
ELaNa XX
EDUCATIONAL LAUNCH OF NANOSATELLITES

1
00:00:12,470 --> 00:00:10,709
[Music]

2
00:00:14,709 --> 00:00:12,480
just under two years ago

3
00:00:16,790 --> 00:00:14,719
nasa ushered in a new era of space

4
00:00:18,550 --> 00:00:16,800
flight providing a dedicated ride to

5
00:00:21,269 --> 00:00:18,560
space for small satellites

6
00:00:22,150 --> 00:00:21,279
small sets also called cubesats

7
00:00:24,470 --> 00:00:22,160
microsats

8
00:00:26,790 --> 00:00:24,480
or nanosatellites that are quickly

9
00:00:28,230 --> 00:00:26,800
becoming a game changer for science and

10
00:00:30,390 --> 00:00:28,240
exploration

11
00:00:31,669 --> 00:00:30,400
nasa is building on this capability with

12
00:00:34,709 --> 00:00:31,679
the launch of 10

13
00:00:35,350 --> 00:00:34,719

more cubesats virgin orbits cosmic girl

14
00:00:37,270 --> 00:00:35,360
aircraft

15
00:00:39,910 --> 00:00:37,280
and launcher one rocket rose to the

16
00:00:40,310 --> 00:00:39,920
challenge a perfect match for a host of

17
00:00:43,350 --> 00:00:40,320
small

18
00:00:44,950 --> 00:00:43,360
satellites with big goals well like

19
00:00:47,670 --> 00:00:44,960
everybody i've long been a

20
00:00:48,869 --> 00:00:47,680
huge fan of nasa ever since i was a very

21
00:00:51,750 --> 00:00:48,879
small child with some

22
00:00:53,270 --> 00:00:51,760
very big ideas and like me they believe

23
00:00:54,950 --> 00:00:53,280
in the power of innovation

24
00:00:56,389 --> 00:00:54,960
constantly pushing the boundaries of

25
00:00:58,229 --> 00:00:56,399
what's possible

26
00:01:00,150 --> 00:00:58,239
their bold adventurous spirit is

27
00:01:01,910 --> 00:01:00,160
inspiring and we couldn't be more

28
00:01:03,270 --> 00:01:01,920
honoured to work by their side for this

29
00:01:05,270 --> 00:01:03,280
mission

30
00:01:06,390 --> 00:01:05,280
the nasa payload about to launch on the

31
00:01:09,910 --> 00:01:06,400
launcher one rocket

32
00:01:12,550 --> 00:01:09,920
is called alana 20. alana stands for

33
00:01:14,149 --> 00:01:12,560
educational launch of nanosatellites

34
00:01:17,190 --> 00:01:14,159
part of nasa's cubesat

35
00:01:20,070 --> 00:01:17,200
launch initiative or csli

36
00:01:21,190 --> 00:01:20,080
through csli 10 cubesats were selected

37
00:01:23,190 --> 00:01:21,200
for this mission

38
00:01:25,270 --> 00:01:23,200

and it's the first payload complement

39
00:01:27,670 --> 00:01:25,280
ever carried by launcher one

40
00:01:28,390 --> 00:01:27,680
one of two venture-class vehicles nasa

41
00:01:31,670 --> 00:01:28,400
chose to get

42
00:01:32,630 --> 00:01:31,680
cubesats and cubesats alone a ride to

43
00:01:35,109 --> 00:01:32,640
space

44
00:01:36,149 --> 00:01:35,119
the cubesat launch initiative or csli

45
00:01:38,950 --> 00:01:36,159
provides free

46
00:01:40,789 --> 00:01:38,960
or reduced cost launches for eligible

47
00:01:42,469 --> 00:01:40,799
and worthy cubesats developed by

48
00:01:45,749 --> 00:01:42,479
academic institutions

49
00:01:47,270 --> 00:01:45,759
nonprofit organizations and nasa centers

50
00:01:49,510 --> 00:01:47,280
the launch services program at the

51
00:01:50,149 --> 00:01:49,520
kennedy space center is responsible for

52
00:01:53,429 --> 00:01:50,159
launching

53
00:01:56,389 --> 00:01:53,439
csli selected cubesats in the space we

54
00:01:58,149 --> 00:01:56,399
match satellites with rockets the group

55
00:01:58,870 --> 00:01:58,159
of satellites that we fly on a given

56
00:02:01,510 --> 00:01:58,880
rocket

57
00:02:03,270 --> 00:02:01,520
is called an alana mission which stands

58
00:02:04,550 --> 00:02:03,280
for educational launch of nano

59
00:02:06,550 --> 00:02:04,560
satellites

60
00:02:07,749 --> 00:02:06,560
the cubesats launched aboard the virgin

61
00:02:11,750 --> 00:02:07,759
orbit launcher one

62
00:02:13,910 --> 00:02:11,760
we're all part of the alana 20 mission

63
00:02:16,150 --> 00:02:13,920

rockets dedicated to small satellites

64
00:02:18,390 --> 00:02:16,160
mean expanded access to space

65
00:02:20,949 --> 00:02:18,400
and orbital deployments tailor-made to

66
00:02:22,869 --> 00:02:20,959
each cubesat's science goals

67
00:02:24,869 --> 00:02:22,879
most of these cubesats can be compared

68
00:02:27,910 --> 00:02:24,879
to the size of a loaf of bread

69
00:02:30,070 --> 00:02:27,920
but some were even smaller about the

70
00:02:32,390 --> 00:02:30,080
size of a softball

71
00:02:34,550 --> 00:02:32,400
sponsored by nasa they were developed by

72
00:02:38,309 --> 00:02:34,560
universities across the nation

73
00:02:39,350 --> 00:02:38,319
as well as one nasa center cactus one

74
00:02:41,750 --> 00:02:39,360
was developed by

75
00:02:42,710 --> 00:02:41,760
capital technology university in laurel

76
00:02:45,110 --> 00:02:42,720
maryland

77
00:02:46,070 --> 00:02:45,120
built entirely by undergraduate students

78
00:02:48,229 --> 00:02:46,080
it's a tabbed

79
00:02:50,710 --> 00:02:48,239
3u cubesat with two technology

80
00:02:53,350 --> 00:02:50,720
demonstrations on board the first

81
00:02:55,509 --> 00:02:53,360
trapsat uses aerogel to capture and

82
00:02:56,630 --> 00:02:55,519
profile space debris in low earth orbit

83
00:02:59,509 --> 00:02:56,640
for cleanup

84
00:03:01,350 --> 00:02:59,519
the other hermes aims to send commands

85
00:03:03,990 --> 00:03:01,360
and communication to the satellite

86
00:03:04,470 --> 00:03:04,000
via the internet providing a cost saving

87
00:03:06,550 --> 00:03:04,480
system

88
00:03:08,309 --> 00:03:06,560

for gathering scientific data if you

89
00:03:10,070 --> 00:03:08,319
were to do a coolness bingo

90
00:03:11,670 --> 00:03:10,080
we pretty much tick off all the boxes

91
00:03:13,990 --> 00:03:11,680
because we're doing

92
00:03:15,110 --> 00:03:14,000
orbital debris using aerogel with a

93
00:03:17,350 --> 00:03:15,120
raspberry pi

94
00:03:18,949 --> 00:03:17,360
programmed in python that we released as

95
00:03:21,030 --> 00:03:18,959
open source

96
00:03:22,470 --> 00:03:21,040
able to send text to and from the

97
00:03:24,309 --> 00:03:22,480
satellite using internet

98
00:03:26,550 --> 00:03:24,319
student conceived for under thirty

99
00:03:27,430 --> 00:03:26,560
thousand dollars using the new cubesat

100
00:03:29,670 --> 00:03:27,440
tab

101
00:03:31,430 --> 00:03:29,680
uh format instead of rails so i think

102
00:03:33,110 --> 00:03:31,440
that's like a double cross and bingo

103
00:03:35,670 --> 00:03:33,120
there

104
00:03:36,309 --> 00:03:35,680
passive inspection cubesats or picks for

105
00:03:38,630 --> 00:03:36,319
short

106
00:03:39,830 --> 00:03:38,640
are twin satellites developed by brigham

107
00:03:42,949 --> 00:03:39,840
young university in

108
00:03:44,869 --> 00:03:42,959
provo utah each one has tiny cameras on

109
00:03:45,509 --> 00:03:44,879
all sides to capture imagery of each

110
00:03:48,470 --> 00:03:45,519
other

111
00:03:49,750 --> 00:03:48,480
as well as launcher one in action so we

112
00:03:52,789 --> 00:03:49,760
had the idea to use

113
00:03:55,910 --> 00:03:52,799

a cubesat that is inert

114
00:03:56,869 --> 00:03:55,920
has no capability to maneuver itself but

115
00:04:00,070 --> 00:03:56,879
has cameras

116
00:04:00,949 --> 00:04:00,080
on all sides like a vr camera so that it

117
00:04:03,190 --> 00:04:00,959
could

118
00:04:04,070 --> 00:04:03,200
regardless of tumble image the

119
00:04:07,990 --> 00:04:04,080
spacecraft

120
00:04:09,110 --> 00:04:08,000
that deploys it essentially it's like a

121
00:04:13,270 --> 00:04:09,120
selfie camera

122
00:04:15,030 --> 00:04:13,280
for launcher one or any other spacecraft

123
00:04:16,390 --> 00:04:15,040
while many of the satellites flying on

124
00:04:17,590 --> 00:04:16,400
this mission are technology

125
00:04:19,909 --> 00:04:17,600
demonstrations

126
00:04:20,870 --> 00:04:19,919
there are a few focusing strictly on

127
00:04:23,350 --> 00:04:20,880
science

128
00:04:24,150 --> 00:04:23,360
cubase stands for cubesat particle

129
00:04:26,790 --> 00:04:24,160
aggregation

130
00:04:28,870 --> 00:04:26,800
and collision experiment developed by

131
00:04:31,510 --> 00:04:28,880
the university of central florida

132
00:04:32,310 --> 00:04:31,520
in orlando florida cubase will study the

133
00:04:34,469 --> 00:04:32,320
collision of

134
00:04:36,150 --> 00:04:34,479
various sized particles and particle

135
00:04:38,070 --> 00:04:36,160
clusters in space

136
00:04:39,510 --> 00:04:38,080
this three-year experiment will give

137
00:04:41,909 --> 00:04:39,520
insight into a process

138
00:04:43,590 --> 00:04:41,919

researchers hope to study not only

139
00:04:46,629 --> 00:04:43,600
within our own solar system

140
00:04:47,270 --> 00:04:46,639
but around other stars as well satellite

141
00:04:51,430 --> 00:04:47,280
that's

142
00:04:54,390 --> 00:04:51,440
carrying a microgravity experiment that

143
00:04:55,749 --> 00:04:54,400
explores the gentle collisions between

144
00:04:57,430 --> 00:04:55,759
small particles that

145
00:04:58,950 --> 00:04:57,440
are the very first steps of the

146
00:05:00,629 --> 00:04:58,960
formation of planets

147
00:05:03,029 --> 00:05:00,639
we're hoping to better understand the

148
00:05:04,870 --> 00:05:03,039
processes of planet formation

149
00:05:06,310 --> 00:05:04,880
not just in our own solar system but

150
00:05:09,029 --> 00:05:06,320
around other stars

151
00:05:10,629 --> 00:05:09,039
polar cube developed by the university

152
00:05:13,270 --> 00:05:10,639
of colorado at boulder

153
00:05:15,029 --> 00:05:13,280
is another scientific mission this one

154
00:05:16,150 --> 00:05:15,039
is aimed at collecting sea ice

155
00:05:18,310 --> 00:05:16,160
concentration

156
00:05:19,830 --> 00:05:18,320
and atmospheric temperature data for

157
00:05:22,790 --> 00:05:19,840
future scientific studies

158
00:05:23,590 --> 00:05:22,800
and applications and it can actually go

159
00:05:24,469 --> 00:05:23,600
through different layers of the

160
00:05:27,670 --> 00:05:24,479
troposphere

161
00:05:29,350 --> 00:05:27,680
and so we can get a large profile of

162
00:05:31,670 --> 00:05:29,360
the actual temperature through the

163
00:05:32,150 --> 00:05:31,680

atmosphere and get an understanding of

164
00:05:34,230 --> 00:05:32,160
different

165
00:05:36,550 --> 00:05:34,240
weather phenomenon based off of that

166
00:05:38,469 --> 00:05:36,560
some of the cubesats flying on a lana 20

167
00:05:39,430 --> 00:05:38,479
are a continuation in a series of

168
00:05:41,909 --> 00:05:39,440
missions

169
00:05:44,390 --> 00:05:41,919
tech edsat-7 is the seventh in a series

170
00:05:44,870 --> 00:05:44,400
of satellites from nasa's ames research

171
00:05:47,830 --> 00:05:44,880
center

172
00:05:49,909 --> 00:05:47,840
in california's silicon valley the

173
00:05:51,189 --> 00:05:49,919
primary technology demonstration aboard

174
00:05:52,870 --> 00:05:51,199
tech edsat-7

175
00:05:55,110 --> 00:05:52,880
involves commanding the satellite to

176
00:05:58,390 --> 00:05:55,120
quickly re-enter earth's atmosphere

177
00:05:59,590 --> 00:05:58,400
after 60 days in orbit validating a new

178
00:06:00,469 --> 00:05:59,600
braking device

179
00:06:02,950 --> 00:06:00,479
so what's really cool about the

180
00:06:05,189 --> 00:06:02,960
tekkitsat series is that it's not just

181
00:06:06,870 --> 00:06:05,199
one satellite it's progression and it

182
00:06:07,590 --> 00:06:06,880
has two main purposes the primary

183
00:06:10,309 --> 00:06:07,600
experiment

184
00:06:12,230 --> 00:06:10,319
is a deployable drag device known as the

185
00:06:15,749 --> 00:06:12,240
exo break for targeted re-entry

186
00:06:18,870 --> 00:06:15,759
and then the other main purpose is a

187
00:06:20,550 --> 00:06:18,880
bus for other payloads so other external

188
00:06:22,390 --> 00:06:20,560

companies or other teams at nasa

189
00:06:24,469 --> 00:06:22,400
can contract to us bring their payload

190
00:06:27,189 --> 00:06:24,479
onto our spacecraft and

191
00:06:28,070 --> 00:06:27,199
we kind of work as a bus ride for them

192
00:06:30,070 --> 00:06:28,080
while students

193
00:06:31,830 --> 00:06:30,080
engineers and researchers are preparing

194
00:06:34,309 --> 00:06:31,840
their cubesats for launch

195
00:06:36,790 --> 00:06:34,319
virgin orbit is hard at work readying

196
00:06:39,510 --> 00:06:36,800
its launcher one rocket for flight

197
00:06:40,070 --> 00:06:39,520
launcher one is a two-staged expendable

198
00:06:43,029 --> 00:06:40,080
rocket

199
00:06:44,469 --> 00:06:43,039
roughly 70 feet in length it attaches to

200
00:06:48,390 --> 00:06:44,479
the underside of the company's

201
00:06:50,469 --> 00:06:48,400
747 aircraft cosmic girl

202
00:06:52,070 --> 00:06:50,479
on launch day the rocket is designed to

203
00:06:54,150 --> 00:06:52,080
release from the left wing

204
00:06:55,270 --> 00:06:54,160
for a controlled drop over the pacific

205
00:06:57,350 --> 00:06:55,280
ocean

206
00:06:59,589 --> 00:06:57,360
once it's safely away from the plane the

207
00:07:01,430 --> 00:06:59,599
rocket's first stage engine will ignite

208
00:07:03,430 --> 00:07:01,440
beginning the launch sequence to send

209
00:07:05,189 --> 00:07:03,440
the satellites on board into low earth

210
00:07:07,430 --> 00:07:05,199
orbit

211
00:07:08,390 --> 00:07:07,440
launcher one is manufactured at virgin

212
00:07:11,670 --> 00:07:08,400
orbits facility

213
00:07:13,029 --> 00:07:11,680

in long beach california then five

214
00:07:15,270 --> 00:07:13,039
months prior to launch

215
00:07:17,029 --> 00:07:15,280
the rocket takes its first journey a

216
00:07:19,749 --> 00:07:17,039
short trip to the desert landscape

217
00:07:22,070 --> 00:07:19,759
of the mojave air and spaceport just a

218
00:07:23,990 --> 00:07:22,080
little under two hours away

219
00:07:26,550 --> 00:07:24,000
here it goes through rounds of critical

220
00:07:28,790 --> 00:07:26,560
pre-launch tests and checkouts

221
00:07:30,790 --> 00:07:28,800
with testing complete it goes back to

222
00:07:33,430 --> 00:07:30,800
long beach for final integration before

223
00:07:35,589 --> 00:07:33,440
returning to mojave for launch

224
00:07:37,430 --> 00:07:35,599
around the same time cubesats begin

225
00:07:38,390 --> 00:07:37,440
arriving at virgin orbit's processing

226
00:07:40,550 --> 00:07:38,400
facility

227
00:07:44,309 --> 00:07:40,560
also in long beach to be packed into the

228
00:07:46,309 --> 00:07:44,319
rocket's payload fairing

229
00:07:47,510 --> 00:07:46,319
exocube2 is the progression of a

230
00:07:49,909 --> 00:07:47,520
satellite developed by

231
00:07:52,390 --> 00:07:49,919
california polytechnic state university

232
00:07:54,070 --> 00:07:52,400
in san luis obispo california

233
00:07:55,990 --> 00:07:54,080
a mass spectrometer on board the

234
00:07:58,070 --> 00:07:56,000
spacecraft will measure the density of

235
00:08:00,230 --> 00:07:58,080
particles in the exosphere to improve

236
00:08:02,070 --> 00:08:00,240
space weather prediction space isn't

237
00:08:04,790 --> 00:08:02,080
just a pure vacuum there's always some

238
00:08:05,670 --> 00:08:04,800

particles up there and the particles

239
00:08:08,950 --> 00:08:05,680
impact

240
00:08:10,309 --> 00:08:08,960
various your things with space weather

241
00:08:11,990 --> 00:08:10,319
how the sun

242
00:08:13,350 --> 00:08:12,000
you know rays actually get to the earth

243
00:08:15,990 --> 00:08:13,360
how the sun rays impact

244
00:08:17,909 --> 00:08:16,000
various spacecraft so understanding the

245
00:08:20,390 --> 00:08:17,919
particle composition helps us do

246
00:08:21,510 --> 00:08:20,400
better space weather prediction rad

247
00:08:23,909 --> 00:08:21,520
affects that too

248
00:08:25,430 --> 00:08:23,919
will study space radiation effects on

249
00:08:27,749 --> 00:08:25,440
various types of commercial

250
00:08:28,629 --> 00:08:27,759
off-the-shelf memory including the same

251
00:08:31,270 --> 00:08:28,639
type of memory

252
00:08:33,029 --> 00:08:31,280
used in cell phones and laptops the

253
00:08:35,190 --> 00:08:33,039
experiment is led by vanderbilt

254
00:08:37,269 --> 00:08:35,200
university in nashville tennessee

255
00:08:38,709 --> 00:08:37,279
but it's flying on a cubesat developed

256
00:08:41,430 --> 00:08:38,719
by amsat

257
00:08:44,710 --> 00:08:41,440
a non-profit organization of volunteers

258
00:08:47,110 --> 00:08:44,720
who build satellites with amateur radios

259
00:08:48,230 --> 00:08:47,120
amsat is also launching its own payload

260
00:08:50,150 --> 00:08:48,240
on this satellite

261
00:08:51,990 --> 00:08:50,160
it will test a design for two-way

262
00:08:53,350 --> 00:08:52,000
amateur radio communications

263
00:08:55,750 --> 00:08:53,360

and the data gathered from the

264
00:08:57,590 --> 00:08:55,760
experiment and the satellite itself

265
00:08:59,990 --> 00:08:57,600
will be available for anyone in the

266
00:09:01,910 --> 00:09:00,000
world with amateur radio access

267
00:09:03,590 --> 00:09:01,920
what i really like about this is the

268
00:09:06,310 --> 00:09:03,600
educational component

269
00:09:06,790 --> 00:09:06,320
and it goes reaches out to adults and

270
00:09:08,790 --> 00:09:06,800
children

271
00:09:10,389 --> 00:09:08,800
as they learn about amateur radio but

272
00:09:12,710 --> 00:09:10,399
especially when kids

273
00:09:14,389 --> 00:09:12,720
first are given the opportunity to

274
00:09:15,430 --> 00:09:14,399
experience talking through a satellite

275
00:09:17,829 --> 00:09:15,440
as it's put

276
00:09:19,269 --> 00:09:17,839
and they're like wow i talked to

277
00:09:21,990 --> 00:09:19,279
somebody through a satellite you know

278
00:09:23,829 --> 00:09:22,000
that's bingo that's the paycheck

279
00:09:25,910 --> 00:09:23,839
cape 3 is the third satellite in the

280
00:09:28,310 --> 00:09:25,920
cape series of educational missions

281
00:09:29,750 --> 00:09:28,320
developed by the university of louisiana

282
00:09:32,230 --> 00:09:29,760
at lafayette

283
00:09:34,790 --> 00:09:32,240
cape 3 has two missions with the primary

284
00:09:36,630 --> 00:09:34,800
mission focused on grades k-12

285
00:09:38,630 --> 00:09:36,640
bringing interactive experiments to the

286
00:09:40,949 --> 00:09:38,640
classroom by using an experimental

287
00:09:43,190 --> 00:09:40,959
smartphone ground station grid

288
00:09:44,070 --> 00:09:43,200

teachers can download the k3 app on

289
00:09:46,870 --> 00:09:44,080
their phone

290
00:09:48,470 --> 00:09:46,880
and with a radio board and antenna send

291
00:09:50,389 --> 00:09:48,480
little commands to the satellite and

292
00:09:51,990 --> 00:09:50,399
receive a response

293
00:09:53,990 --> 00:09:52,000
the final payload that will be carried

294
00:09:55,590 --> 00:09:54,000
by launcher one is the mighty

295
00:09:58,230 --> 00:09:55,600
technology demonstration from the

296
00:10:00,150 --> 00:09:58,240
university of michigan in ann arbor

297
00:10:02,389 --> 00:10:00,160
the mission involves a main body

298
00:10:03,030 --> 00:10:02,399
satellite and an attached picosize

299
00:10:05,910 --> 00:10:03,040
satellite

300
00:10:08,150 --> 00:10:05,920
or picosat to investigate and prove

301
00:10:09,030 --> 00:10:08,160
electrodynamic tether applications in

302
00:10:11,030 --> 00:10:09,040
space

303
00:10:12,389 --> 00:10:11,040
after launch the two satellites will

304
00:10:13,910 --> 00:10:12,399
deploy from one another

305
00:10:15,750 --> 00:10:13,920
the tether connecting the two will

306
00:10:17,829 --> 00:10:15,760
generate a magnetic field that can

307
00:10:19,110 --> 00:10:17,839
interact with earth's magnetic field to

308
00:10:21,430 --> 00:10:19,120
keep them in orbit

309
00:10:23,269 --> 00:10:21,440
if proven these tethers could allow

310
00:10:25,590 --> 00:10:23,279
large groups of satellites to function

311
00:10:27,509 --> 00:10:25,600
like a coordinated controllable fleet

312
00:10:29,269 --> 00:10:27,519
as satellites decrease in size the

313
00:10:32,790 --> 00:10:29,279

orbital lifetimes

314
00:10:34,790 --> 00:10:32,800
decreases very rapidly so you need a way

315
00:10:37,509 --> 00:10:34,800
to keep your satellite in space and

316
00:10:39,670 --> 00:10:37,519
the electrodynamic tether provides us a

317
00:10:42,949 --> 00:10:39,680
propellant-less

318
00:10:46,389 --> 00:10:42,959
method of station keeping and

319
00:10:48,550 --> 00:10:46,399
propulsion in space by november 2020

320
00:10:51,590 --> 00:10:48,560
each of the 10 cubesats is safely

321
00:10:53,910 --> 00:10:51,600
secured in launcher 1's payload bearing

322
00:10:55,829 --> 00:10:53,920
now everything is in virgin orbit's

323
00:10:57,670 --> 00:10:55,839
hands

324
00:10:59,430 --> 00:10:57,680
the fairing makes the short trip from

325
00:11:00,470 --> 00:10:59,440
the company's processing facility in

326
00:11:02,949 --> 00:11:00,480
california

327
00:11:04,630 --> 00:11:02,959
to the nearby mojave air and spaceport

328
00:11:05,750 --> 00:11:04,640
where it's mated to the rocket ahead of

329
00:11:07,910 --> 00:11:05,760
launch

330
00:11:10,069 --> 00:11:07,920
after wet dress rehearsals and final

331
00:11:13,590 --> 00:11:10,079
reviews launcher one is deemed

332
00:11:16,870 --> 00:11:13,600
ready to fly january 17

333
00:11:18,630 --> 00:11:16,880
2021 launcher 1 and cosmic girl are

334
00:11:21,750 --> 00:11:18,640
positioned for takeoff

335
00:11:24,710 --> 00:11:21,760
at approximately 1 38 p.m eastern

336
00:11:27,590 --> 00:11:24,720
the carrier aircraft takes to the sky at

337
00:11:30,069 --> 00:11:27,600
35 000 feet above the pacific ocean

338
00:11:31,110 --> 00:11:30,079

the rocket is released from cosmic girl

339
00:11:33,829 --> 00:11:31,120
and then

340
00:11:37,110 --> 00:11:33,839
its newton 3 first stage engine ignites

341
00:11:39,110 --> 00:11:37,120
sending the rocket on its way

342
00:11:41,190 --> 00:11:39,120
just a few minutes later the second

343
00:11:43,509 --> 00:11:41,200
stage newton four engine performs a

344
00:11:45,430 --> 00:11:43,519
series of burns to power launcher one

345
00:11:48,310 --> 00:11:45,440
into low earth orbit

346
00:11:50,550 --> 00:11:48,320
approximately two hours after takeoff

347
00:11:53,750 --> 00:11:50,560
the elana 20 cubesats are deployed

348
00:11:54,949 --> 00:11:53,760
successfully cubesats have demonstrated

349
00:11:56,870 --> 00:11:54,959
their ability to meet

350
00:11:58,949 --> 00:11:56,880
science technology development and

351
00:12:01,269 --> 00:11:58,959
educational objectives in a very

352
00:12:02,710 --> 00:12:01,279
cost effective way i believe that the

353
00:12:05,430 --> 00:12:02,720
demand for cubesats will

354
00:12:06,629 --> 00:12:05,440
only grow in the future the cubesat

355
00:12:07,670 --> 00:12:06,639
launch initiative and the launch

356
00:12:09,990 --> 00:12:07,680
services program

357
00:12:12,550 --> 00:12:10,000
both look forward to being there to help

358
00:12:14,550 --> 00:12:12,560
put those cubesats into orbit

359
00:12:16,470 --> 00:12:14,560
with dedicated rides to space these

360
00:12:17,990 --> 00:12:16,480
cubesats are unlocking the potential for

361
00:12:19,670 --> 00:12:18,000
a brighter future

362
00:12:22,470 --> 00:12:19,680
one filled with greater scientific

363
00:12:26,150 --> 00:12:22,480

discoveries increased access to space

364
00:12:28,150 --> 00:12:26,160
and just maybe a knowledge of new worlds

365
00:12:29,509 --> 00:12:28,160
to get involved in nasa's cubesat launch

366
00:12:39,110 --> 00:12:29,519
initiative visit