12 years Ilana three is our tenth

242
00:10:42,880 --> 00:10:39,250
launch it's exciting for us at Cal Poly

243
00:10:45,730 --> 00:10:42,890
because we finally made it to to you

244
00:10:48,130 --> 00:10:45,740
know to the Delta two and two prominent

245
00:10:50,140 --> 00:10:48,140
US launch vehicles this is a huge step

246
00:10:53,850 --> 00:10:50,150
we originally started out with the

247
00:10:56,680 --> 00:10:53,860
Russians we had three launches with them

248
00:10:58,780 --> 00:10:56,690
first and then we started working

249
00:11:03,370 --> 00:10:58,790
towards getting the pea pods and cube

250
00:11:07,080 --> 00:11:03,380
sets on us launch vehicles and so we've

251
00:11:10,480 --> 00:11:07,090
kind of come full circle in terms of

252
00:11:12,490 --> 00:11:10,490
starting off as a student project going

253
00:11:14,140 --> 00:11:12,500
with the Russians and now we're

254
00:11:17,980 --> 00:11:14,150
launching it in our own backyard it's

255
00:11:19,450 --> 00:11:17,990
absolutely amazing and so one of the

256
00:11:22,590 --> 00:11:19,460
things I just wanted to tell you guys

257
00:11:28,720 --> 00:11:22,600
some a brief story of how i met Garrett

258
00:11:30,640 --> 00:11:28,730
I was about 21 years old went to the

259
00:11:33,820 --> 00:11:30,650
small payloads rideshare conference

260
00:11:36,970 --> 00:11:33,830
about six or seven years ago and I

261
00:11:39,850 --> 00:11:36,980
pretty much knew nothing our advisor

262
00:11:42,700 --> 00:11:39,860
Jordi puts woori said go to Denver go to

263
00:11:45,490 --> 00:11:42,710

the conference have fun but get us

264
00:11:47,320 --> 00:11:45,500
launches on us vehicles it was a pretty

265
00:11:51,340 --> 00:11:47,330
daunting task I had no idea what I was

266
00:11:54,070 --> 00:11:51,350
getting myself into and so actually

267
00:11:56,470 --> 00:11:54,080
talking to people at the conference a

268
00:11:58,930 --> 00:11:56,480
bunch of people said you see that

269
00:12:03,340 --> 00:11:58,940
gentleman over there his name's Big

270
00:12:06,540 --> 00:12:03,350
Daddy you have to talk to him and he's a

271
00:12:11,470 --> 00:12:06,550
NASA mission manager and you know I was

272
00:12:13,300 --> 00:12:11,480
scared to death to approach him but I

273
00:12:17,110 --> 00:12:13,310
started talking with them and we had an

274
00:12:20,580 --> 00:12:17,120
amazing conversation at the workshop he

275
00:12:27,700 --> 00:12:23,440
continued with the launches get flight

276
00:12:31,510 --> 00:12:27,710
heritage but be patient it will come one

277
00:12:34,000 --> 00:12:31,520
day and that was 67 years ago and you

278
00:12:36,880 --> 00:12:34,010
know six seven years you know till now

279
00:12:39,910 --> 00:12:36,890
it's an amazing experience we're finally

280
00:12:41,740 --> 00:12:39,920
here we have something sustainable and

281
00:12:44,470 --> 00:12:41,750
Garrett the biggest heart in the world

282
00:12:49,030 --> 00:12:44,480
you know he kept his promise and you

283
00:12:52,120 --> 00:12:49,040
know and here we are today also to the

284
00:12:55,720 --> 00:12:52,130
tremendous impact the Alana program has

285
00:12:57,700 --> 00:12:55,730
had on the CubeSat community and the

286
00:13:01,180 --> 00:12:57,710
students at Cal Poly is absolutely

287
00:13:05,500 --> 00:13:01,190
tremendous I think one of the one of the

288
00:13:06,910 --> 00:13:05,510

big things that may be lacking in some

289
00:13:08,620 --> 00:13:06,920
of the education that we get in the

290
00:13:11,200 --> 00:13:08,630
classroom is we don't get this real

291
00:13:13,060 --> 00:13:11,210
world experience we don't get real

292
00:13:16,660 --> 00:13:13,070
engineering problems we have to solve

293
00:13:19,780 --> 00:13:16,670
and so if you fail a test you get an F

294
00:13:22,060 --> 00:13:19,790
if you fail problems or if you can't

295
00:13:24,730 --> 00:13:22,070
resolve issues you don't go on the

296
00:13:29,140 --> 00:13:24,740
mission mission is over and the impact

297
00:13:31,300 --> 00:13:29,150
is much widespread and so the ability to

298
00:13:34,090 --> 00:13:31,310
work with NASA and for the students to

299
00:13:35,590 --> 00:13:34,100
understand systems engineering to work

300
00:13:37,450 --> 00:13:35,600
with multiple disciplines with

301
00:13:40,630 --> 00:13:37,460
Mechanical Engineers electrical

302
00:13:44,440 --> 00:13:40,640
engineers computer science physicists is

303
00:13:47,440 --> 00:13:44,450
a tremendous opportunity and it's very

304
00:13:49,690 --> 00:13:47,450
difficult to find that you know to find

305
00:13:51,370 --> 00:13:49,700
that in the classroom and so that's what

306
00:13:54,250 --> 00:13:51,380
the cube set program gives and that's

307
00:13:56,890 --> 00:13:54,260
what NASA is allowing us to do is to

308
00:14:00,070 --> 00:13:56,900
really have all of these students come

309
00:14:04,690 --> 00:14:00,080
together build a real spacecraft get it

310
00:14:06,790 --> 00:14:04,700
launched and and operated on orbit so

311
00:14:09,490 --> 00:14:06,800
some of the students you know at Cal

312
00:14:11,920 --> 00:14:09,500
Poly tremendous opportunities for them

313
00:14:14,620 --> 00:14:11,930

because those students get to work with

314
00:14:16,600 --> 00:14:14,630
Garrett and his team on a daily basis

315
00:14:18,880 --> 00:14:16,610
you know we understand what requirements

316
00:14:21,760 --> 00:14:18,890
are we understand what verifications are

317
00:14:24,670 --> 00:14:21,770
and so when they graduate they move

318
00:14:27,220 --> 00:14:24,680
directly into their job knowing full

319
00:14:31,690 --> 00:14:27,230
well what you know what they need to do

320
00:14:32,650 --> 00:14:31,700
and finally just want to thank everybody

321
00:14:36,189 --> 00:14:32,660
than that

322
00:14:40,800 --> 00:14:36,199
set NASA headquarters Jason and an NASA

323
00:14:44,350 --> 00:14:40,810
LSP from James Wood to Amanda to Garrett

324
00:14:46,990 --> 00:14:44,360
and to Bill and Larry it's been a

325
00:14:48,970 --> 00:14:47,000
tremendous opportunity to you know to

326
00:14:53,769 --> 00:14:48,980
work with everybody and just want to

327
00:14:55,960 --> 00:14:53,779
thank everybody for working through some

328
00:14:58,420 --> 00:14:55,970
of the issues that we've had you know

329
00:15:01,030 --> 00:14:58,430
through these 2 Alana missions never

330
00:15:03,579 --> 00:15:01,040
giving up on us always saying there is

331
00:15:06,879 --> 00:15:03,589
an answer there is a solution we just

332
00:15:10,540 --> 00:15:06,889
need to go work it and that is amazing

333
00:15:13,119 --> 00:15:10,550
so thank you thank you rollin and now we

334
00:15:14,499 --> 00:15:13,129
have a feature coming up for you all

335
00:15:15,790 --> 00:15:14,509
we're going to let Garrett tell us a

336
00:15:19,780 --> 00:15:15,800
little bit about what we're going to see

337
00:15:21,249 --> 00:15:19,790
in a moment yeah okay some of the

338
00:15:22,749 --> 00:15:21,259

research directors and principal

339
00:15:26,369 --> 00:15:22,759
investigators from Yolanda 3 mission

340
00:15:29,679 --> 00:15:26,379
took a lil bit of time out this week and

341
00:15:31,449 --> 00:15:29,689
put together a video describing a little

342
00:15:32,860 --> 00:15:31,459
bit about their to keep sets and some of

343
00:15:34,629 --> 00:15:32,870
the science and what they're doing at

344
00:15:37,300 --> 00:15:34,639
the home universities and so we just

345
00:15:40,329 --> 00:15:37,310
want to show that video now keeps it is

346
00:15:42,730 --> 00:15:40,339
a radio our Explorer it's a grant of

347
00:15:44,769 --> 00:15:42,740
space by City greater experiments so our

348
00:15:47,170 --> 00:15:44,779
mission is unique because we get to use

349
00:15:49,410 --> 00:15:47,180
very narrow beam very strong radars that

350
00:15:51,730 --> 00:15:49,420
gives us very high resolution

351
00:15:55,120 --> 00:15:51,740
measurements of disturbance in altitude

352
00:15:57,550 --> 00:15:55,130
and at the same time it as a spacecraft

353
00:16:01,090 --> 00:15:57,560
flies over the experimental zone we get

354
00:16:02,650 --> 00:16:01,100
there are different views of the the

355
00:16:05,559 --> 00:16:02,660
turbulence with respect to the magnetic

356
00:16:08,110 --> 00:16:05,569
field lines we have two websites wanted

357
00:16:10,360 --> 00:16:08,120
sra international and one at University

358
00:16:12,240 --> 00:16:10,370
of Michigan the SR I site provides

359
00:16:15,189 --> 00:16:12,250
information about the science operations

360
00:16:17,769 --> 00:16:15,199
ground-based radar Operations and also

361
00:16:20,079 --> 00:16:17,779
presents data that are immediately after

362
00:16:21,549 --> 00:16:20,089
the experiment the Michigan website

363
00:16:23,620 --> 00:16:21,559

provides information on the spacecraft

364
00:16:25,900 --> 00:16:23,630
status spacecraft health status

365
00:16:29,590 --> 00:16:25,910
operations and also planned experiments

366
00:16:31,780 --> 00:16:29,600
as well keep sets are unique in bringing

367
00:16:36,549 --> 00:16:31,790
together students of different academic

368
00:16:39,579 --> 00:16:36,559
background engineering physics power

369
00:16:41,410 --> 00:16:39,589
system communication folks who wouldn't

370
00:16:43,299 --> 00:16:41,420
normally be seen in the same room

371
00:16:45,670 --> 00:16:43,309
together or having to pool their

372
00:16:47,440 --> 00:16:45,680
energies to carry out a CubeSat mission

373
00:16:50,530 --> 00:16:47,450
and because they're doing that the

374
00:16:52,450 --> 00:16:50,540
students can then go forward and claim

375
00:16:54,370 --> 00:16:52,460
to their respective employers that they

376
00:16:58,060 --> 00:16:54,380
have a lot of interdisciplinary

377
00:17:00,250 --> 00:16:58,070
information in particular this racks to

378
00:17:03,460 --> 00:17:00,260
CubeSat is supported by the national

379
00:17:06,220 --> 00:17:03,470
science foundation and the data from it

380
00:17:09,250 --> 00:17:06,230
will be available to students decades

381
00:17:11,260 --> 00:17:09,260
from now this is an exciting time for

382
00:17:14,410 --> 00:17:11,270
all of us keeps hats are flying on a

383
00:17:16,840 --> 00:17:14,420
yearly basis and at our research

384
00:17:19,840 --> 00:17:16,850
institution we're working on a variety

385
00:17:21,549 --> 00:17:19,850
of remote sensing instruments and

386
00:17:23,410 --> 00:17:21,559
payloads that can go in future cube sets

387
00:17:28,000 --> 00:17:23,420
and we look forward to the day when

388
00:17:30,070 --> 00:17:28,010

there's not one or two going up per year

389
00:17:38,659 --> 00:17:30,080
for research purposes but there's maybe

390
00:17:44,039 --> 00:17:41,159
the name of our CubeSat is dynamic

391
00:17:46,620 --> 00:17:44,049
ionosphere CubeSat experiment or dice

392
00:17:48,120 --> 00:17:46,630
for short what dice is going to do is

393
00:17:51,200 --> 00:17:48,130
it's going to look at storms in the

394
00:17:53,400 --> 00:17:51,210
ionosphere that occur periodically

395
00:17:54,870 --> 00:17:53,410
especially over the United States so

396
00:17:56,760 --> 00:17:54,880
this is especially interesting because

397
00:18:00,030 --> 00:17:56,770
it's a u.s. experiment looking at a

398
00:18:04,220 --> 00:18:00,040
uniquely u.s. phenomenon and these

399
00:18:07,260 --> 00:18:04,230
storms occur and they can disrupt

400
00:18:08,970 --> 00:18:07,270
systems like GPS navigation systems

401
00:18:11,789 --> 00:18:08,980
communication systems and surveillance

402
00:18:14,190 --> 00:18:11,799
systems and the atmosphere affects radio

403
00:18:15,600 --> 00:18:14,200
communications at all frequencies and so

404
00:18:17,159 --> 00:18:15,610
it's very important that we understand

405
00:18:19,320 --> 00:18:17,169
what's going on in the atmosphere there

406
00:18:21,870 --> 00:18:19,330
were 23 students involved over two years

407
00:18:23,669 --> 00:18:21,880
at Utah State University and they mostly

408
00:18:26,010 --> 00:18:23,679
worked at the space dynamics lab which

409
00:18:27,480 --> 00:18:26,020
is the engineering spacecraft

410
00:18:30,150 --> 00:18:27,490
engineering part of utah state

411
00:18:32,940 --> 00:18:30,160
university and they were involved in

412
00:18:34,650 --> 00:18:32,950
building the instruments building the

413
00:18:37,049 --> 00:18:34,660

satellite they also helped him the

414
00:18:39,720 --> 00:18:37,059
design so they did mathematical studies

415
00:18:42,750 --> 00:18:39,730
of the heat transfer within the

416
00:18:44,130 --> 00:18:42,760
satellite the operation of various

417
00:18:46,440 --> 00:18:44,140
components and they helped to design

418
00:18:47,700 --> 00:18:46,450
some of the mechanical components so

419
00:18:50,070 --> 00:18:47,710
they were very involved in the design

420
00:18:51,360 --> 00:18:50,080
and the building of the satellite well

421
00:18:53,280 --> 00:18:51,370
the National Science Foundation

422
00:18:56,250 --> 00:18:53,290
initiated the project and they provided

423
00:18:58,710 --> 00:18:56,260
1.2 million dollars of funding but in

424
00:19:02,330 --> 00:18:58,720
addition there's been support from NASA

425
00:19:05,220 --> 00:19:02,340
through the Wallops Island ground-based

426
00:19:06,870 --> 00:19:05,230
tracking station and the Alana program

427
00:19:08,880 --> 00:19:06,880
to which we're very grateful for that

428
00:19:10,860 --> 00:19:08,890
help and the alarm program actually made

429
00:19:13,200 --> 00:19:10,870
it possible to launch the satellites the

430
00:19:15,360 --> 00:19:13,210
public can be involved by looking at the

431
00:19:18,750 --> 00:19:15,370
Astra website there's information there

432
00:19:20,159 --> 00:19:18,760
about the dice CubeSat program and there

433
00:19:24,960 --> 00:19:20,169
will be data shown once it becomes

434
00:19:27,810 --> 00:19:24,970
available and they can go to ww Astra

435
00:19:29,970 --> 00:19:27,820
space net and we also have phone apps

436
00:19:31,409 --> 00:19:29,980
that are developed by Astra and we'll be

437
00:19:41,080 --> 00:19:31,419
putting some of the data and some of the

438
00:19:47,989 --> 00:19:45,009

name of our cube set is all be set one

439
00:19:52,269 --> 00:19:47,999
it's named after a mascot at the

440
00:19:56,419 --> 00:19:52,279
University I'll be and it's going to

441
00:19:58,789 --> 00:19:56,429
mostly look at two encapsulants we put

442
00:20:00,739 --> 00:19:58,799
on solar panels and see how well they

443
00:20:03,919 --> 00:20:00,749
protect the solar panels from the harsh

444
00:20:05,749 --> 00:20:03,929
environment of space I think what makes

445
00:20:08,359 --> 00:20:05,759
it unique is how many undergraduate

446
00:20:11,899 --> 00:20:08,369
students have worked on it we over the

447
00:20:15,229 --> 00:20:11,909
years we've had over a hundred probably

448
00:20:17,690 --> 00:20:15,239
200 undergraduate students working at no

449
00:20:20,499 --> 00:20:17,700
grad students know professors directly

450
00:20:25,519 --> 00:20:20,509
involved it's a complete undergraduate

451
00:20:28,479 --> 00:20:25,529
effort the end result is that well

452
00:20:31,849 --> 00:20:28,489
hundreds of students went through a

453
00:20:34,909 --> 00:20:31,859
project which is NASA funded and which

454
00:20:37,879 --> 00:20:34,919
is also NASA inspired and they have

455
00:20:40,580 --> 00:20:37,889
learned our number of skills which I

456
00:20:44,720 --> 00:20:40,590
couldn't develop in a classroom these

457
00:20:46,609 --> 00:20:44,730
are skills of communication of learning

458
00:20:49,700 --> 00:20:46,619
management learning systems engineering

459
00:20:52,129 --> 00:20:49,710
and not book learning if you want but it

460
00:20:54,259 --> 00:20:52,139
really is learning by doing we have

461
00:20:57,289 --> 00:20:54,269
approached the international amateur

462
00:20:59,299 --> 00:20:57,299
radio community and told them about our

463
00:21:01,609 --> 00:20:59,309

satellite we have to just give them now

464
00:21:04,399 --> 00:21:01,619
the Clarion elements so they know where

465
00:21:06,259 --> 00:21:04,409
to look for it and when and they know

466
00:21:09,080 --> 00:21:06,269
the kind of messages that's supposed to

467
00:21:10,609 --> 00:21:09,090
hear and then what they do is they email

468
00:21:12,950 --> 00:21:10,619
them to us and tell us what they heard

469
00:21:14,690 --> 00:21:12,960
and where they were located etc so we're

470
00:21:17,359 --> 00:21:14,700
going to hopefully get the news from our

471
00:21:19,460 --> 00:21:17,369
satellites from all over the world the

472
00:21:24,549 --> 00:21:19,470
public can participate by logging on to

473
00:21:26,779 --> 00:21:24,559
our website space dot a burn dot edu and

474
00:21:29,899 --> 00:21:26,789
they're going to get find the

475
00:21:32,149 --> 00:21:29,909
instructions on how to download the data

476
00:21:41,420 --> 00:21:32,159
and also where the satellite will be and

477
00:21:46,200 --> 00:21:44,430
the name of our CubeSat is M cubed it

478
00:21:48,420 --> 00:21:46,210
stands for Michigan multi-purpose mini

479
00:21:50,580 --> 00:21:48,430
SAT and the cubesat is developed by the

480
00:21:51,810 --> 00:21:50,590
University of Michigan it has a camera

481
00:21:53,910 --> 00:21:51,820
on board that will take medium

482
00:21:55,830 --> 00:21:53,920
resolution images of the earth and then

483
00:21:58,760 --> 00:21:55,840
there's a secondary payload on this cube

484
00:22:01,200 --> 00:21:58,770
set that was developed by NASA JPL and

485
00:22:03,030 --> 00:22:01,210
that payload will do some image

486
00:22:04,800 --> 00:22:03,040
processing well what's unique about this

487
00:22:07,830 --> 00:22:04,810
mission is I think the collaboration

488
00:22:11,820 --> 00:22:07,840

that was established between Michigan

489
00:22:15,230 --> 00:22:11,830
and JPL to develop a secondary payload

490
00:22:17,340 --> 00:22:15,240
and roughly a year ago we started this

491
00:22:20,250 --> 00:22:17,350
effort through funding from their

492
00:22:21,990 --> 00:22:20,260
science technology office and through

493
00:22:23,790 --> 00:22:22,000
the collaboration we will be validating

494
00:22:26,070 --> 00:22:23,800
hardware and a software algorithm for a

495
00:22:29,190 --> 00:22:26,080
future instrument that is being

496
00:22:31,380 --> 00:22:29,200
developed by NASA for in support of the

497
00:22:34,020 --> 00:22:31,390
decatur survey mission over the course

498
00:22:36,450 --> 00:22:34,030
of the entire project there are roughly

499
00:22:38,940 --> 00:22:36,460
50 students involved at the University

500
00:22:41,370 --> 00:22:38,950
in this last year of concentrated effort

501
00:22:44,190 --> 00:22:41,380
with NASA JPL the core team was about

502
00:22:45,930 --> 00:22:44,200
ten students and we had roughly six

503
00:22:48,060 --> 00:22:45,940
part-time professionals at JPL also

504
00:22:49,830 --> 00:22:48,070
supporting the payload development they

505
00:22:53,130 --> 00:22:49,840
did all the hands-on work development

506
00:22:55,550 --> 00:22:53,140
for this keep set they did machining for

507
00:22:58,500 --> 00:22:55,560
the structure they developed the

508
00:23:00,600 --> 00:22:58,510
subsystems built their own hardware I

509
00:23:01,890 --> 00:23:00,610
think the experience of developing these

510
00:23:06,240 --> 00:23:01,900
keep sets that the universe is very

511
00:23:07,890 --> 00:23:06,250
important we really look for that direct

512
00:23:09,660 --> 00:23:07,900
experience in our early career hire

513
00:23:12,360 --> 00:23:09,670

program at JPL it's been very

514
00:23:13,620 --> 00:23:12,370
interesting to see these students coming

515
00:23:15,660 --> 00:23:13,630
through the programs with their hands on

516
00:23:17,610 --> 00:23:15,670
experience the public can participate in

517
00:23:19,950 --> 00:23:17,620
this mission through the amateur

518
00:23:22,050 --> 00:23:19,960
satellite community where the ham radio

519
00:23:25,110 --> 00:23:22,060
frequencies for M cubed will be made

520
00:23:27,870 --> 00:23:25,120
known and they can track the data as

521
00:23:31,020 --> 00:23:27,880
well as at the university website um q

522
00:23:41,190 --> 00:23:31,030
org we will have results of the mission

523
00:23:47,289 --> 00:23:44,260
our satellite is called Explorer 1 Prime

524
00:23:51,310 --> 00:23:47,299
it's named after the United States's

525
00:23:53,590 --> 00:23:51,320
first satellite explorer one that

526
00:23:57,669 --> 00:23:53,600
discovered the fenelon radiation belts

527
00:24:01,330 --> 00:23:57,679
in 1958 our satellite is carrying one of

528
00:24:03,909 --> 00:24:01,340
Van Allen's Geiger counters that was

529
00:24:07,180 --> 00:24:03,919
used to discover radiation around the

530
00:24:08,620 --> 00:24:07,190
planets and it was donated to us by dr.

531
00:24:13,690 --> 00:24:08,630
Van Allen before he passed away about

532
00:24:16,720 --> 00:24:13,700
five years ago our students began

533
00:24:18,880 --> 00:24:16,730
working on explorer 1 prime in 2006 and

534
00:24:20,289 --> 00:24:18,890
we've had about a hundred and

535
00:24:22,169 --> 00:24:20,299
twenty-five students involved in the

536
00:24:24,669 --> 00:24:22,179
program during these five years

537
00:24:27,039 --> 00:24:24,679
oftentimes students only have the

538
00:24:30,010 --> 00:24:27,049

opportunity to do a design or a concept

539
00:24:31,720 --> 00:24:30,020
study and it's my experience that what

540
00:24:34,060 --> 00:24:31,730
really makes the difference is when the

541
00:24:36,460 --> 00:24:34,070
students are allowed to actually build

542
00:24:38,919 --> 00:24:36,470
their designs test them and discover

543
00:24:40,779 --> 00:24:38,929
that they don't really work and then

544
00:24:43,659 --> 00:24:40,789
they have to go back and do a redesign

545
00:24:46,779 --> 00:24:43,669
and then retest and this whole process

546
00:24:50,230 --> 00:24:46,789
of qualifying a satellite no matter what

547
00:24:52,299 --> 00:24:50,240
its size is for spaceflight is where the

548
00:24:55,720 --> 00:24:52,309
rubber really meets the road in terms of

549
00:24:58,029 --> 00:24:55,730
the learning process we hope that our

550
00:24:59,590 --> 00:24:58,039
satellite will keep on ticking for about

551
00:25:02,049 --> 00:24:59,600
four months which would equal the

552
00:25:04,630 --> 00:25:02,059
lifetime of the Explorer run original

553
00:25:07,149 --> 00:25:04,640
explore one satellite we're currently

554
00:25:10,200 --> 00:25:07,159
building two other satellite programs

555
00:25:12,880 --> 00:25:10,210
one for National Science Foundation a

556
00:25:15,340 --> 00:25:12,890
scientific experiment to study radiation

557
00:25:17,980 --> 00:25:15,350
belts and a second one under the

558
00:25:21,430 --> 00:25:17,990
university nano set program for the Air

559
00:25:23,380 --> 00:25:21,440
Force Research Laboratories we believe

560
00:25:27,279 --> 00:25:23,390
that the real utility these very

561
00:25:30,610 --> 00:25:27,289
diminutive satellites is in the ability

562
00:25:33,519 --> 00:25:30,620
to launch large constellations dozens of

563
00:25:35,409 --> 00:25:33,529

satellites working together in this very

564
00:25:37,299 --> 00:25:35,419
small form factor to do things that

565
00:25:51,820 --> 00:25:37,309
we've never been able to do in space in

566
00:25:56,210 --> 00:25:54,889
alright read it out to take questions so

567
00:25:58,190 --> 00:25:56,220
please give your name and affiliation

568
00:26:01,450 --> 00:25:58,200
again when the mic comes to you and

569
00:26:04,220 --> 00:26:01,460
we'll start right over here with Nora I

570
00:26:05,989 --> 00:26:04,230
Nora Wallace Santa Barbara news-press do

571
00:26:07,580 --> 00:26:05,999
you have any idea how many students

572
00:26:09,289 --> 00:26:07,590
might be coming to the launch and also

573
00:26:12,859 --> 00:26:09,299
can you give us any sense of the

574
00:26:16,879 --> 00:26:12,869
collective cost of the satellites on

575
00:26:18,169 --> 00:26:16,889
this rocket I know that some of the

576
00:26:19,669 --> 00:26:18,179
universities are not able to bring the

577
00:26:21,759 --> 00:26:19,679
students due to the class schedules but

578
00:26:25,310 --> 00:26:21,769
from what I'm hearing there's probably

579
00:26:27,529 --> 00:26:25,320
30 to 50 students as be in the area for

580
00:26:29,539 --> 00:26:27,539
the admission but most of movie watching

581
00:26:32,450 --> 00:26:29,549
it on television on the webcast back in

582
00:26:35,600 --> 00:26:32,460
the university dorms or you know getting

583
00:26:37,100 --> 00:26:35,610
ready for it as to the cost everyone I'm

584
00:26:39,460 --> 00:26:37,110
to la believes a little bit different

585
00:26:41,899 --> 00:26:39,470
they all costs in a different aspect

586
00:26:43,700 --> 00:26:41,909
ones like dice like they indicated was

587
00:26:45,950 --> 00:26:43,710
like 1.2 million for that because it's

588
00:26:47,749 --> 00:26:45,960

doing significant science where you may

589
00:26:49,039 --> 00:26:47,759
have all be sad or what are the other

590
00:26:56,149 --> 00:26:49,049
ones that has this to very smaller

591
00:26:58,279 --> 00:26:56,159
science be a lot less Janine Scully

592
00:26:59,869 --> 00:26:58,289
santa maria times lompoc record what you

593
00:27:02,779 --> 00:26:59,879
mentioned some future missions what

594
00:27:04,359 --> 00:27:02,789
vehicles and will those fly on and do

595
00:27:09,139 --> 00:27:04,369
you know approximately what time frame

596
00:27:12,320 --> 00:27:09,149
yes Ilana six will be flying in July of

597
00:27:13,970 --> 00:27:12,330
2012 we have three P pods which keep

598
00:27:17,060 --> 00:27:13,980
sets on it and we're partnering with the

599
00:27:20,029 --> 00:27:17,070
in a row one of their missions after

600
00:27:23,239 --> 00:27:20,039
that we have us CRS two and three flight

601
00:27:26,720 --> 00:27:23,249
out at Kennedy scheduled for late 12 or

602
00:27:31,609 --> 00:27:26,730
13 and we have four pods on crs two and

603
00:27:35,060 --> 00:27:31,619
five peapods on crs three currently any

604
00:27:37,460 --> 00:27:35,070
other questions Nora

605
00:27:38,810 --> 00:27:37,470
at this point is it is it long enough in

606
00:27:41,749 --> 00:27:38,820
the program that you're starting to see

607
00:27:43,129 --> 00:27:41,759
students come to NASA and JPL and

608
00:27:45,649 --> 00:27:43,139
everywhere else looking for jobs that

609
00:27:49,759 --> 00:27:45,659
have worked on some of these case in

610
00:27:52,180 --> 00:27:49,769
point absolutely and a lot of the

611
00:27:55,249 --> 00:27:52,190
students who graduate are now working

612
00:27:57,940 --> 00:27:55,259
you know for these companies and they're

613
00:28:01,899 --> 00:27:57,950

coming back to us with cubes on ideas

614
00:28:04,310 --> 00:28:01,909
collaboration we see it all the time in

615
00:28:07,879 --> 00:28:04,320
government agencies like NASA also

616
00:28:09,769 --> 00:28:07,889
commercial I would want to say like the

617
00:28:13,490 --> 00:28:09,779
CubeSat mafia is slowly starting to

618
00:28:16,310 --> 00:28:13,500
spread and it's it's amazing to see that

619
00:28:17,990 --> 00:28:16,320
the passion still in them that they want

620
00:28:20,899 --> 00:28:18,000
to come back and you know help support

621
00:28:22,399 --> 00:28:20,909
their university there's actually I

622
00:28:25,909 --> 00:28:22,409
believe one of the students from Cal

623
00:28:27,950 --> 00:28:25,919
Poly that's supporting mpb so I was

624
00:28:31,580 --> 00:28:27,960
talking to them at the hotel the other

625
00:28:33,740 --> 00:28:31,590
evening all right we have no other

626
00:28:36,590 --> 00:28:33,750
questions none from other centers or

627
00:28:39,440 --> 00:28:36,600
online so that is going to conclude this

628
00:28:41,029 --> 00:28:39,450
briefing and our next activity will be

629
00:28:44,379 --> 00:28:41,039
launched coverage which will begin at