
SPACEX

1
00:00:07,030 --> 00:00:05,590
good morning everyone and welcome to the

2
00:00:10,230 --> 00:00:07,040
briefing on the second round of the

3
00:00:11,669 --> 00:00:10,240
commercial development program um

4
00:00:13,589 --> 00:00:11,679
let me introduce the people that are

5
00:00:15,829 --> 00:00:13,599
sitting on my left our briefers

6
00:00:17,109 --> 00:00:15,839
phil mcallister is the acting director

7
00:00:19,510 --> 00:00:17,119
of nasa's commercial space flight

8
00:00:21,910 --> 00:00:19,520
development at nasa headquarters

9
00:00:25,189 --> 00:00:21,920
ed mango is the program manager nasa's

10
00:00:27,429 --> 00:00:25,199
commercial crew program here at ksc

11
00:00:29,109 --> 00:00:27,439
rob myerson the program manager for blue

12
00:00:31,910 --> 00:00:29,119
origin

13
00:00:34,549 --> 00:00:31,920

mark syrangelo program manager sierra

14
00:00:39,110 --> 00:00:36,630
garrett reisman program manager for

15
00:00:41,270 --> 00:00:39,120
spacex

16
00:00:42,790 --> 00:00:41,280
and john elbon the program manager for

17
00:00:45,430 --> 00:00:42,800
commercial crew programs at the boeing

18
00:00:47,510 --> 00:00:45,440
company we'll begin the briefing with uh

19
00:00:49,029 --> 00:00:47,520
phil mcallister phil

20
00:00:51,350 --> 00:00:49,039
thanks mike

21
00:00:53,830 --> 00:00:51,360
first i want to acknowledge the great

22
00:00:56,150 --> 00:00:53,840
work done by the people who designed

23
00:00:58,549 --> 00:00:56,160
built prepared operated and flew the

24
00:01:00,229 --> 00:00:58,559
space shuttle for over 30 years

25
00:01:01,670 --> 00:01:00,239
i believe the shuttle is an inherent

26
00:01:03,349 --> 00:01:01,680
part of the pride we all feel as

27
00:01:05,429 --> 00:01:03,359
americans and it is the reason why i'm

28
00:01:08,230 --> 00:01:05,439
sitting in this chair today actually

29
00:01:11,109 --> 00:01:08,240
on august 12 1977 the space shuttle

30
00:01:12,950 --> 00:01:11,119
enterprise flew on its first flight

31
00:01:14,710 --> 00:01:12,960
by itself during one of its approach and

32
00:01:17,109 --> 00:01:14,720
landing tests and a picture of the

33
00:01:19,670 --> 00:01:17,119
enterprise was splashed across the

34
00:01:21,190 --> 00:01:19,680
front page of my home hometown newspaper

35
00:01:23,190 --> 00:01:21,200
thanks to the media

36
00:01:24,710 --> 00:01:23,200
and i thought it was the coolest thing i

37
00:01:26,149 --> 00:01:24,720
had ever seen

38
00:01:28,070 --> 00:01:26,159

landing on the runway and it was then

39
00:01:29,270 --> 00:01:28,080
that i decided to become an aerospace

40
00:01:31,350 --> 00:01:29,280
engineer

41
00:01:33,429 --> 00:01:31,360
but like the saying goes all good things

42
00:01:35,030 --> 00:01:33,439
must come to an end

43
00:01:36,789 --> 00:01:35,040
while we are ending the space shuttle

44
00:01:38,870 --> 00:01:36,799
program we are not ending the nation's

45
00:01:41,429 --> 00:01:38,880
human space flight program it is

46
00:01:43,429 --> 00:01:41,439
evolving into an exciting new paradigm

47
00:01:46,310 --> 00:01:43,439
of commercial crew operations to low

48
00:01:48,950 --> 00:01:46,320
earth orbit this evolution follows a

49
00:01:50,630 --> 00:01:48,960
pattern where the government initiates

50
00:01:52,710 --> 00:01:50,640
an activity which is then followed by

51
00:01:54,389 --> 00:01:52,720
the private sector we have seen this

52
00:01:58,550 --> 00:01:54,399
pattern historically in other modes of

53
00:02:00,630 --> 00:01:58,560
transportation for example the early air

54
00:02:02,870 --> 00:02:00,640
air mill contract spurred the modern day

55
00:02:04,709 --> 00:02:02,880
airline industry and the railroad

56
00:02:06,950 --> 00:02:04,719
industry was initially enabled through

57
00:02:09,430 --> 00:02:06,960
government legislation and investment

58
00:02:11,589 --> 00:02:09,440
the commercial crew paradigm shift

59
00:02:13,110 --> 00:02:11,599
represents a similar shift in scope and

60
00:02:15,270 --> 00:02:13,120
requirements to the private sector

61
00:02:17,750 --> 00:02:15,280
freeing nasa and nasa's limited

62
00:02:19,670 --> 00:02:17,760
resources to pursue other exploration

63
00:02:21,830 --> 00:02:19,680

driven capabilities

64
00:02:23,430 --> 00:02:21,840
it will also fix feature a fixed

65
00:02:25,190 --> 00:02:23,440
government investment

66
00:02:26,630 --> 00:02:25,200
and a requirement that the industry

67
00:02:28,470 --> 00:02:26,640
partners invest some of their own

68
00:02:30,550 --> 00:02:28,480
capital into development

69
00:02:31,830 --> 00:02:30,560
and another key aspect of the program is

70
00:02:33,509 --> 00:02:31,840
competition

71
00:02:35,030 --> 00:02:33,519
that's why you see four people up here

72
00:02:36,630 --> 00:02:35,040
at the podium today

73
00:02:38,869 --> 00:02:36,640
competition is very central to our

74
00:02:41,110 --> 00:02:38,879
strategy it incentivizes performance and

75
00:02:43,750 --> 00:02:41,120
encourages cost effectiveness and it

76
00:02:46,070 --> 00:02:43,760
also does not

77
00:02:50,790 --> 00:02:46,080
require nasa to be solely reliant on a

78
00:02:54,390 --> 00:02:52,390
there are many challenges ahead

79
00:02:57,110 --> 00:02:54,400
technical financial and cultural and

80
00:02:58,309 --> 00:02:57,120
success is not assured both nasa and our

81
00:03:00,470 --> 00:02:58,319
industry partners are going to have to

82
00:03:02,710 --> 00:03:00,480
change the way we do business in order

83
00:03:04,790 --> 00:03:02,720
for this program to succeed but the

84
00:03:06,869 --> 00:03:04,800
benefits of this new approach are clear

85
00:03:08,550 --> 00:03:06,879
and compelling it will ensure that u.s

86
00:03:10,550 --> 00:03:08,560
astronauts will be transported to and

87
00:03:12,470 --> 00:03:10,560
from the international space station on

88
00:03:14,309 --> 00:03:12,480

american-made spacecraft thereby

89
00:03:16,309 --> 00:03:14,319
limiting our reliance on foreign systems

90
00:03:18,309 --> 00:03:16,319
and providing assured access to the

91
00:03:20,149 --> 00:03:18,319
international space station it will

92
00:03:23,190 --> 00:03:20,159
allow nasa to concentrate our limited

93
00:03:25,110 --> 00:03:23,200
resources on exploration beyond leo

94
00:03:27,670 --> 00:03:25,120
it will benefit the us private industry

95
00:03:30,070 --> 00:03:27,680
by strengthening our industrial base

96
00:03:32,149 --> 00:03:30,080
enhancing our our capabilities in a new

97
00:03:34,070 --> 00:03:32,159
high-tech industry and it will open up

98
00:03:35,589 --> 00:03:34,080
new markets for customers other than the

99
00:03:37,750 --> 00:03:35,599
us government

100
00:03:40,070 --> 00:03:37,760
but most importantly it will reaffirm

101
00:03:42,470 --> 00:03:40,080
the u.s leadership in space later this

102
00:03:43,910 --> 00:03:42,480
year the shuttle will be retired and

103
00:03:46,470 --> 00:03:43,920
with it the means for the u.s to

104
00:03:49,270 --> 00:03:46,480
transport astronauts to space at that

105
00:03:51,430 --> 00:03:49,280
time only russia and china will have the

106
00:03:52,630 --> 00:03:51,440
capability of getting people into low

107
00:03:54,229 --> 00:03:52,640
earth orbit

108
00:03:55,990 --> 00:03:54,239
this represents a very real and

109
00:03:57,589 --> 00:03:56,000
significant threat to u.s leadership in

110
00:03:59,830 --> 00:03:57,599
space and something that has been

111
00:04:01,750 --> 00:03:59,840
unquestioned since neil armstrong and

112
00:04:03,910 --> 00:04:01,760
buzz aldrin took their historic steps on

113
00:04:06,309 --> 00:04:03,920

the moon over 40 years ago

114
00:04:08,550 --> 00:04:06,319
well commercial crew will end the gap in

115
00:04:10,630 --> 00:04:08,560
u.s human access to space

116
00:04:12,390 --> 00:04:10,640
the recently enacted 2010 nasa

117
00:04:14,070 --> 00:04:12,400
authorization act clearly established

118
00:04:15,750 --> 00:04:14,080
commercial crew is the primary means for

119
00:04:18,069 --> 00:04:15,760
u.s access to the international space

120
00:04:20,150 --> 00:04:18,079
station and as such the commercial crew

121
00:04:22,310 --> 00:04:20,160
program is the nation's primary strategy

122
00:04:25,270 --> 00:04:22,320
for ending the gap and eliminating the

123
00:04:28,790 --> 00:04:25,280
threat to america's leadership in space

124
00:04:33,350 --> 00:04:30,870
the commercial crew program is not only

125
00:04:35,350 --> 00:04:33,360
good for the united states i personally

126
00:04:36,629 --> 00:04:35,360
believe the program will benefit all of

127
00:04:38,870 --> 00:04:36,639
humanity

128
00:04:40,790 --> 00:04:38,880
we have seen how tenuous our human space

129
00:04:42,710 --> 00:04:40,800
flight endeavors can be

130
00:04:44,310 --> 00:04:42,720
we cannot have the future of human space

131
00:04:46,469 --> 00:04:44,320
flight completely dependent on the

132
00:04:47,590 --> 00:04:46,479
prevailing political winds or partisan

133
00:04:49,270 --> 00:04:47,600
concerns

134
00:04:50,870 --> 00:04:49,280
by pushing the boundaries of private

135
00:04:52,790 --> 00:04:50,880
enterprise and commerce into low earth

136
00:04:55,189 --> 00:04:52,800
orbit we will have planted the first

137
00:04:56,950 --> 00:04:55,199
truly sustainable flagpole in our

138
00:04:59,270 --> 00:04:56,960

expansion into space

139
00:05:00,950 --> 00:04:59,280
there will be no turning back

140
00:05:03,030 --> 00:05:00,960
once commercial human space flight into

141
00:05:04,950 --> 00:05:03,040
low earth orbit is a robust vibrant

142
00:05:06,950 --> 00:05:04,960
profit-making commercial enterprise with

143
00:05:08,790 --> 00:05:06,960
many providers and a wide range of

144
00:05:10,790 --> 00:05:08,800
private and public users

145
00:05:13,350 --> 00:05:10,800
this is the ultimate goal and one that i

146
00:05:15,029 --> 00:05:13,360
believe unites us all

147
00:05:18,150 --> 00:05:15,039
that's it and with that i'll turn it

148
00:05:19,909 --> 00:05:18,160
over to my colleague ed mango

149
00:05:21,430 --> 00:05:19,919
see uh good morning everybody and

150
00:05:23,590 --> 00:05:21,440
welcome to florida

151
00:05:26,870 --> 00:05:23,600
i'm glad you all are here you know our

152
00:05:29,029 --> 00:05:26,880
nation's leadership in space can easily

153
00:05:30,469 --> 00:05:29,039
be displayed by what is at the pad just

154
00:05:33,430 --> 00:05:30,479
three miles from here

155
00:05:35,270 --> 00:05:33,440
uh it's a magnificent machine

156
00:05:37,430 --> 00:05:35,280
but the machine is not what the most

157
00:05:38,390 --> 00:05:37,440
important part is it's the people and

158
00:05:39,830 --> 00:05:38,400
the

159
00:05:42,469 --> 00:05:39,840
intelligence that went behind that

160
00:05:45,350 --> 00:05:42,479
machine that makes that machine fly and

161
00:05:47,670 --> 00:05:45,360
so the space shuttle program is clearly

162
00:05:49,749 --> 00:05:47,680
a key part of what leadership in space

163
00:05:52,469 --> 00:05:49,759

is all about and has been a premier part

164
00:05:54,310 --> 00:05:52,479
of what leadership is for america i

165
00:05:55,990 --> 00:05:54,320
think the the spaceship itself and the

166
00:05:58,550 --> 00:05:56,000
crew that's going to go fly on this next

167
00:06:00,710 --> 00:05:58,560
mission are examples of what we are

168
00:06:02,950 --> 00:06:00,720
capable of doing what we are capable of

169
00:06:04,950 --> 00:06:02,960
overcoming and what we're capable of

170
00:06:07,430 --> 00:06:04,960
doing in space

171
00:06:08,469 --> 00:06:07,440
and what we're also capable of leading

172
00:06:10,230 --> 00:06:08,479
the next

173
00:06:11,830 --> 00:06:10,240
uh this space shuttle mission and the

174
00:06:14,150 --> 00:06:11,840
last space shuttle mission will end an

175
00:06:16,469 --> 00:06:14,160
era of space shuttle and will end the

176
00:06:19,189 --> 00:06:16,479
era of the shuttle being the key

177
00:06:21,110 --> 00:06:19,199
leadership role of trying to get humans

178
00:06:23,189 --> 00:06:21,120
into low-earth orbit

179
00:06:24,790 --> 00:06:23,199
the next phase of that is the commercial

180
00:06:26,390 --> 00:06:24,800
crew program

181
00:06:28,710 --> 00:06:26,400
another great example of leadership in

182
00:06:31,270 --> 00:06:28,720
space is the international space station

183
00:06:33,270 --> 00:06:31,280
it's a fantastic laboratory in space led

184
00:06:34,950 --> 00:06:33,280
by the americans with many other

185
00:06:36,629 --> 00:06:34,960
countries helping but it was that

186
00:06:38,790 --> 00:06:36,639
american leadership that got

187
00:06:41,590 --> 00:06:38,800
the iss into space and is operating the

188
00:06:43,590 --> 00:06:41,600

iss today as a lab for the entire planet

189
00:06:45,270 --> 00:06:43,600
to use

190
00:06:47,110 --> 00:06:45,280
our nation will continue to be leaders

191
00:06:48,950 --> 00:06:47,120
in space and i do believe that the

192
00:06:51,189 --> 00:06:48,960
commercial crew program will be the

193
00:06:53,350 --> 00:06:51,199
method by which we close the gap and

194
00:06:55,510 --> 00:06:53,360
continue our leadership in space at

195
00:06:57,990 --> 00:06:55,520
least for low earth orbit

196
00:06:59,990 --> 00:06:58,000
today we're kicking off our cc dev2 as

197
00:07:01,990 --> 00:07:00,000
we call it for short our commercial crew

198
00:07:04,150 --> 00:07:02,000
development number two

199
00:07:06,309 --> 00:07:04,160
program and activities

200
00:07:09,029 --> 00:07:06,319
our nation's next step will not just be

201
00:07:11,430 --> 00:07:09,039
a nasa internal thing or a nasa setting

202
00:07:13,510 --> 00:07:11,440
a contract and letting folks come

203
00:07:15,749 --> 00:07:13,520
to try to work on that contract we're

204
00:07:17,510 --> 00:07:15,759
doing this as truly as a partnership

205
00:07:18,950 --> 00:07:17,520
we want innovation and we want a

206
00:07:20,870 --> 00:07:18,960
partnership and that's why there's four

207
00:07:22,309 --> 00:07:20,880
companies involved in the ccdev2

208
00:07:26,710 --> 00:07:22,319
activity

209
00:07:28,469 --> 00:07:26,720
transportation system to low-earth orbit

210
00:07:31,270 --> 00:07:28,479
that is what we're doing and it's an

211
00:07:34,629 --> 00:07:31,280
american system it is not just done here

212
00:07:36,550 --> 00:07:34,639
in florida or any other specific spot in

213
00:07:39,189 --> 00:07:36,560

uh in the country in fact i think i have

214
00:07:42,070 --> 00:07:39,199
a chart if i can get it up

215
00:07:45,350 --> 00:07:42,080
and it shows clearly that the commercial

216
00:07:47,589 --> 00:07:45,360
crew activities for ccdev 2 are spread

217
00:07:49,510 --> 00:07:47,599
across the country we really cover all

218
00:07:51,589 --> 00:07:49,520
four corners of the country and many

219
00:07:54,150 --> 00:07:51,599
states in the middle it is not just a

220
00:07:56,629 --> 00:07:54,160
single entity in a single location

221
00:07:58,390 --> 00:07:56,639
these four companies have themselves

222
00:07:59,749 --> 00:07:58,400
spread throughout the country and other

223
00:08:01,670 --> 00:07:59,759
partners that they're working with

224
00:08:03,990 --> 00:08:01,680
spread across the country so this is

225
00:08:05,830 --> 00:08:04,000
truly a national endeavor in order to

226
00:08:07,589 --> 00:08:05,840
keep the gap as

227
00:08:09,270 --> 00:08:07,599
short as possible and to keep our

228
00:08:10,710 --> 00:08:09,280
leadership in space

229
00:08:12,390 --> 00:08:10,720
like i said at the beginning the space

230
00:08:13,430 --> 00:08:12,400
shuttle program

231
00:08:15,110 --> 00:08:13,440
is really

232
00:08:17,110 --> 00:08:15,120
made of people that are flying that

233
00:08:19,110 --> 00:08:17,120
magnificent machine and getting that

234
00:08:20,629 --> 00:08:19,120
machine to work properly it is the

235
00:08:23,189 --> 00:08:20,639
nation and the people the nation that

236
00:08:25,589 --> 00:08:23,199
will make the commercial crew program

237
00:08:28,230 --> 00:08:25,599
and the crew transportation system work

238
00:08:30,390 --> 00:08:28,240

and be successful i'm very excited and

239
00:08:33,269 --> 00:08:30,400
my team is extremely excited to be part

240
00:08:35,350 --> 00:08:33,279
of what will keep america as the premier

241
00:08:37,110 --> 00:08:35,360
nation for space leadership i'm now

242
00:08:38,149 --> 00:08:37,120
going to invite rob to talk a little bit

243
00:08:41,670 --> 00:08:38,159
about

244
00:08:44,149 --> 00:08:41,680
his particular portion of ccdev2 okay

245
00:08:45,829 --> 00:08:44,159
thank you ed and thank you phil

246
00:08:47,670 --> 00:08:45,839
i'm rob meyerson i'm the president and

247
00:08:49,350 --> 00:08:47,680
program manager at blue origin uh up in

248
00:08:50,949 --> 00:08:49,360
kent washington and i'm going to talk to

249
00:08:53,829 --> 00:08:50,959
you about our ccdev activities i'd like

250
00:08:55,350 --> 00:08:53,839
to to follow up on the theme that phil

251
00:08:56,949 --> 00:08:55,360
and ed brought out is his i worked on

252
00:08:58,389 --> 00:08:56,959
space shuttle early in my career and and

253
00:09:00,150 --> 00:08:58,399
uh i'm extremely proud of the

254
00:09:01,829 --> 00:09:00,160
accomplishments of that program and and

255
00:09:03,269 --> 00:09:01,839
the reason i'm here is because of space

256
00:09:05,190 --> 00:09:03,279
shuttle and apollo i mean that's the

257
00:09:06,870 --> 00:09:05,200
reason i think we're all here um we're

258
00:09:08,870 --> 00:09:06,880
standing on the shoulders of the

259
00:09:10,150 --> 00:09:08,880
accomplishments of these programs and

260
00:09:12,230 --> 00:09:10,160
and that's why i got into aerospace to

261
00:09:13,750 --> 00:09:12,240
start with so so i want to just lead off

262
00:09:16,150 --> 00:09:13,760
with that and we can get to our first

263
00:09:17,750 --> 00:09:16,160

chart i'll uh talk about our ccw2

264
00:09:18,949 --> 00:09:17,760
activities um give you a little

265
00:09:20,389 --> 00:09:18,959
background on blue origin i'll be

266
00:09:23,269 --> 00:09:20,399
hard-pressed to fit it all into five

267
00:09:25,990 --> 00:09:23,279
minutes so bear with me but uh thank you

268
00:09:27,829 --> 00:09:26,000
and uh let's go to the first chart uh

269
00:09:29,750 --> 00:09:27,839
second chart i'm sorry uh blue origin is

270
00:09:31,430 --> 00:09:29,760
a private privately held company it was

271
00:09:32,790 --> 00:09:31,440
uh founded in the year 2000 by jeff

272
00:09:35,030 --> 00:09:32,800
bezos i've been with the company for

273
00:09:36,230 --> 00:09:35,040
eight years um it started out with a

274
00:09:38,150 --> 00:09:36,240
very very small group of people and

275
00:09:39,910 --> 00:09:38,160
we're our focus has been consistent over

276
00:09:41,750 --> 00:09:39,920
this time we're developing vehicles and

277
00:09:43,590 --> 00:09:41,760
systems and technologies to provide safe

278
00:09:45,670 --> 00:09:43,600
and affordable human space flight uh

279
00:09:48,710 --> 00:09:45,680
jeff has a long time passion in space uh

280
00:09:50,470 --> 00:09:48,720
passion for space and uh he's

281
00:09:52,710 --> 00:09:50,480
brought that to bear in in terms of the

282
00:09:54,710 --> 00:09:52,720
uh in bringing blue origin from a very

283
00:09:55,829 --> 00:09:54,720
very small company to where we are today

284
00:09:57,829 --> 00:09:55,839
um we are developing a crew

285
00:09:59,670 --> 00:09:57,839
transportation system that uh that's

286
00:10:01,350 --> 00:09:59,680
comprised of an orbital space vehicle

287
00:10:02,230 --> 00:10:01,360
and a reusable booster system that will

288
00:10:04,150 --> 00:10:02,240

take

289
00:10:06,070 --> 00:10:04,160
humans safely and affordably to and from

290
00:10:07,509 --> 00:10:06,080
low earth orbit and and the space

291
00:10:09,350 --> 00:10:07,519
vehicle is designed to fly on multiple

292
00:10:11,430 --> 00:10:09,360
boosters including the atlas v in

293
00:10:14,550 --> 00:10:11,440
addition to our own uh reusable booster

294
00:10:17,110 --> 00:10:14,560
system that will follow um follow the

295
00:10:19,430 --> 00:10:17,120
deflects on atlas 5. um our our

296
00:10:21,190 --> 00:10:19,440
incremental development program uh is uh

297
00:10:23,509 --> 00:10:21,200
uh that approach uses suborbital tests

298
00:10:26,790 --> 00:10:23,519
to uh retire development risk and that's

299
00:10:28,790 --> 00:10:26,800
uh that's how we we intend to uh step

300
00:10:30,310 --> 00:10:28,800
stepwise our way step our way towards uh

301
00:10:33,030 --> 00:10:30,320
human spaceflight so let's go to the

302
00:10:34,389 --> 00:10:33,040
next chart please um

303
00:10:36,389 --> 00:10:34,399
as i mentioned we're a small company

304
00:10:37,590 --> 00:10:36,399
we're based in kent washington uh we

305
00:10:39,110 --> 00:10:37,600
have a uh

306
00:10:40,470 --> 00:10:39,120
we've spent quite a bit of money putting

307
00:10:41,750 --> 00:10:40,480
the facilities together the equipment

308
00:10:44,710 --> 00:10:41,760
and building the tool the team and the

309
00:10:47,829 --> 00:10:44,720
tools to uh to take on this endeavor

310
00:10:50,150 --> 00:10:47,839
our our kent site is about 250 000

311
00:10:51,750 --> 00:10:50,160
square feet on 25 acres we have our own

312
00:10:53,750 --> 00:10:51,760
rocket engine test facilities at that

313
00:10:54,870 --> 00:10:53,760

site that we've developed and then we

314
00:10:55,990 --> 00:10:54,880
also uh

315
00:10:57,750 --> 00:10:56,000
have our own

316
00:10:59,990 --> 00:10:57,760
privately owned launch site out in west

317
00:11:01,110 --> 00:11:00,000
texas it's about two hours east of el

318
00:11:05,030 --> 00:11:01,120
paso

319
00:11:07,110 --> 00:11:05,040
it's a 33 square mile site on 165 000

320
00:11:08,870 --> 00:11:07,120
acres of private ranch land and we built

321
00:11:09,750 --> 00:11:08,880
that site from greenfield and we've

322
00:11:11,509 --> 00:11:09,760
flown

323
00:11:13,590 --> 00:11:11,519
our first iteration of our of our

324
00:11:16,150 --> 00:11:13,600
suborbital vehicles at that site we can

325
00:11:17,990 --> 00:11:16,160
go to the next uh the next chart please

326
00:11:19,670 --> 00:11:18,000
uh that suborbital vehicle i'm talking

327
00:11:23,590 --> 00:11:19,680
about is the new shepard program and we

328
00:11:25,190 --> 00:11:23,600
kicked this off in in 2005 and that uh

329
00:11:27,509 --> 00:11:25,200
that program

330
00:11:29,110 --> 00:11:27,519
consists of a suborbital

331
00:11:31,269 --> 00:11:29,120
propulsion module which is essentially a

332
00:11:32,870 --> 00:11:31,279
reusable first stage it takes off and

333
00:11:34,310 --> 00:11:32,880
lands vertically

334
00:11:35,990 --> 00:11:34,320
under its own power

335
00:11:38,150 --> 00:11:36,000
and a crew capsule which which launches

336
00:11:39,670 --> 00:11:38,160
on top of the propulsion module carries

337
00:11:41,509 --> 00:11:39,680
the astronauts to and from sober world

338
00:11:44,550 --> 00:11:41,519

space brings them back so you get a

339
00:11:46,550 --> 00:11:44,560
short amount of microgravity time

340
00:11:48,150 --> 00:11:46,560
we're targeting space tourism suborbital

341
00:11:50,550 --> 00:11:48,160
science and other and other technology

342
00:11:53,110 --> 00:11:50,560
missions both of these

343
00:11:55,750 --> 00:11:53,120
vehicles are fully reusable they return

344
00:11:57,509 --> 00:11:55,760
to the west texas launch site for reuse

345
00:11:59,190 --> 00:11:57,519
and we we began that program

346
00:12:01,030 --> 00:11:59,200
incrementally with our first flights of

347
00:12:03,110 --> 00:12:01,040
a vehicle we called goddard which is

348
00:12:04,949 --> 00:12:03,120
shown in the uh the lower right photo

349
00:12:06,710 --> 00:12:04,959
the goddard vehicle was was used to

350
00:12:08,069 --> 00:12:06,720
demonstrate our our technology for

351
00:12:09,190 --> 00:12:08,079
vertical takeoff powered vertical

352
00:12:11,590 --> 00:12:09,200
landing

353
00:12:13,269 --> 00:12:11,600
our concept of operations our and some

354
00:12:16,150 --> 00:12:13,279
of the technologies that'll that'll fly

355
00:12:19,829 --> 00:12:16,160
on the suborbital vehicle in the future

356
00:12:24,710 --> 00:12:22,150
during ccdev1 we were one of the five

357
00:12:26,310 --> 00:12:24,720
five winners of agreements under ccdev1

358
00:12:27,590 --> 00:12:26,320
and uh we worked through that program

359
00:12:29,190 --> 00:12:27,600
and successfully accomplished all of our

360
00:12:32,230 --> 00:12:29,200
milestones and we're very proud to have

361
00:12:33,829 --> 00:12:32,240
done that um the the two two projects we

362
00:12:35,030 --> 00:12:33,839
worked under ccdev1 one was the

363
00:12:37,190 --> 00:12:35,040

development of a composite pressure

364
00:12:38,389 --> 00:12:37,200
vessel and that's shown in the the right

365
00:12:40,069 --> 00:12:38,399
photo

366
00:12:41,350 --> 00:12:40,079
and what we did is we we assembled our

367
00:12:43,190 --> 00:12:41,360
composite pressure vessel for our

368
00:12:45,590 --> 00:12:43,200
sub-orbital vehicle this program was

369
00:12:47,190 --> 00:12:45,600
ongoing when ccdev1 started we assembled

370
00:12:49,269 --> 00:12:47,200
that vehicle we proof tested it and we

371
00:12:51,030 --> 00:12:49,279
drop tested it to demonstrate

372
00:12:53,350 --> 00:12:51,040
basically a hard landing

373
00:12:54,949 --> 00:12:53,360
verified all of our our loads of our

374
00:12:56,150 --> 00:12:54,959
design parameters

375
00:12:57,829 --> 00:12:56,160
the the

376
00:12:59,190 --> 00:12:57,839
i've heard people comment on the purple

377
00:13:01,190 --> 00:12:59,200
nature of that i'd like to say it's a

378
00:13:03,750 --> 00:13:01,200
tribute to the washington huskies but it

379
00:13:06,389 --> 00:13:03,760
is really a it really is a an artifact

380
00:13:08,870 --> 00:13:06,399
of the manufacturing process and so uh

381
00:13:10,470 --> 00:13:08,880
but that's uh that's our uh

382
00:13:12,069 --> 00:13:10,480
the composite pressure vessel during

383
00:13:14,069 --> 00:13:12,079
that stage of assembly during the ccdev

384
00:13:15,590 --> 00:13:14,079
one program we also developed our pusher

385
00:13:17,910 --> 00:13:15,600
escape

386
00:13:19,509 --> 00:13:17,920
system which uh is a technology we're

387
00:13:21,910 --> 00:13:19,519
developing in-house

388
00:13:23,269 --> 00:13:21,920

we tested the the escape system on using

389
00:13:25,430 --> 00:13:23,279
a solid rocket motor developed by

390
00:13:27,269 --> 00:13:25,440
aerojet uh in our tests uh one of our

391
00:13:28,949 --> 00:13:27,279
tests is shown there in the in the photo

392
00:13:30,710 --> 00:13:28,959
in the at the bottom of the chart we

393
00:13:33,430 --> 00:13:30,720
conducted two ground tests and we

394
00:13:34,790 --> 00:13:33,440
demonstrated the uh the side force and

395
00:13:37,110 --> 00:13:34,800
the life of the materials of the of the

396
00:13:38,550 --> 00:13:37,120
escape system under a full mission duty

397
00:13:41,590 --> 00:13:38,560
cycle type test

398
00:13:43,990 --> 00:13:41,600
so let's go to the next chart please

399
00:13:46,470 --> 00:13:44,000
under ccdev2 we have three projects one

400
00:13:48,629 --> 00:13:46,480
is the maturing the the design of our

401
00:13:50,230 --> 00:13:48,639
orbital space vehicle and

402
00:13:52,710 --> 00:13:50,240
there's a couple of there's several

403
00:13:54,949 --> 00:13:52,720
items we have in that in that task

404
00:13:55,990 --> 00:13:54,959
completing key subsystem trades uh we're

405
00:13:57,670 --> 00:13:56,000
going to be working on our thermal

406
00:13:59,110 --> 00:13:57,680
protection system with nasa ames they're

407
00:14:00,150 --> 00:13:59,120
nasa's center of excellence for thermal

408
00:14:01,509 --> 00:14:00,160
protection

409
00:14:02,470 --> 00:14:01,519
materials and we're happy to have them

410
00:14:05,350 --> 00:14:02,480
on our team

411
00:14:06,870 --> 00:14:05,360
um we'll be uh defining the the biconic

412
00:14:09,670 --> 00:14:06,880
shape which we've selected for its

413
00:14:11,350 --> 00:14:09,680

mid-lift to drag ratio uh provides

414
00:14:14,310 --> 00:14:11,360
lower entry g loads than a than a

415
00:14:15,670 --> 00:14:14,320
capsule um but it

416
00:14:16,949 --> 00:14:15,680
and it provides uh

417
00:14:18,629 --> 00:14:16,959
more landing opportunities we'll be

418
00:14:20,470 --> 00:14:18,639
refining that design with

419
00:14:23,110 --> 00:14:20,480
aerodynamic analysis and wind tunnel

420
00:14:25,430 --> 00:14:23,120
testing uh we're going to be developing

421
00:14:27,189 --> 00:14:25,440
the interface between the orbital space

422
00:14:28,629 --> 00:14:27,199
vehicle and the atlas v vehicle working

423
00:14:29,910 --> 00:14:28,639
in uh hand-in-hand with united launch

424
00:14:30,790 --> 00:14:29,920
alliance who is another member of our

425
00:14:33,430 --> 00:14:30,800
team

426
00:14:35,590 --> 00:14:33,440
and and then we'll be completing two two

427
00:14:37,030 --> 00:14:35,600
reviews for the uh

428
00:14:38,710 --> 00:14:37,040
for the program the mission concept

429
00:14:40,550 --> 00:14:38,720
review and then a system requirements

430
00:14:42,389 --> 00:14:40,560
review uh which are the two first

431
00:14:43,350 --> 00:14:42,399
reviews in that in that design design

432
00:14:47,189 --> 00:14:43,360
process

433
00:14:50,310 --> 00:14:49,110
our second project is continue to

434
00:14:53,269 --> 00:14:50,320
continue the work we started under

435
00:14:55,590 --> 00:14:53,279
ccdev1 on our pusher escape system and

436
00:14:57,110 --> 00:14:55,600
we will be conducting additional design

437
00:15:00,069 --> 00:14:57,120
efforts and that that project will

438
00:15:02,230 --> 00:15:00,079

culminate with a pad escape test of our

439
00:15:04,710 --> 00:15:02,240
of our suborbital

440
00:15:07,350 --> 00:15:04,720
crew capsule using that uh that pusher

441
00:15:09,189 --> 00:15:07,360
escape system uh the uh the third

442
00:15:11,350 --> 00:15:09,199
project is accelerating our booster

443
00:15:13,030 --> 00:15:11,360
engine development and uh we are

444
00:15:15,350 --> 00:15:13,040
developing our own liquid oxygen liquid

445
00:15:17,189 --> 00:15:15,360
hydrogen booster engine uh and we'll be

446
00:15:19,350 --> 00:15:17,199
testing that uh thrust chamber at

447
00:15:21,509 --> 00:15:19,360
stennis space center uh and we're happy

448
00:15:23,110 --> 00:15:21,519
to have stennis on our team and uh we'll

449
00:15:25,910 --> 00:15:23,120
be testing at the at one of their

450
00:15:28,069 --> 00:15:25,920
existing stands um that that engine is

451
00:15:29,670 --> 00:15:28,079
designed to do deep throttling uh to

452
00:15:32,310 --> 00:15:29,680
support our vertical takeoff vertical

453
00:15:34,629 --> 00:15:32,320
landing technology

454
00:15:36,790 --> 00:15:34,639
and the next chart please

455
00:15:38,069 --> 00:15:36,800
in summary um we're committed to

456
00:15:40,710 --> 00:15:38,079
developing safe and affordable

457
00:15:42,629 --> 00:15:40,720
commercial human space flight and uh and

458
00:15:44,949 --> 00:15:42,639
the suborbital system the new shepard

459
00:15:47,030 --> 00:15:44,959
system that we've been developing uh is

460
00:15:48,710 --> 00:15:47,040
uh is designed to prove out the

461
00:15:50,310 --> 00:15:48,720
technologies before we commit them to

462
00:15:51,910 --> 00:15:50,320
orbital space flight so it's an

463
00:15:53,110 --> 00:15:51,920

incremental development approach that

464
00:15:55,030 --> 00:15:53,120
we've been taking

465
00:15:58,069 --> 00:15:55,040
to long-term vision and and we're

466
00:15:59,990 --> 00:15:58,079
focused on on executing that the ccdev2

467
00:16:02,550 --> 00:16:00,000
projects were proposed because they help

468
00:16:04,389 --> 00:16:02,560
us to accelerate orbital capability so

469
00:16:05,829 --> 00:16:04,399
we can use the suborbital program in

470
00:16:07,990 --> 00:16:05,839
some some of the aspects some of the

471
00:16:09,509 --> 00:16:08,000
projects to demonstrate

472
00:16:11,430 --> 00:16:09,519
these technologies before we commit to

473
00:16:13,189 --> 00:16:11,440
an orbital development and then we can

474
00:16:15,350 --> 00:16:13,199
conduct the mature maturation of the

475
00:16:18,790 --> 00:16:15,360
space vehicle design

476
00:16:20,389 --> 00:16:18,800
during ccw2 to to show to work with nasa

477
00:16:21,670 --> 00:16:20,399
and the experts at nasa to to help to

478
00:16:23,189 --> 00:16:21,680
develop that

479
00:16:25,269 --> 00:16:23,199
finally i want to thank nasa and our

480
00:16:28,069 --> 00:16:25,279
nasa team we'll be working closely with

481
00:16:30,310 --> 00:16:28,079
with ed ed mango brent jett uh bill lane

482
00:16:31,829 --> 00:16:30,320
is our our partner manager we're looking

483
00:16:33,110 --> 00:16:31,839
forward to working with with them on

484
00:16:35,350 --> 00:16:33,120
this we're also looking forward to

485
00:16:36,629 --> 00:16:35,360
working with our nasa team partners

486
00:16:38,310 --> 00:16:36,639
including ames research center and

487
00:16:39,590 --> 00:16:38,320
stennis space center and of course the

488
00:16:40,870 --> 00:16:39,600

other technical experts within the

489
00:16:42,069 --> 00:16:40,880
agency who

490
00:16:43,430 --> 00:16:42,079
who we know will be coming to our

491
00:16:45,350 --> 00:16:43,440
reviews and participating we look

492
00:16:46,629 --> 00:16:45,360
forward to to reaching out and working

493
00:16:48,550 --> 00:16:46,639
with you and partnering partnering with

494
00:16:50,389 --> 00:16:48,560
you to develop the best system possible

495
00:16:51,749 --> 00:16:50,399
so thank you and now i'd like to

496
00:16:53,829 --> 00:16:51,759
introduce marc sarangelo from sierra

497
00:16:56,230 --> 00:16:53,839
nevada thank you

498
00:16:58,069 --> 00:16:56,240
good morning and thanks for coming out

499
00:16:59,749 --> 00:16:58,079
one of the aspects of being part of the

500
00:17:01,110 --> 00:16:59,759
commercial crew industry and part of the

501
00:17:04,230 --> 00:17:01,120
space industry is that you have to be

502
00:17:06,230 --> 00:17:04,240
flexible and for some reason our slides

503
00:17:07,429 --> 00:17:06,240
got uh corrupted so

504
00:17:08,710 --> 00:17:07,439
you're all gonna have to look at me for

505
00:17:10,309 --> 00:17:08,720
the next five minutes and write really

506
00:17:11,829 --> 00:17:10,319
good things about me

507
00:17:15,909 --> 00:17:11,839
and we're going back to the low-tech

508
00:17:19,750 --> 00:17:17,669
everybody gets to look at this slide and

509
00:17:21,590 --> 00:17:19,760
write a lot about it and uh over the

510
00:17:23,590 --> 00:17:21,600
next four minutes you'll get tired of

511
00:17:24,949 --> 00:17:23,600
seeing me so thank you for your patience

512
00:17:26,870 --> 00:17:24,959
and this is one of the things i drew the

513
00:17:28,630 --> 00:17:26,880

short straw this morning so

514
00:17:30,310 --> 00:17:28,640
my name is mark sorangelo i run sierra

515
00:17:31,830 --> 00:17:30,320
nevada space systems and i'm really

516
00:17:33,990 --> 00:17:31,840
thrilled to be here and be part of this

517
00:17:35,909 --> 00:17:34,000
it's a it's an amazing feat to be

518
00:17:37,830 --> 00:17:35,919
standing here and before i get into my

519
00:17:39,990 --> 00:17:37,840
talk i'd like to just this space is a

520
00:17:41,830 --> 00:17:40,000
very small community and those of you

521
00:17:43,270 --> 00:17:41,840
who've covered the news this morning

522
00:17:44,470 --> 00:17:43,280
realize that there's been some really

523
00:17:46,230 --> 00:17:44,480
terrible things have happened in the

524
00:17:48,150 --> 00:17:46,240
southwest and in alabama and i wanted to

525
00:17:50,150 --> 00:17:48,160
send our thoughts out to our friends in

526
00:17:51,510 --> 00:17:50,160
alabama and in the space industry you're

527
00:17:53,110 --> 00:17:51,520
going through a pretty rough day while

528
00:17:54,470 --> 00:17:53,120
we're enjoying this really wonderful

529
00:17:56,310 --> 00:17:54,480
moment so

530
00:17:58,390 --> 00:17:56,320
for all of us i think we want to send

531
00:18:00,870 --> 00:17:58,400
our best wishes and hope things recover

532
00:18:03,350 --> 00:18:00,880
very well for you sierra nevada is a is

533
00:18:04,870 --> 00:18:03,360
a company that many of you may not know

534
00:18:06,950 --> 00:18:04,880
we have been around though since the

535
00:18:08,470 --> 00:18:06,960
1960s the company is approaching its

536
00:18:10,230 --> 00:18:08,480
50th anniversary it's been under the

537
00:18:11,590 --> 00:18:10,240
same ownership and management since the

538
00:18:13,669 --> 00:18:11,600

1990s

539
00:18:14,630 --> 00:18:13,679
we have about 2 200 people working in 20

540
00:18:17,190 --> 00:18:14,640
states

541
00:18:19,909 --> 00:18:17,200
and our space business so quiet has been

542
00:18:22,470 --> 00:18:19,919
in operation now for 22 years

543
00:18:24,710 --> 00:18:22,480
we've had over 400 space successful

544
00:18:26,070 --> 00:18:24,720
space missions and over 5 000 things

545
00:18:27,510 --> 00:18:26,080
that we have built and developed have

546
00:18:28,470 --> 00:18:27,520
gone to space successfully over the

547
00:18:30,150 --> 00:18:28,480
years

548
00:18:31,590 --> 00:18:30,160
we operated throughout the country and

549
00:18:33,750 --> 00:18:31,600
in a number of facilities and we're

550
00:18:35,590 --> 00:18:33,760
really been really proud of this effort

551
00:18:37,590 --> 00:18:35,600
our program which you see on my very

552
00:18:39,750 --> 00:18:37,600
high tech slide here is something called

553
00:18:41,029 --> 00:18:39,760
the dream chaser it is a lifting body

554
00:18:43,430 --> 00:18:41,039
it's a seven

555
00:18:45,750 --> 00:18:43,440
crew vehicle that has actually its

556
00:18:47,750 --> 00:18:45,760
origins in nasa

557
00:18:49,830 --> 00:18:47,760
starting back in the late 1980s in a

558
00:18:51,270 --> 00:18:49,840
program called the hl-20 which developed

559
00:18:53,350 --> 00:18:51,280
for about eight years

560
00:18:54,789 --> 00:18:53,360
is one of the most developed and tested

561
00:18:56,150 --> 00:18:54,799
programs that nasa worked on and

562
00:18:58,070 --> 00:18:56,160
originally the vehicle was meant to be

563
00:18:59,909 --> 00:18:58,080

the lifeboat for the space station

564
00:19:01,830 --> 00:18:59,919
we took that program and began working

565
00:19:04,150 --> 00:19:01,840
now about six years ago on our program

566
00:19:06,070 --> 00:19:04,160
so in total there's been almost 14 15

567
00:19:08,390 --> 00:19:06,080
years worth of very advanced development

568
00:19:10,390 --> 00:19:08,400
on the effort the vehicle is a lifting

569
00:19:12,390 --> 00:19:10,400
body taking off vertically and landing

570
00:19:14,549 --> 00:19:12,400
horizontally it has a number of really

571
00:19:16,470 --> 00:19:14,559
key attributes that we think are quite

572
00:19:19,029 --> 00:19:16,480
good for this program it has the ability

573
00:19:21,190 --> 00:19:19,039
to be a reconfigurable vehicle so it can

574
00:19:22,630 --> 00:19:21,200
take all crew it could take cargo it can

575
00:19:24,950 --> 00:19:22,640
take critical cargo it comes in and

576
00:19:27,110 --> 00:19:24,960
lands on a runway we carry no hazardous

577
00:19:29,110 --> 00:19:27,120
materials on board so the ability for

578
00:19:31,510 --> 00:19:29,120
our vehicle to come into

579
00:19:33,510 --> 00:19:31,520
and and be accessed immediately upon

580
00:19:35,270 --> 00:19:33,520
landing is a very important element of

581
00:19:37,990 --> 00:19:35,280
what we're trying to accomplish

582
00:19:40,150 --> 00:19:38,000
we have in the ccdev1 program we were

583
00:19:41,590 --> 00:19:40,160
the largest award winner in that program

584
00:19:43,830 --> 00:19:41,600
and over the course of the program we

585
00:19:46,070 --> 00:19:43,840
decided to focus our efforts on working

586
00:19:47,830 --> 00:19:46,080
on specific hardware tasks that really

587
00:19:50,470 --> 00:19:47,840
move things forward in the course of

588
00:19:51,909 --> 00:19:50,480

that program we we built and tested our

589
00:19:54,310 --> 00:19:51,919
flight motors throughout the entire

590
00:19:56,470 --> 00:19:54,320
flight profile for the for the operation

591
00:19:57,830 --> 00:19:56,480
if you get a close-up of our vehicle you

592
00:19:59,909 --> 00:19:57,840
will see that it carries on board

593
00:20:01,990 --> 00:19:59,919
propulsion and that onboard propulsion

594
00:20:03,590 --> 00:20:02,000
allows us to have really flexible

595
00:20:05,270 --> 00:20:03,600
ability to board in fact we have no

596
00:20:06,549 --> 00:20:05,280
black zones on our abort system all the

597
00:20:09,190 --> 00:20:06,559
way through

598
00:20:10,789 --> 00:20:09,200
to orbit and we also have the ability to

599
00:20:11,750 --> 00:20:10,799
maneuver the vehicle while we're in

600
00:20:13,590 --> 00:20:11,760
orbit

601
00:20:16,230 --> 00:20:13,600
beyond the the motor testing that we did

602
00:20:18,230 --> 00:20:16,240
we actually began and built the first

603
00:20:19,909 --> 00:20:18,240
engineering test article so the first

604
00:20:21,669 --> 00:20:19,919
vehicle is under production for us and

605
00:20:23,110 --> 00:20:21,679
it is something that we have

606
00:20:24,470 --> 00:20:23,120
really been working hard on doing

607
00:20:26,549 --> 00:20:24,480
because we believe in our in our

608
00:20:27,750 --> 00:20:26,559
business that that hardware development

609
00:20:29,350 --> 00:20:27,760
should go in hand in hand with the

610
00:20:30,950 --> 00:20:29,360
software development and

611
00:20:32,870 --> 00:20:30,960
and the preparation network that we're

612
00:20:34,710 --> 00:20:32,880
doing for the next phase we're quite

613
00:20:36,549 --> 00:20:34,720

proud of being able to have won a

614
00:20:38,390 --> 00:20:36,559
significant award under the ccdev2

615
00:20:39,990 --> 00:20:38,400
program and under that award what we're

616
00:20:41,669 --> 00:20:40,000
essentially going to be able to do is

617
00:20:43,350 --> 00:20:41,679
take this vehicle and bring it to

618
00:20:44,789 --> 00:20:43,360
atmospheric flight tests so we will

619
00:20:46,390 --> 00:20:44,799
actually be able to take the vehicle up

620
00:20:48,310 --> 00:20:46,400
and test and in fact we have built a

621
00:20:50,070 --> 00:20:48,320
scale model of the test of the vehicle

622
00:20:51,669 --> 00:20:50,080
and tested it in december with the

623
00:20:54,310 --> 00:20:51,679
wonderful help from the nasa dryden

624
00:20:56,950 --> 00:20:54,320
centers and conducted a very significant

625
00:20:59,190 --> 00:20:56,960
series of flight tests from high

626
00:21:00,310 --> 00:20:59,200
altitude down in landing and reuse of

627
00:21:02,630 --> 00:21:00,320
the vehicle

628
00:21:04,070 --> 00:21:02,640
we're also moving forward on being able

629
00:21:06,149 --> 00:21:04,080
to do all work and we'll take the

630
00:21:08,070 --> 00:21:06,159
vehicle through the pdr stage by the end

631
00:21:10,070 --> 00:21:08,080
of the by the end of the cycle and in

632
00:21:11,590 --> 00:21:10,080
the ccdev2

633
00:21:14,070 --> 00:21:11,600
award process

634
00:21:15,990 --> 00:21:14,080
i wanted to conclude if i could by

635
00:21:17,510 --> 00:21:16,000
expressing our appreciation to charlie

636
00:21:18,789 --> 00:21:17,520
bolden and lori garver and all those at

637
00:21:20,710 --> 00:21:18,799
nasa and this has been a really

638
00:21:22,470 --> 00:21:20,720

tumultuous time in the space industry

639
00:21:24,149 --> 00:21:22,480
those of you who covered it know

640
00:21:25,830 --> 00:21:24,159
and it's it's a really difficult time

641
00:21:27,350 --> 00:21:25,840
and i'd like to to

642
00:21:30,549 --> 00:21:27,360
tell you a bit of a story since i don't

643
00:21:32,230 --> 00:21:30,559
have any more of my slides to bring out

644
00:21:33,669 --> 00:21:32,240
i i think many of us are in this

645
00:21:35,190 --> 00:21:33,679
industry because we have a passion for

646
00:21:37,669 --> 00:21:35,200
it and we believe in what we're doing

647
00:21:39,029 --> 00:21:37,679
and i had the recent ability to go

648
00:21:40,950 --> 00:21:39,039
through the smithsonian air and space

649
00:21:43,430 --> 00:21:40,960
museum and i go there very often when i

650
00:21:44,950 --> 00:21:43,440
need time to think and to develop my my

651
00:21:46,149 --> 00:21:44,960
my thought processes about the future

652
00:21:48,470 --> 00:21:46,159
and one of the things i noticed there

653
00:21:50,789 --> 00:21:48,480
was was really two true really three

654
00:21:52,230 --> 00:21:50,799
things in total the first being that

655
00:21:54,390 --> 00:21:52,240
when you look up in the in the building

656
00:21:56,710 --> 00:21:54,400
you see a lot of firsts a lot of people

657
00:21:58,149 --> 00:21:56,720
who have done pretty amazing things i

658
00:22:00,710 --> 00:21:58,159
wonder what would have happened in the

659
00:22:02,149 --> 00:22:00,720
past if the rights and curtis and and

660
00:22:04,149 --> 00:22:02,159
goddard would have been told well you

661
00:22:05,430 --> 00:22:04,159
can't do this it's not possible you'll

662
00:22:07,430 --> 00:22:05,440
never be able to make it you won't be

663
00:22:09,270 --> 00:22:07,440

able to get the funds we believe that we

664
00:22:11,110 --> 00:22:09,280
can do that and i also notice those

665
00:22:12,549 --> 00:22:11,120
vehicles are sitting alongside of many

666
00:22:14,310 --> 00:22:12,559
of our heritage programs there's no

667
00:22:16,470 --> 00:22:14,320
reason that what we do can't work hand

668
00:22:18,390 --> 00:22:16,480
in hand together with the with the past

669
00:22:20,149 --> 00:22:18,400
of nasa and where they are now i've

670
00:22:21,750 --> 00:22:20,159
heard and read many times in the last

671
00:22:22,789 --> 00:22:21,760
week about the end of the space shuttle

672
00:22:24,390 --> 00:22:22,799
program

673
00:22:26,549 --> 00:22:24,400
from my perspective i don't see it as an

674
00:22:29,270 --> 00:22:26,559
end i see it as a beginning of the next

675
00:22:31,430 --> 00:22:29,280
step i think space shuttle was a bridge

676
00:22:33,110 --> 00:22:31,440
to move forward our vehicle is based in

677
00:22:34,870 --> 00:22:33,120
large part on the successes on the

678
00:22:36,549 --> 00:22:34,880
triumphs of the challenges of the pain

679
00:22:38,870 --> 00:22:36,559
that was been been done in the space

680
00:22:40,470 --> 00:22:38,880
shuttle program and on behalf of my team

681
00:22:42,310 --> 00:22:40,480
who i believe i have the best team in

682
00:22:44,230 --> 00:22:42,320
the country working on this i'd like to

683
00:22:45,750 --> 00:22:44,240
express our appreciation not only to the

684
00:22:47,430 --> 00:22:45,760
leadership of nasa but to the men and

685
00:22:49,510 --> 00:22:47,440
women who've worked through this program

686
00:22:51,190 --> 00:22:49,520
to make this possible we would not be

687
00:22:52,950 --> 00:22:51,200
here if those people didn't do what they

688
00:22:54,950 --> 00:22:52,960

did and everything that we're doing in

689
00:22:56,710 --> 00:22:54,960
our vehicle being that we think it's the

690
00:22:58,470 --> 00:22:56,720
emotional connection back to the space

691
00:23:00,470 --> 00:22:58,480
shuttle has really been based on their

692
00:23:02,470 --> 00:23:00,480
success so to all of you out there i

693
00:23:04,149 --> 00:23:02,480
really do appreciate it and on behalf of

694
00:23:05,830 --> 00:23:04,159
all of us we thank you for your efforts

695
00:23:07,750 --> 00:23:05,840
and look forward to being that bridge

696
00:23:11,270 --> 00:23:07,760
continuing into the future i'd like to

697
00:23:13,590 --> 00:23:11,280
turn it over now to garrett from spacex

698
00:23:14,630 --> 00:23:13,600
thanks mark

699
00:23:16,789 --> 00:23:14,640
my name is garrett riesman i'm

700
00:23:19,909 --> 00:23:16,799
representing spacex and spacex was

701
00:23:22,230 --> 00:23:19,919
founded back in 2002 by elon musk and

702
00:23:24,549 --> 00:23:22,240
we've grown very rapidly we now have

703
00:23:26,549 --> 00:23:24,559
over 1300 employees

704
00:23:29,190 --> 00:23:26,559
and we've been working very hard but the

705
00:23:31,430 --> 00:23:29,200
company was founded originally with the

706
00:23:32,310 --> 00:23:31,440
idea to advance the cause of human space

707
00:23:34,230 --> 00:23:32,320
flight

708
00:23:36,149 --> 00:23:34,240
that's the whole purpose of our

709
00:23:38,230 --> 00:23:36,159
existence and it's actually this

710
00:23:40,870 --> 00:23:38,240
opportunity now to take this next step

711
00:23:42,470 --> 00:23:40,880
as part of ccdev2

712
00:23:44,789 --> 00:23:42,480
that not only

713
00:23:46,549 --> 00:23:44,799

takes us along our founding vision but

714
00:23:48,390 --> 00:23:46,559
also is also the reason why i left the

715
00:23:51,590 --> 00:23:48,400
astronaut office and joined up with

716
00:23:53,350 --> 00:23:51,600
spacex to help in any way i can and so

717
00:23:57,750 --> 00:23:53,360
now i'm i'm here to talk to you about

718
00:23:59,110 --> 00:23:57,760
ccdev2 ccdev2 our program is

719
00:24:01,190 --> 00:23:59,120
basically

720
00:24:03,669 --> 00:24:01,200
taking our established rocket to the

721
00:24:05,270 --> 00:24:03,679
next step and i actually brought my

722
00:24:08,149 --> 00:24:05,280
rocket with me so if you bear bear with

723
00:24:12,470 --> 00:24:09,590
it's not it's not the real one this is

724
00:24:14,950 --> 00:24:12,480
not actual size i don't want any uh

725
00:24:18,870 --> 00:24:14,960
any uh miscommunication there but

726
00:24:21,190 --> 00:24:18,880
the um falcon 9 rocket and the dragon

727
00:24:23,590 --> 00:24:21,200
spacecraft have both been built and

728
00:24:25,669 --> 00:24:23,600
flown the falcon 9 has flown twice

729
00:24:27,830 --> 00:24:25,679
and the second time it launched it

730
00:24:29,590 --> 00:24:27,840
carried the dragon spacecraft into orbit

731
00:24:31,510 --> 00:24:29,600
orbited the earth two times splashed

732
00:24:33,350 --> 00:24:31,520
down in the pacific ocean and was the

733
00:24:35,350 --> 00:24:33,360
first time a private company had brought

734
00:24:37,190 --> 00:24:35,360
back and successfully recovered a

735
00:24:38,710 --> 00:24:37,200
spacecraft from orbit

736
00:24:40,310 --> 00:24:38,720
so we're very very proud of that and

737
00:24:42,070 --> 00:24:40,320
basically we're taking it to the next

738
00:24:44,390 --> 00:24:42,080

level now this is something we've been

739
00:24:46,950 --> 00:24:44,400
planning for a long time the falcon 9

740
00:24:48,950 --> 00:24:46,960
rocket and a dragon capsule

741
00:24:50,549 --> 00:24:48,960
were designed from day one

742
00:24:52,630 --> 00:24:50,559
to carry people

743
00:24:54,149 --> 00:24:52,640
so when we built the falcon 9 rocket we

744
00:24:55,909 --> 00:24:54,159
had all the requirements in mind for

745
00:24:58,710 --> 00:24:55,919
human rating and when we built the

746
00:25:00,549 --> 00:24:58,720
dragon space capsule the same thing

747
00:25:02,710 --> 00:25:00,559
it's under contract and we've built this

748
00:25:05,590 --> 00:25:02,720
in partnership with nasa with a lot of

749
00:25:07,430 --> 00:25:05,600
support from our nasa partners and the

750
00:25:09,269 --> 00:25:07,440
idea is to use this rocket and the

751
00:25:12,230 --> 00:25:09,279
dragon spacecraft to supply the space

752
00:25:14,230 --> 00:25:12,240
station as part of the cots crs program

753
00:25:16,310 --> 00:25:14,240
which we've uh are proceeding along

754
00:25:17,669 --> 00:25:16,320
we'll have the next launch coming up uh

755
00:25:19,190 --> 00:25:17,679
later this year

756
00:25:20,390 --> 00:25:19,200
so on our next launch we intend to take

757
00:25:22,710 --> 00:25:20,400
the dragon all the way to the space

758
00:25:25,190 --> 00:25:22,720
station dock it unload it and bring it

759
00:25:26,789 --> 00:25:25,200
back so it takes cargo

760
00:25:28,390 --> 00:25:26,799
but one thing about it if you look at

761
00:25:30,710 --> 00:25:28,400
the at the capsule

762
00:25:31,830 --> 00:25:30,720
not this one because it's too small but

763
00:25:33,830 --> 00:25:31,840

if you look at the real one it has

764
00:25:35,990 --> 00:25:33,840
windows on it now i've never met any

765
00:25:37,350 --> 00:25:36,000
cargo that has to look out the window

766
00:25:38,710 --> 00:25:37,360
so the idea from

767
00:25:40,230 --> 00:25:38,720
the very beginning is a very graphic

768
00:25:41,830 --> 00:25:40,240
demonstration that we intended to put

769
00:25:44,630 --> 00:25:41,840
people on there

770
00:25:46,230 --> 00:25:44,640
so ccdev2 for us is all about everything

771
00:25:48,950 --> 00:25:46,240
we need to do

772
00:25:51,430 --> 00:25:48,960
to take what we have and get it ready to

773
00:25:52,310 --> 00:25:51,440
actually put astronauts inside of it

774
00:25:53,590 --> 00:25:52,320
and

775
00:25:55,430 --> 00:25:53,600
so with that what i'd like to do is show

776
00:25:57,269 --> 00:25:55,440
you a little video which i think will

777
00:26:24,310 --> 00:25:57,279
give you a better idea of what we have

778
00:26:27,909 --> 00:26:25,990
if there'd been people sitting in the

779
00:26:47,990 --> 00:26:27,919
dragon capsule today they would have had

780
00:26:51,430 --> 00:26:49,909
there's only one made to develop an item

781
00:26:52,789 --> 00:26:51,440
and that is the launch escape system

782
00:26:54,630 --> 00:26:52,799
we're going to build the escape engines

783
00:26:56,470 --> 00:26:54,640
into the sidewall of the spacecraft

784
00:26:58,070 --> 00:26:56,480
you'll actually be able to have escape

785
00:27:00,549 --> 00:26:58,080
capability all the way to orbit even

786
00:27:01,830 --> 00:27:00,559
apollo didn't have that also

787
00:27:03,909 --> 00:27:01,840
because you don't have to release the

788
00:27:05,669 --> 00:27:03,919

escape tower every time you you don't

789
00:27:21,190 --> 00:27:05,679
have that as a necessary thing that has

790
00:27:24,630 --> 00:27:23,029
capability is the very reason spacex was

791
00:27:34,230 --> 00:27:24,640
founded so we will do whatever we need

792
00:27:37,350 --> 00:27:35,990
so if uh if you like that video as much

793
00:27:38,950 --> 00:27:37,360
as i did i've

794
00:27:41,750 --> 00:27:38,960
told to tell you you can see it on

795
00:27:44,310 --> 00:27:41,760
youtube on the

796
00:27:46,230 --> 00:27:44,320
on the spacex channel so please tune in

797
00:27:47,990 --> 00:27:46,240
um so it's to give you a little more

798
00:27:51,029 --> 00:27:48,000
specifics of what you just saw on the

799
00:27:52,549 --> 00:27:51,039
video during our ccdev 2 project

800
00:27:55,029 --> 00:27:52,559
over the course of the next year our

801
00:27:56,470 --> 00:27:55,039
focus will be that launch abort system

802
00:27:58,470 --> 00:27:56,480
and the

803
00:28:00,950 --> 00:27:58,480
designing and developing and testing the

804
00:28:02,950 --> 00:28:00,960
engines the tanks and all the related

805
00:28:04,789 --> 00:28:02,960
components for that propulsion system

806
00:28:06,870 --> 00:28:04,799
will be our main focus

807
00:28:08,710 --> 00:28:06,880
in addition we have to design all the

808
00:28:12,230 --> 00:28:08,720
systems that go along with that the

809
00:28:14,389 --> 00:28:12,240
abort modes triggers boundaries

810
00:28:15,990 --> 00:28:14,399
doing the risk assessments and safety

811
00:28:17,830 --> 00:28:16,000
emission assurance work that needs to be

812
00:28:19,350 --> 00:28:17,840
done and then we'll be working on crew

813
00:28:22,070 --> 00:28:19,360

accommodations

814
00:28:24,470 --> 00:28:22,080
so we'll be looking at seats suits

815
00:28:26,470 --> 00:28:24,480
displays controls uh life support

816
00:28:29,350 --> 00:28:26,480
systems everything astronauts

817
00:28:31,190 --> 00:28:29,360
need in inside the dragon and that will

818
00:28:33,350 --> 00:28:31,200
be the focus of our efforts we have a

819
00:28:34,630 --> 00:28:33,360
lot of work to do but we have a lot of

820
00:28:37,350 --> 00:28:34,640
great partners and a lot of help from

821
00:28:39,510 --> 00:28:37,360
nasa which we appreciate and uh we look

822
00:28:42,789 --> 00:28:39,520
forward to getting ready to put people

823
00:28:45,190 --> 00:28:42,799
in the dragon thank you very much

824
00:28:47,350 --> 00:28:45,200
oh i'm sorry and introduce uh this is

825
00:28:49,430 --> 00:28:47,360
john elvin from boeing

826
00:28:51,590 --> 00:28:49,440
great thanks garrett

827
00:28:54,070 --> 00:28:51,600
good morning it's um exciting to be here

828
00:28:55,510 --> 00:28:54,080
it's exciting to be a part of this group

829
00:28:57,269 --> 00:28:55,520
we're certainly looking forward with the

830
00:29:00,230 --> 00:28:57,279
opportunity to

831
00:29:02,549 --> 00:29:00,240
partner with nasa as we build on

832
00:29:03,990 --> 00:29:02,559
what we've done from apollo shuttle

833
00:29:05,590 --> 00:29:04,000
station

834
00:29:08,230 --> 00:29:05,600
and leverage that into this next phase

835
00:29:10,470 --> 00:29:08,240
of human space flight

836
00:29:12,389 --> 00:29:10,480
so this morning i have a couple slides

837
00:29:14,310 --> 00:29:12,399
to show you the the system that we're

838
00:29:16,470 --> 00:29:14,320

working on a little bit of what we

839
00:29:19,909 --> 00:29:16,480
accomplished in ccdev

840
00:29:22,710 --> 00:29:19,919
1 and then our plans for ccdev 2.

841
00:29:26,470 --> 00:29:22,720
so if we can have the first slide please

842
00:29:29,430 --> 00:29:28,549
so this is the integrated system that we

843
00:29:31,830 --> 00:29:29,440
are

844
00:29:34,070 --> 00:29:31,840
developing we're focusing on the design

845
00:29:35,909 --> 00:29:34,080
of a spacecraft that will be flown on a

846
00:29:37,830 --> 00:29:35,919
proven launch vehicle

847
00:29:39,430 --> 00:29:37,840
currently we're in the in the selection

848
00:29:41,669 --> 00:29:39,440
process of going through the procurement

849
00:29:45,110 --> 00:29:41,679
of that launch vehicle

850
00:29:46,950 --> 00:29:45,120
it will launch from ksc

851
00:29:49,029 --> 00:29:46,960
rendezvous with an orbiting platform

852
00:29:50,310 --> 00:29:49,039
such as space station or bigelow space

853
00:29:52,149 --> 00:29:50,320
complex

854
00:29:56,470 --> 00:29:52,159
it can stay on orbit for up to six

855
00:29:58,630 --> 00:29:56,480
months to serve the lifeboat function

856
00:30:01,430 --> 00:29:58,640
after the after it's time on orbit it

857
00:30:03,750 --> 00:30:01,440
will then deorbit the service module is

858
00:30:05,669 --> 00:30:03,760
discarded during re-entry

859
00:30:08,950 --> 00:30:05,679
we land on parachutes

860
00:30:11,590 --> 00:30:08,960
using airbags on land the capsule is

861
00:30:13,430 --> 00:30:11,600
reusable for up to 10 missions it's our

862
00:30:15,590 --> 00:30:13,440
design point

863
00:30:17,510 --> 00:30:15,600

and then importantly an integrated piece

864
00:30:19,110 --> 00:30:17,520
of this system is a mission control

865
00:30:20,549 --> 00:30:19,120
center and the ground processing

866
00:30:23,430 --> 00:30:20,559
capability

867
00:30:25,190 --> 00:30:23,440
so as we've worked through ccdev1 and on

868
00:30:27,110 --> 00:30:25,200
through ccdev2

869
00:30:28,710 --> 00:30:27,120
subsequently completing development

870
00:30:30,230 --> 00:30:28,720
we'll be focused on this entire

871
00:30:32,549 --> 00:30:30,240
integrated system as a turnkey

872
00:30:36,710 --> 00:30:32,559
capability

873
00:30:40,789 --> 00:30:38,630
this is the schedule that we're working

874
00:30:42,950 --> 00:30:40,799
to

875
00:30:45,669 --> 00:30:42,960
colored in is cc dev one during that

876
00:30:47,750 --> 00:30:45,679
phase we took the design of the

877
00:30:50,470 --> 00:30:47,760
integrated system through systems

878
00:30:53,190 --> 00:30:50,480
definition review sdr

879
00:30:55,990 --> 00:30:53,200
and that was completed last november

880
00:30:57,190 --> 00:30:56,000
as we start into ccdev2 now we'll be

881
00:30:59,190 --> 00:30:57,200
working

882
00:31:01,029 --> 00:30:59,200
through pdr

883
00:31:02,710 --> 00:31:01,039
part of the way towards

884
00:31:04,070 --> 00:31:02,720
pdr's preliminary design review and then

885
00:31:05,990 --> 00:31:04,080
part of the way towards the critical

886
00:31:07,430 --> 00:31:06,000
design review

887
00:31:09,190 --> 00:31:07,440
there are four test flights that are

888
00:31:12,070 --> 00:31:09,200

part of our program

889
00:31:14,630 --> 00:31:12,080
pad abort test that is scheduled in 2013

890
00:31:16,549 --> 00:31:14,640
to test out the abort system just

891
00:31:18,789 --> 00:31:16,559
launching from the ground

892
00:31:20,710 --> 00:31:18,799
and then three flights that will use

893
00:31:21,990 --> 00:31:20,720
rockets one that will be an orbital

894
00:31:23,750 --> 00:31:22,000
flight test

895
00:31:25,110 --> 00:31:23,760
that will put the spacecraft into orbit

896
00:31:27,990 --> 00:31:25,120
will operate for

897
00:31:30,549 --> 00:31:28,000
a couple days in orbit uncrewed

898
00:31:33,750 --> 00:31:30,559
and then re-enter an ascent abort test

899
00:31:36,230 --> 00:31:33,760
that will test the abort system at

900
00:31:39,509 --> 00:31:36,240
maximum dynamic pressure max q that's

901
00:31:41,590 --> 00:31:39,519
the stressing case for the abort system

902
00:31:43,430 --> 00:31:41,600
and then finally a true two crew flight

903
00:31:45,350 --> 00:31:43,440
test that will happen in

904
00:31:47,350 --> 00:31:45,360
in early 15

905
00:31:50,549 --> 00:31:47,360
and then we'll be ready for

906
00:31:51,909 --> 00:31:50,559
operational readiness later in 15.

907
00:31:53,430 --> 00:31:51,919
so those test flights are part of our

908
00:31:56,230 --> 00:31:53,440
schedule going forward

909
00:31:57,830 --> 00:31:56,240
the design of our spacecraft is

910
00:31:59,269 --> 00:31:57,840
we're really focusing on keeping it

911
00:32:01,029 --> 00:31:59,279
simple and that's that's for several

912
00:32:03,590 --> 00:32:01,039
reasons

913
00:32:05,430 --> 00:32:03,600

as phil mentioned this is uh

914
00:32:07,110 --> 00:32:05,440
an environment where nasa's investment

915
00:32:09,509 --> 00:32:07,120
is fixed

916
00:32:11,269 --> 00:32:09,519
and so we need to really control the

917
00:32:14,070 --> 00:32:11,279
risk that we have during the development

918
00:32:16,310 --> 00:32:14,080
phase and so selecting

919
00:32:17,750 --> 00:32:16,320
technologies that are high trl allows us

920
00:32:20,149 --> 00:32:17,760
to manage that

921
00:32:22,710 --> 00:32:20,159
in addition having a simple system makes

922
00:32:24,789 --> 00:32:22,720
it safe and reliable

923
00:32:26,149 --> 00:32:24,799
and it helps us to keep the operational

924
00:32:29,830 --> 00:32:26,159
costs low so those are really the

925
00:32:34,310 --> 00:32:29,840
focuses of our design as we move forward

926
00:32:38,470 --> 00:32:36,070
these are the teammates that we have as

927
00:32:40,070 --> 00:32:38,480
part of our ccdev2 team

928
00:32:41,830 --> 00:32:40,080
airborne systems will be working on

929
00:32:44,389 --> 00:32:41,840
parachutes for us

930
00:32:45,750 --> 00:32:44,399
aries is doing some areas as a company

931
00:32:48,149 --> 00:32:45,760
in houston

932
00:32:49,190 --> 00:32:48,159
strong background in safety

933
00:32:50,710 --> 00:32:49,200
type

934
00:32:52,710 --> 00:32:50,720
disciplines and they'll be helping us

935
00:32:54,230 --> 00:32:52,720
with loss of crew loss of mission risk

936
00:32:56,310 --> 00:32:54,240
assessments

937
00:32:59,430 --> 00:32:56,320
we've been teamed with bigelow through

938
00:33:01,190 --> 00:32:59,440

ccdev1 and now through ccdev2

939
00:33:03,909 --> 00:33:01,200
a lot of our testing is done at the

940
00:33:05,909 --> 00:33:03,919
bigelow facility work on mockups

941
00:33:08,070 --> 00:33:05,919
and as a

942
00:33:10,470 --> 00:33:08,080
a user of our system

943
00:33:12,630 --> 00:33:10,480
also helping us to find the requirements

944
00:33:14,389 --> 00:33:12,640
ilc dover is working on the landing

945
00:33:16,630 --> 00:33:14,399
system airbags

946
00:33:18,630 --> 00:33:16,640
pratt whitney rocketdyne is

947
00:33:20,470 --> 00:33:18,640
working on the abort system the engines

948
00:33:22,230 --> 00:33:20,480
associated with that and the tanks and

949
00:33:24,710 --> 00:33:22,240
integrated system

950
00:33:26,710 --> 00:33:24,720
spincraft is a provider of the

951
00:33:28,630 --> 00:33:26,720
spun form domes that we use to build our

952
00:33:31,350 --> 00:33:28,640
pressure structure out of

953
00:33:33,350 --> 00:33:31,360
and finally on the list here is usa who

954
00:33:36,149 --> 00:33:33,360
will be helping us with some

955
00:33:39,990 --> 00:33:36,159
flight ops and training activity

956
00:33:41,909 --> 00:33:40,000
in addition we are teamed with

957
00:33:44,789 --> 00:33:41,919
bigelow and space adventures as

958
00:33:45,990 --> 00:33:44,799
potential users in the future and so

959
00:33:47,430 --> 00:33:46,000
they're helping to define the

960
00:33:48,950 --> 00:33:47,440
requirements of a vehicle as we move

961
00:33:50,830 --> 00:33:48,960
forward

962
00:33:54,470 --> 00:33:50,840
next

963
00:33:55,750 --> 00:33:54,480

slide just some of um in summary i'll

964
00:33:58,149 --> 00:33:55,760
fashion i'll show you some of the

965
00:33:59,669 --> 00:33:58,159
accomplishments during ccdev

966
00:34:01,509 --> 00:33:59,679
the the biggest one as i mentioned was

967
00:34:02,870 --> 00:34:01,519
we took the design through sdr a lot of

968
00:34:05,190 --> 00:34:02,880
effort in that and then these are some

969
00:34:07,110 --> 00:34:05,200
of the demonstrations we did about 20

970
00:34:08,950 --> 00:34:07,120
drop tests

971
00:34:10,389 --> 00:34:08,960
using the airbags to demonstrate how

972
00:34:12,629 --> 00:34:10,399
that system worked

973
00:34:14,869 --> 00:34:12,639
some uprighting tests in a contingency

974
00:34:16,629 --> 00:34:14,879
we land in water capsules have a

975
00:34:18,950 --> 00:34:16,639
condition called stable 2 where they can

976
00:34:20,149 --> 00:34:18,960
be nose down the uprighting test showed

977
00:34:21,270 --> 00:34:20,159
that we could upright from that

978
00:34:23,109 --> 00:34:21,280
condition

979
00:34:24,790 --> 00:34:23,119
integrated the life support system to

980
00:34:26,869 --> 00:34:24,800
verify we could handle the metabolic

981
00:34:29,270 --> 00:34:26,879
load of seven crew

982
00:34:32,069 --> 00:34:29,280
and then built the crew module mockup so

983
00:34:34,389 --> 00:34:32,079
we could have the the crew help us with

984
00:34:35,909 --> 00:34:34,399
positioning panels and and that sort of

985
00:34:37,829 --> 00:34:35,919
thing

986
00:34:41,829 --> 00:34:37,839
more demonstrations on the next slide if

987
00:34:44,869 --> 00:34:43,589
having an inexpensive heat shield is

988
00:34:46,790 --> 00:34:44,879

important to our model because we

989
00:34:48,869 --> 00:34:46,800
discard that each mission so we did some

990
00:34:52,069 --> 00:34:48,879
work on new material new manufacturing

991
00:34:54,310 --> 00:34:52,079
process for low-cost heat shields

992
00:34:56,149 --> 00:34:54,320
we fire the abort engine

993
00:34:59,109 --> 00:34:56,159
it's a it's an engine with a lot of

994
00:35:00,790 --> 00:34:59,119
heritage it's used with a different fuel

995
00:35:03,349 --> 00:35:00,800
for our system so we fired it with that

996
00:35:05,109 --> 00:35:03,359
fuel and it performed well

997
00:35:06,470 --> 00:35:05,119
we fabricated the pressure vessel

998
00:35:08,550 --> 00:35:06,480
structure

999
00:35:10,230 --> 00:35:08,560
very innovative approach here of

1000
00:35:12,390 --> 00:35:10,240
building a structure it has no welds

1001
00:35:16,069 --> 00:35:12,400
it's got one joint that is bolted

1002
00:35:18,310 --> 00:35:16,079
together out it's constructed out of two

1003
00:35:20,230 --> 00:35:18,320
spun form pieces

1004
00:35:21,510 --> 00:35:20,240
another innovation that helps with

1005
00:35:22,870 --> 00:35:21,520
affordability

1006
00:35:25,670 --> 00:35:22,880
and then finally we integrated the

1007
00:35:27,430 --> 00:35:25,680
automated rendezvous and docking system

1008
00:35:29,670 --> 00:35:27,440
which is based on the orbital express

1009
00:35:31,750 --> 00:35:29,680
system that demonstrated on orbit

1010
00:35:33,589 --> 00:35:31,760
automated rendezvous and docking

1011
00:35:35,589 --> 00:35:33,599
and that's all working well

1012
00:35:40,310 --> 00:35:35,599
we'll continue this through ccdev2 on

1013
00:35:43,910 --> 00:35:42,390

importantly we'll take the design

1014
00:35:45,670 --> 00:35:43,920
maturity

1015
00:35:46,470 --> 00:35:45,680
through preliminary design review and

1016
00:35:48,310 --> 00:35:46,480
then

1017
00:35:50,150 --> 00:35:48,320
some amount past preliminary design

1018
00:35:53,030 --> 00:35:50,160
review but we'll go through a couple of

1019
00:35:54,470 --> 00:35:53,040
design analysis cycles some subsystem

1020
00:35:55,589 --> 00:35:54,480
preliminary design reviews and then

1021
00:35:57,510 --> 00:35:55,599
finally the integrated system

1022
00:35:59,430 --> 00:35:57,520
preliminary design review

1023
00:36:01,190 --> 00:35:59,440
and then we've got 13 development test

1024
00:36:03,349 --> 00:36:01,200
plans six of those we pulled out as

1025
00:36:06,950 --> 00:36:03,359
demonstrations that will be

1026
00:36:08,550 --> 00:36:06,960
included as milestones in ccdev 2.

1027
00:36:10,310 --> 00:36:08,560
pratt mini rocketdyne is developing a

1028
00:36:12,790 --> 00:36:10,320
lightweight version of the abort engine

1029
00:36:14,790 --> 00:36:12,800
and we'll fabricate that and fire it

1030
00:36:16,390 --> 00:36:14,800
more landing back air

1031
00:36:17,990 --> 00:36:16,400
drop tests this time we'll add

1032
00:36:20,390 --> 00:36:18,000
horizontal velocity in addition to

1033
00:36:22,150 --> 00:36:20,400
vertical velocity so we can simulate

1034
00:36:24,150 --> 00:36:22,160
landing on parachutes

1035
00:36:25,990 --> 00:36:24,160
we'll be doing wind tunnel testing

1036
00:36:27,589 --> 00:36:26,000
initially with the spacecraft as shown

1037
00:36:30,150 --> 00:36:27,599
there and then once we select the launch

1038
00:36:32,630 --> 00:36:30,160

vehicle we'll add the launch vehicle to

1039
00:36:34,550 --> 00:36:32,640
those wind tunnel tests

1040
00:36:36,550 --> 00:36:34,560
we're doing some parachute drop tests

1041
00:36:38,829 --> 00:36:36,560
including deploying airbags and landing

1042
00:36:41,430 --> 00:36:38,839
on the airbags using

1043
00:36:43,270 --> 00:36:41,440
parachutes expelling the fuel for our

1044
00:36:45,910 --> 00:36:43,280
board system is a significant thing we

1045
00:36:46,870 --> 00:36:45,920
have to expel all that fuel in 3.2

1046
00:36:48,470 --> 00:36:46,880
seconds

1047
00:36:49,190 --> 00:36:48,480
and so we'll be doing demonstration of

1048
00:36:51,670 --> 00:36:49,200
the

1049
00:36:54,150 --> 00:36:51,680
pressure tanks ability to do that

1050
00:36:55,430 --> 00:36:54,160
and then finally once we select a launch

1051
00:36:57,190 --> 00:36:55,440
vehicle we'll be integrating the

1052
00:36:58,710 --> 00:36:57,200
emergency detection system of that

1053
00:37:01,670 --> 00:36:58,720
launch vehicle with our launch abort

1054
00:37:05,109 --> 00:37:01,680
system to verify that those avionics can

1055
00:37:11,510 --> 00:37:06,950
so a lot of work planned for ccdev2

1056
00:37:15,349 --> 00:37:14,150
this is really our our mantra here as we

1057
00:37:16,790 --> 00:37:15,359
go forward

1058
00:37:18,790 --> 00:37:16,800
all of our design is focused on

1059
00:37:20,550 --> 00:37:18,800
delivering a safe vehicle

1060
00:37:23,349 --> 00:37:20,560
one that's affordable

1061
00:37:25,990 --> 00:37:23,359
and one that can be fielded soon so that

1062
00:37:28,310 --> 00:37:26,000
we can close the gap that phil and ed

1063
00:37:29,109 --> 00:37:28,320

described up front between the

1064
00:37:34,790 --> 00:37:29,119
the

1065
00:37:37,030 --> 00:37:34,800
next u.s ability to carry astronauts to

1066
00:37:38,710 --> 00:37:37,040
station

1067
00:37:39,510 --> 00:37:38,720
and so that's what i had for today

1068
00:37:41,589 --> 00:37:39,520
thanks

1069
00:37:43,510 --> 00:37:41,599
thank you john we have some time for

1070
00:37:45,510 --> 00:37:43,520
questions so please wait for the

1071
00:37:50,390 --> 00:37:45,520
microphone and please give your name and

1072
00:37:55,589 --> 00:37:52,790
seth bernstein associated press uh

1073
00:37:57,270 --> 00:37:55,599
multipart for the four participants um i

1074
00:37:58,630 --> 00:37:57,280
guess less so for john because you gave

1075
00:38:02,150 --> 00:37:58,640
us some dates

1076
00:38:04,870 --> 00:38:02,160
uh first for for garrett elon before cc

1077
00:38:07,270 --> 00:38:04,880
dev2 announcement said if you get if he

1078
00:38:10,550 --> 00:38:07,280
got enough money he could do it um

1079
00:38:13,670 --> 00:38:10,560
deliver in three years uh crew is what

1080
00:38:14,870 --> 00:38:13,680
you got the 75 million enough money

1081
00:38:19,750 --> 00:38:14,880
or

1082
00:38:21,910 --> 00:38:19,760
two gentlemen um from the the less

1083
00:38:22,870 --> 00:38:21,920
proven uh you know the the ones that are

1084
00:38:24,310 --> 00:38:22,880
still

1085
00:38:26,950 --> 00:38:24,320
a little

1086
00:38:29,990 --> 00:38:26,960
newer to the field here can you give us

1087
00:38:32,470 --> 00:38:30,000
some time frames on given what you

1088
00:38:34,150 --> 00:38:32,480

what's come out now when do you expect

1089
00:38:35,030 --> 00:38:34,160
your first

1090
00:38:41,990 --> 00:38:35,040
crew

1091
00:38:43,030 --> 00:38:42,000
vehicle to go into orbit

1092
00:38:44,870 --> 00:38:43,040
so

1093
00:38:46,790 --> 00:38:44,880
well uh i guess i could start with

1094
00:38:49,510 --> 00:38:46,800
answering your question about uh how

1095
00:38:51,109 --> 00:38:49,520
long it would take and and uh the ccdev2

1096
00:38:56,150 --> 00:38:51,119
project

1097
00:38:58,069 --> 00:38:56,160
um so uh you know we still we still

1098
00:39:00,870 --> 00:38:58,079
believe that we can have a person in the

1099
00:39:02,630 --> 00:39:00,880
dragon fly people a crew dragon within

1100
00:39:04,870 --> 00:39:02,640
three years from right now

1101
00:39:07,510 --> 00:39:04,880
however uh yeah we would need additional

1102
00:39:08,470 --> 00:39:07,520
support from nasa beyond the ccdev2

1103
00:39:10,069 --> 00:39:08,480
program

1104
00:39:12,550 --> 00:39:10,079
to get us through those last two years

1105
00:39:16,390 --> 00:39:14,310
so thank you for the question uh from

1106
00:39:17,990 --> 00:39:16,400
from our perspective you didn't see my

1107
00:39:20,150 --> 00:39:18,000
timeline the really good one that i had

1108
00:39:21,430 --> 00:39:20,160
up there

1109
00:39:23,430 --> 00:39:21,440
it was really good pictures it was

1110
00:39:24,230 --> 00:39:23,440
wonderful we'll send it to you later but

1111
00:39:25,990 --> 00:39:24,240
uh

1112
00:39:28,150 --> 00:39:26,000
specifically the two two-part question

1113
00:39:30,390 --> 00:39:28,160

one is that we our vehicle has been in

1114
00:39:32,630 --> 00:39:30,400
design and testing now for over 12 years

1115
00:39:34,870 --> 00:39:32,640
going on 13 years so it's it's quite

1116
00:39:37,270 --> 00:39:34,880
well known in terms of its design we're

1117
00:39:39,349 --> 00:39:37,280
flying uh on an atlas v rocket which has

1118
00:39:41,270 --> 00:39:39,359
had 25 flights and it's going to have 40

1119
00:39:43,270 --> 00:39:41,280
before we go up our timeline is that we

1120
00:39:45,910 --> 00:39:43,280
will be expecting to start our

1121
00:39:48,150 --> 00:39:45,920
atmospheric tests in 2012 for the

1122
00:39:50,870 --> 00:39:48,160
vehicle we're expecting to then do

1123
00:39:53,990 --> 00:39:50,880
suborbital flights in 2013 and do our

1124
00:39:55,510 --> 00:39:54,000
first orbital flights in 2014 and by the

1125
00:39:58,069 --> 00:39:55,520
end of that period we would then be

1126
00:40:00,230 --> 00:39:58,079
crewed and be looking to start our our

1127
00:40:03,910 --> 00:40:00,240
orbital transfer service

1128
00:40:08,069 --> 00:40:05,589
seth also thank you for the question um

1129
00:40:09,349 --> 00:40:08,079
we all of our milestones are included in

1130
00:40:10,950 --> 00:40:09,359
our space act agreement including the

1131
00:40:12,470 --> 00:40:10,960
dates for for all the objectives under

1132
00:40:14,550 --> 00:40:12,480
ccdev2

1133
00:40:15,589 --> 00:40:14,560
follow-on work for orbital space flight

1134
00:40:17,990 --> 00:40:15,599
will

1135
00:40:20,710 --> 00:40:18,000
be continued under under our founders

1136
00:40:22,069 --> 00:40:20,720
funding um but if ccdev3 or commercial

1137
00:40:24,310 --> 00:40:22,079
crew follow-on is there then we'll

1138
00:40:26,069 --> 00:40:24,320

continue to seek that and accelerate our

1139
00:40:27,750 --> 00:40:26,079
program we don't release launch dates

1140
00:40:29,910 --> 00:40:27,760
for orbital human spaceflight and i'm

1141
00:40:33,030 --> 00:40:29,920
not prepared to to release those today

1142
00:40:36,790 --> 00:40:35,030
okay right here hi ken kramer for space

1143
00:40:38,470 --> 00:40:36,800
flight magazine this is a kind of a

1144
00:40:40,710 --> 00:40:38,480
general question for all of you i'd like

1145
00:40:41,750 --> 00:40:40,720
to know about uh your business models do

1146
00:40:44,390 --> 00:40:41,760
you think

1147
00:40:47,109 --> 00:40:44,400
um that there is a market to support

1148
00:40:49,030 --> 00:40:47,119
more than one or two

1149
00:40:51,109 --> 00:40:49,040
of these crew transport vehicles given

1150
00:40:52,550 --> 00:40:51,119
the way the economy is

1151
00:40:54,470 --> 00:40:52,560
you're going to have to find customers

1152
00:40:55,829 --> 00:40:54,480
besides nasa do you think they're there

1153
00:40:56,950 --> 00:40:55,839
and what are you doing about it thank

1154
00:40:58,710 --> 00:40:56,960
you

1155
00:41:00,710 --> 00:40:58,720
i'll take a shot at that i absolutely do

1156
00:41:02,230 --> 00:41:00,720
believe that um

1157
00:41:05,109 --> 00:41:02,240
customers in the future

1158
00:41:06,630 --> 00:41:05,119
safety is is the absolute after that

1159
00:41:08,870 --> 00:41:06,640
it's going to be priced and customers

1160
00:41:10,390 --> 00:41:08,880
will be will be picking based on price

1161
00:41:11,829 --> 00:41:10,400
and i believe there's a market for for

1162
00:41:13,349 --> 00:41:11,839
multiple um

1163
00:41:15,030 --> 00:41:13,359

multiple suppliers launching people into

1164
00:41:17,670 --> 00:41:15,040
orbit as long as the prices

1165
00:41:20,470 --> 00:41:17,680
is competitive so thank you

1166
00:41:22,069 --> 00:41:20,480
from our perspective i think speaking

1167
00:41:23,430 --> 00:41:22,079
words you can say anyone can say that

1168
00:41:24,790 --> 00:41:23,440
there's a market i think what we are

1169
00:41:26,550 --> 00:41:24,800
doing is putting a lot of money behind

1170
00:41:28,630 --> 00:41:26,560
it because we believe in it and one of

1171
00:41:30,790 --> 00:41:28,640
the reasons we do is that nasa is just

1172
00:41:32,550 --> 00:41:30,800
but one customer and taking people to

1173
00:41:34,150 --> 00:41:32,560
space is but one activity from our

1174
00:41:35,750 --> 00:41:34,160
vehicle we're designing a vehicle that

1175
00:41:37,430 --> 00:41:35,760
has multiple purposes we think there are

1176
00:41:39,349 --> 00:41:37,440
other things we can do in space the

1177
00:41:41,829 --> 00:41:39,359
servicing mission in leo for example is

1178
00:41:43,990 --> 00:41:41,839
a big market having a

1179
00:41:45,750 --> 00:41:44,000
shuttle-like vehicle that is

1180
00:41:47,750 --> 00:41:45,760
modernized by 30 years and has the

1181
00:41:49,510 --> 00:41:47,760
capabilities to do new things gives us

1182
00:41:51,829 --> 00:41:49,520
other markets that we can look towards

1183
00:41:53,349 --> 00:41:51,839
in space and we're very confident that

1184
00:41:55,030 --> 00:41:53,359
those other markets in addition to the

1185
00:41:58,470 --> 00:41:55,040
nasa markets will be able to support

1186
00:42:01,109 --> 00:41:59,750
i haven't had a chance to study our

1187
00:42:02,550 --> 00:42:01,119
business plan i've only

1188
00:42:04,790 --> 00:42:02,560

been working in the spacex for two

1189
00:42:05,990 --> 00:42:04,800
months now so that that part i haven't

1190
00:42:08,470 --> 00:42:06,000
covered but i can tell you that in

1191
00:42:10,390 --> 00:42:08,480
general uh competition is a good thing

1192
00:42:12,309 --> 00:42:10,400
as we said right in the beginning of the

1193
00:42:13,750 --> 00:42:12,319
press conference and also having

1194
00:42:15,109 --> 00:42:13,760
multiple

1195
00:42:17,030 --> 00:42:15,119
vehicles that can get you access to

1196
00:42:20,390 --> 00:42:17,040
space i was in the astronaut office when

1197
00:42:21,670 --> 00:42:20,400
we lost uh columbia and i know that uh

1198
00:42:23,109 --> 00:42:21,680
you know we're able to keep supporting

1199
00:42:24,630 --> 00:42:23,119
space station because our russian

1200
00:42:26,470 --> 00:42:24,640
partners stepped up and

1201
00:42:28,069 --> 00:42:26,480
uh and had the soyuz vehicle which is

1202
00:42:29,349 --> 00:42:28,079
completely independent so i think

1203
00:42:30,630 --> 00:42:29,359
there's real technical reasons why you

1204
00:42:32,710 --> 00:42:30,640
might want to do that and i'll just

1205
00:42:35,349 --> 00:42:32,720
leave it at that

1206
00:42:37,510 --> 00:42:35,359
i have a couple comments to the question

1207
00:42:39,510 --> 00:42:37,520
first of all i think there is a market

1208
00:42:40,710 --> 00:42:39,520
beyond beyond nasa

1209
00:42:42,390 --> 00:42:40,720
space adventures has certainly

1210
00:42:44,550 --> 00:42:42,400
demonstrated that with their flights to

1211
00:42:47,109 --> 00:42:44,560
space station to this point

1212
00:42:48,230 --> 00:42:47,119
and the work that bigelow airspace is

1213
00:42:50,150 --> 00:42:48,240

doing

1214
00:42:51,990 --> 00:42:50,160
is um is

1215
00:42:53,510 --> 00:42:52,000
demonstrating that we took mr bigelow

1216
00:42:55,030 --> 00:42:53,520
over the farnborough air show last year

1217
00:42:57,270 --> 00:42:55,040
and had an opportunity to meet with

1218
00:42:59,990 --> 00:42:57,280
several of his potential clients who are

1219
00:43:01,750 --> 00:43:00,000
primarily countries who want to

1220
00:43:03,910 --> 00:43:01,760
have a space program but can't afford

1221
00:43:06,470 --> 00:43:03,920
the infrastructure of their own

1222
00:43:08,950 --> 00:43:06,480
dedicated space program and but they do

1223
00:43:12,470 --> 00:43:08,960
have funds available to to rent a piece

1224
00:43:14,630 --> 00:43:12,480
of bigelow's space complex for some

1225
00:43:17,349 --> 00:43:14,640
number of months or years and have their

1226
00:43:19,430 --> 00:43:17,359
own astronauts and do their own science

1227
00:43:23,030 --> 00:43:19,440
quantifying that market and basing a

1228
00:43:25,589 --> 00:43:23,040
business case on it is difficult

1229
00:43:27,670 --> 00:43:25,599
so we're closing our business case

1230
00:43:29,670 --> 00:43:27,680
internally assuming that the only thing

1231
00:43:31,430 --> 00:43:29,680
that materializes is nasa business and

1232
00:43:33,349 --> 00:43:31,440
then this other

1233
00:43:35,270 --> 00:43:33,359
business adjacent to that would be a

1234
00:43:37,430 --> 00:43:35,280
significant potential upside as it

1235
00:43:40,309 --> 00:43:37,440
materializes more importantly than any

1236
00:43:42,550 --> 00:43:40,319
of that though i think this affordable

1237
00:43:44,309 --> 00:43:42,560
transportation to leo which is what this

1238
00:43:46,950 --> 00:43:44,319

program is focused on

1239
00:43:48,870 --> 00:43:46,960
is a real enabler for continued

1240
00:43:50,790 --> 00:43:48,880
utilization of iss

1241
00:43:52,470 --> 00:43:50,800
the country has invested a tremendous

1242
00:43:53,829 --> 00:43:52,480
amount of resources the world has

1243
00:43:56,069 --> 00:43:53,839
invested a tremendous amount of

1244
00:43:58,950 --> 00:43:56,079
resources in space station and it's

1245
00:44:01,430 --> 00:43:58,960
important that we have transportation

1246
00:44:02,790 --> 00:44:01,440
and servicing capability to get a return

1247
00:44:05,190 --> 00:44:02,800
on that investment

1248
00:44:08,550 --> 00:44:05,200
and it's an enabler for exploration

1249
00:44:11,030 --> 00:44:08,560
beyond leo by providing an affordable

1250
00:44:12,870 --> 00:44:11,040
transportation system to leo

1251
00:44:15,190 --> 00:44:12,880
if if we don't have an affordable

1252
00:44:17,589 --> 00:44:15,200
transportation system to low earth orbit

1253
00:44:18,550 --> 00:44:17,599
and it takes the preponderance of nasa's

1254
00:44:20,790 --> 00:44:18,560
money

1255
00:44:22,390 --> 00:44:20,800
to provide that kind of a transportation

1256
00:44:25,109 --> 00:44:22,400
system there won't be funds left to

1257
00:44:26,950 --> 00:44:25,119
explore beyond leo so i think in my view

1258
00:44:29,430 --> 00:44:26,960
the most important aspect of this is

1259
00:44:31,910 --> 00:44:29,440
that is an enabler for iss utilization

1260
00:44:33,750 --> 00:44:31,920
and exploration beyond leo and both of

1261
00:44:36,390 --> 00:44:33,760
those things are also important to

1262
00:44:37,910 --> 00:44:36,400
boeing as a company

1263
00:44:40,630 --> 00:44:37,920

right here

1264
00:44:43,270 --> 00:44:40,640
hi robert perlman with collectspace.com

1265
00:44:45,190 --> 00:44:43,280
for the four company representatives um

1266
00:44:47,430 --> 00:44:45,200
since this panel discussion started with

1267
00:44:49,750 --> 00:44:47,440
comments placing the commercial crew

1268
00:44:51,829 --> 00:44:49,760
program into its context of the american

1269
00:44:53,990 --> 00:44:51,839
space program's history uh one of the

1270
00:44:56,870 --> 00:44:54,000
things that's set aside set apart the

1271
00:44:59,190 --> 00:44:56,880
u.s program has been um operating in the

1272
00:45:01,430 --> 00:44:59,200
open um letting the world watch both

1273
00:45:04,950 --> 00:45:01,440
successes and failures i wonder if each

1274
00:45:07,190 --> 00:45:04,960
of you can comment on your company's

1275
00:45:10,230 --> 00:45:07,200
approach to um to running an open

1276
00:45:12,630 --> 00:45:10,240
program or not running an open program

1277
00:45:14,710 --> 00:45:12,640
and and sharing your development and uh

1278
00:45:16,710 --> 00:45:14,720
and trials

1279
00:45:18,390 --> 00:45:16,720
okay i'll start

1280
00:45:20,870 --> 00:45:18,400
all of our uh we'll be working really

1281
00:45:23,910 --> 00:45:20,880
closely with ed and and brent jett and

1282
00:45:25,750 --> 00:45:23,920
and his team on the nasa team to to work

1283
00:45:27,270 --> 00:45:25,760
through all the the detailed information

1284
00:45:29,589 --> 00:45:27,280
that they've that that we've agreed to

1285
00:45:31,190 --> 00:45:29,599
provide under our space act agreement um

1286
00:45:33,430 --> 00:45:31,200
and so that's going to be a very

1287
00:45:35,510 --> 00:45:33,440
fruitful program we look forward to that

1288
00:45:37,910 --> 00:45:35,520

secondly as we as

1289
00:45:39,349 --> 00:45:37,920
blue origin has more accomplishments and

1290
00:45:40,710 --> 00:45:39,359
more meets more milestones we're going

1291
00:45:42,390 --> 00:45:40,720
to be sharing more of our information

1292
00:45:44,230 --> 00:45:42,400
with the with the media and the public

1293
00:45:45,510 --> 00:45:44,240
and we look forward to that so

1294
00:45:47,190 --> 00:45:45,520
thank you

1295
00:45:48,390 --> 00:45:47,200
okay and irene has a question go ahead

1296
00:45:51,190 --> 00:45:48,400
all right did you

1297
00:45:56,230 --> 00:45:54,550
i'm not having very much luck today am i

1298
00:45:57,589 --> 00:45:56,240
he had a wonderful presentation uh

1299
00:45:59,109 --> 00:45:57,599
robert you're you're seeing a good

1300
00:46:00,630 --> 00:45:59,119
firsthand impression of how we do

1301
00:46:03,910 --> 00:46:00,640
failures so let me talk about a little

1302
00:46:05,829 --> 00:46:03,920
bit on success um we are

1303
00:46:06,630 --> 00:46:05,839
we're embracing nasa we think that what

1304
00:46:10,390 --> 00:46:06,640
is

1305
00:46:13,030 --> 00:46:10,400
bringing the past together with the

1306
00:46:14,710 --> 00:46:13,040
future and being part of that so my

1307
00:46:16,150 --> 00:46:14,720
first answer would be i'm inviting you

1308
00:46:17,750 --> 00:46:16,160
out to come visit with us if you want to

1309
00:46:19,270 --> 00:46:17,760
come out and see what we're doing

1310
00:46:20,950 --> 00:46:19,280
we think being open

1311
00:46:23,270 --> 00:46:20,960
part of this is to inspire the country

1312
00:46:25,349 --> 00:46:23,280
to inspire the people inspire the youth

1313
00:46:26,870 --> 00:46:25,359

behind us to come into this program it's

1314
00:46:29,030 --> 00:46:26,880
not just about making money it's not

1315
00:46:31,270 --> 00:46:29,040
just about us going to space it's about

1316
00:46:33,190 --> 00:46:31,280
creating an industry in space and to do

1317
00:46:34,790 --> 00:46:33,200
that we think we have to be in the open

1318
00:46:36,390 --> 00:46:34,800
we have to be able to discuss things and

1319
00:46:38,950 --> 00:46:36,400
be able to admit the things that are

1320
00:46:40,309 --> 00:46:38,960
difficult space is hard and we know that

1321
00:46:41,670 --> 00:46:40,319
but if we can reach out to all those

1322
00:46:43,109 --> 00:46:41,680
really smart people who've been part of

1323
00:46:44,950 --> 00:46:43,119
this industry and bring them into our

1324
00:46:46,390 --> 00:46:44,960
world and if we can embrace the press as

1325
00:46:48,470 --> 00:46:46,400
we're hopefully doing today that will be

1326
00:46:50,069 --> 00:46:48,480
very important to us and it's up to you

1327
00:46:52,309 --> 00:46:50,079
guys to be able to show that this is a

1328
00:46:53,510 --> 00:46:52,319
really good program it really is part of

1329
00:46:56,950 --> 00:46:53,520
the things that could drive the future

1330
00:46:59,190 --> 00:46:56,960
of our country so thanks for that

1331
00:47:01,270 --> 00:46:59,200
uh spacex is a really exciting place to

1332
00:47:03,190 --> 00:47:01,280
be i mean it's just a really fun

1333
00:47:05,190 --> 00:47:03,200
company a great work environment and we

1334
00:47:07,430 --> 00:47:05,200
believe in sharing that excitement with

1335
00:47:09,349 --> 00:47:07,440
everybody else as well so for our

1336
00:47:12,150 --> 00:47:09,359
launches of falcon 9 and that first

1337
00:47:13,990 --> 00:47:12,160
flight of dragon we had live webcasts

1338
00:47:16,710 --> 00:47:14,000

and we had mission managers tweeting

1339
00:47:18,550 --> 00:47:16,720
updates and and we plan to continue

1340
00:47:21,030 --> 00:47:18,560
that type of communication as we go

1341
00:47:25,270 --> 00:47:23,349
and i'll just conclude the row of

1342
00:47:28,630 --> 00:47:25,280
speakers here um

1343
00:47:30,150 --> 00:47:28,640
i would ex our our openness our

1344
00:47:31,829 --> 00:47:30,160
the way we'll proceed with things will

1345
00:47:33,910 --> 00:47:31,839
be very similar to the way we have on

1346
00:47:37,190 --> 00:47:33,920
space shuttle space station

1347
00:47:39,349 --> 00:47:37,200
those kinds of programs in the past

1348
00:47:40,630 --> 00:47:39,359
so not anything real new or different

1349
00:47:43,270 --> 00:47:40,640
there

1350
00:47:44,950 --> 00:47:43,280
okay now to irene

1351
00:47:47,430 --> 00:47:44,960
and then we'll go to the right

1352
00:47:49,109 --> 00:47:47,440
irene claude with reuters um

1353
00:47:51,510 --> 00:47:49,119
all of you are going to need to be

1354
00:47:53,270 --> 00:47:51,520
putting together proposals for ccdev3

1355
00:47:55,990 --> 00:47:53,280
when you're probably just getting

1356
00:47:58,630 --> 00:47:56,000
started on your cctv2 work and i was

1357
00:48:01,510 --> 00:47:58,640
wondering if you um having having this

1358
00:48:03,430 --> 00:48:01,520
funding now in hand and assuming that

1359
00:48:05,030 --> 00:48:03,440
you all meet the milestones to get the

1360
00:48:06,630 --> 00:48:05,040
pay for it

1361
00:48:08,309 --> 00:48:06,640
what sort of funding levels do you think

1362
00:48:11,109 --> 00:48:08,319
you might need

1363
00:48:13,750 --> 00:48:11,119

from nasa for next year

1364
00:48:16,630 --> 00:48:13,760
would you continue on toward development

1365
00:48:17,829 --> 00:48:16,640
of the vehicles without nasa funding and

1366
00:48:19,190 --> 00:48:17,839
for

1367
00:48:21,670 --> 00:48:19,200
mr meyerson

1368
00:48:25,349 --> 00:48:21,680
how many people do you anticipate the

1369
00:48:26,390 --> 00:48:25,359
blue origin vehicle being able to carry

1370
00:48:27,190 --> 00:48:26,400
okay

1371
00:48:30,390 --> 00:48:27,200
um

1372
00:48:31,670 --> 00:48:30,400
the blue origin vehicle that's in our

1373
00:48:33,510 --> 00:48:31,680
space act agreement which is released

1374
00:48:35,829 --> 00:48:33,520
there's seven people

1375
00:48:39,750 --> 00:48:35,839
to go to low earth orbit the um the

1376
00:48:41,430 --> 00:48:39,760
amount of funding um i can't really um

1377
00:48:43,190 --> 00:48:41,440
sorry i

1378
00:48:46,390 --> 00:48:43,200
i can't really guess at that right now

1379
00:48:48,150 --> 00:48:46,400
we're really focused on our our ccw

1380
00:48:49,030 --> 00:48:48,160
agreement we just we just got it the inc

1381
00:48:51,270 --> 00:48:49,040
is

1382
00:48:53,109 --> 00:48:51,280
barely dry and we're working hard on on

1383
00:48:54,950 --> 00:48:53,119
meeting all those milestones and

1384
00:48:56,630 --> 00:48:54,960
exceeding nasa's objectives

1385
00:48:58,630 --> 00:48:56,640
as far as whether we're going to be

1386
00:49:00,309 --> 00:48:58,640
continuing towards developing safe and

1387
00:49:01,190 --> 00:49:00,319
affordable human space flight with nasa

1388
00:49:02,390 --> 00:49:01,200

or not

1389
00:49:03,829 --> 00:49:02,400
absolutely we have a long-term

1390
00:49:06,710 --> 00:49:03,839
commitment of our investor and and this

1391
00:49:08,630 --> 00:49:06,720
is this is our plan um this is a time a

1392
00:49:10,870 --> 00:49:08,640
rare time in in our

1393
00:49:12,630 --> 00:49:10,880
in our history where where

1394
00:49:13,990 --> 00:49:12,640
you know our plan and nasa's plan

1395
00:49:16,069 --> 00:49:14,000
intersect and we're really pleased about

1396
00:49:18,230 --> 00:49:16,079
that and so we're really excited to be a

1397
00:49:20,150 --> 00:49:18,240
part of it thank you

1398
00:49:21,910 --> 00:49:20,160
we uh we we have been working on our

1399
00:49:24,150 --> 00:49:21,920
program for a number of years without

1400
00:49:25,589 --> 00:49:24,160
nasa funding and and would continue to

1401
00:49:27,430 --> 00:49:25,599
do that we think that there are multiple

1402
00:49:28,870 --> 00:49:27,440
markets for what we're accomplishing in

1403
00:49:30,390 --> 00:49:28,880
space certainly

1404
00:49:31,750 --> 00:49:30,400
no one's going to deny that nasa is the

1405
00:49:33,990 --> 00:49:31,760
anchor tenant here and it certainly

1406
00:49:36,069 --> 00:49:34,000
makes it easier it makes it more likely

1407
00:49:37,510 --> 00:49:36,079
to happen and to say otherwise wouldn't

1408
00:49:39,349 --> 00:49:37,520
be truthful

1409
00:49:41,430 --> 00:49:39,359
but from our perspective we we are

1410
00:49:43,270 --> 00:49:41,440
getting ready for the next award program

1411
00:49:45,190 --> 00:49:43,280
and it's it's one of those things you

1412
00:49:46,470 --> 00:49:45,200
graduate school and you're already into

1413
00:49:49,030 --> 00:49:46,480

the next program before you even get

1414
00:49:50,950 --> 00:49:49,040
started and uh it's it's going to be a

1415
00:49:52,150 --> 00:49:50,960
challenging race for all of us i don't

1416
00:49:53,750 --> 00:49:52,160
think we're we're at a point of

1417
00:49:55,109 --> 00:49:53,760
discussing how much money that would be

1418
00:49:56,470 --> 00:49:55,119
because we don't really know what this

1419
00:49:57,750 --> 00:49:56,480
the size of the next program or the

1420
00:49:59,510 --> 00:49:57,760
scope of the next program would be but

1421
00:50:01,589 --> 00:49:59,520
we're continuing to

1422
00:50:03,349 --> 00:50:01,599
expect that we will be part of that and

1423
00:50:04,630 --> 00:50:03,359
and look forward to

1424
00:50:07,030 --> 00:50:04,640
contributing and i think part of the

1425
00:50:08,549 --> 00:50:07,040
other answer is that we all are i think

1426
00:50:09,589 --> 00:50:08,559
every company and certainly my company i

1427
00:50:11,430 --> 00:50:09,599
can speak for us that we're

1428
00:50:12,950 --> 00:50:11,440
co-contributing alongside of nasa and

1429
00:50:14,790 --> 00:50:12,960
these we're investing money in each

1430
00:50:17,750 --> 00:50:14,800
phase of the program and we would also

1431
00:50:20,549 --> 00:50:17,760
continue to look to do that

1432
00:50:22,470 --> 00:50:20,559
thanks irene i guess um you know

1433
00:50:23,750 --> 00:50:22,480
my play is really full with ccdev too

1434
00:50:25,430 --> 00:50:23,760
and now you're talking about having to

1435
00:50:26,630 --> 00:50:25,440
write the proposal for ccdf3 you're

1436
00:50:28,390 --> 00:50:26,640
starting to stress me out here a little

1437
00:50:30,470 --> 00:50:28,400
bit

1438
00:50:32,069 --> 00:50:30,480

so no we haven't we haven't gotten those

1439
00:50:33,990 --> 00:50:32,079
numbers ready yet

1440
00:50:35,510 --> 00:50:34,000
and we we definitely want to continue

1441
00:50:38,069 --> 00:50:35,520
our partnership with nasa as we go

1442
00:50:40,390 --> 00:50:38,079
beyond ccdev2 and i can tell you our

1443
00:50:41,829 --> 00:50:40,400
company is founded to put people into

1444
00:50:44,790 --> 00:50:41,839
into space and advance human space

1445
00:50:45,990 --> 00:50:44,800
flight so we'll be there um and uh give

1446
00:50:47,589 --> 00:50:46,000
us some time to work out the details

1447
00:50:49,190 --> 00:50:47,599
though

1448
00:50:50,470 --> 00:50:49,200
yeah so i guess i would just i would add

1449
00:50:51,910 --> 00:50:50,480
that

1450
00:50:53,670 --> 00:50:51,920
so we've got a program laid out and i

1451
00:50:56,230 --> 00:50:53,680
showed you the launch dates there and so

1452
00:50:57,670 --> 00:50:56,240
it's um it's well defined

1453
00:51:00,150 --> 00:50:57,680
what would have to be done during the

1454
00:51:02,230 --> 00:51:00,160
next phase what we proposed for ccdev2

1455
00:51:03,829 --> 00:51:02,240
really was just a slice of the program

1456
00:51:06,069 --> 00:51:03,839
that was laid out

1457
00:51:07,510 --> 00:51:06,079
so as we work towards ccdev3 we would

1458
00:51:10,150 --> 00:51:07,520
look at the next

1459
00:51:11,510 --> 00:51:10,160
next slice of that i think the best way

1460
00:51:13,510 --> 00:51:11,520
everybody would probably agree the best

1461
00:51:15,589 --> 00:51:13,520
way to work on the ccdev3 proposal is to

1462
00:51:17,990 --> 00:51:15,599
execute on ccdev2

1463
00:51:20,710 --> 00:51:18,000

and do a good job and that's what i'm

1464
00:51:23,270 --> 00:51:20,720
sure all of us will be focused on

1465
00:51:24,549 --> 00:51:23,280
relative to would we continue without

1466
00:51:26,950 --> 00:51:24,559
nasa funding i'll tell you that our

1467
00:51:29,349 --> 00:51:26,960
business model is is dependent on

1468
00:51:31,030 --> 00:51:29,359
government funding for us to continue

1469
00:51:33,109 --> 00:51:31,040
um that's just the way we've structured

1470
00:51:35,349 --> 00:51:33,119
it the way it's laid out if if that

1471
00:51:37,510 --> 00:51:35,359
funding was not there

1472
00:51:39,190 --> 00:51:37,520
we would continue at some very reduced

1473
00:51:40,870 --> 00:51:39,200
level i i would assume but it's

1474
00:51:42,390 --> 00:51:40,880
certainly not a level that would allow

1475
00:51:44,150 --> 00:51:42,400
us to meet the dates that that i've

1476
00:51:47,430 --> 00:51:44,160
shared today

1477
00:51:49,510 --> 00:51:47,440
okay yeah let me uh wait that hasn't

1478
00:51:51,990 --> 00:51:49,520
say that you know ccdf2 is the very

1479
00:51:54,309 --> 00:51:52,000
beginning of this or actually it's the

1480
00:51:56,470 --> 00:51:54,319
continuation of ccdev it's the maturing

1481
00:51:57,829 --> 00:51:56,480
of system elements

1482
00:51:59,510 --> 00:51:57,839
we have in our

1483
00:52:01,589 --> 00:51:59,520
in our planning what we're going to go

1484
00:52:03,349 --> 00:52:01,599
do next and if you look at the overall

1485
00:52:05,430 --> 00:52:03,359
design processes that these folks are

1486
00:52:07,589 --> 00:52:05,440
going through you know we're uh we're

1487
00:52:09,510 --> 00:52:07,599
really at a early design state something

1488
00:52:11,910 --> 00:52:09,520

like a preliminary design if not even

1489
00:52:13,750 --> 00:52:11,920
earlier um and so the next phase is

1490
00:52:15,750 --> 00:52:13,760
going to move us from that that state

1491
00:52:18,309 --> 00:52:15,760
that we're in at the end of next year or

1492
00:52:20,710 --> 00:52:18,319
the end of this ccdev2 or basically in

1493
00:52:22,230 --> 00:52:20,720
the middle next year into the next phase

1494
00:52:24,470 --> 00:52:22,240
which is really more of a critical

1495
00:52:26,710 --> 00:52:24,480
design kind of environment we have to

1496
00:52:27,670 --> 00:52:26,720
integrate um the complete system that is

1497
00:52:29,990 --> 00:52:27,680
the ground

1498
00:52:31,349 --> 00:52:30,000
on orbit uh the launch vehicle and the

1499
00:52:32,870 --> 00:52:31,359
spacecraft and so we're going to be

1500
00:52:35,190 --> 00:52:32,880
looking for concepts that are going to

1501
00:52:37,190 --> 00:52:35,200
be doing that whole thing you heard most

1502
00:52:39,589 --> 00:52:37,200
of the four folks talk about how that is

1503
00:52:41,670 --> 00:52:39,599
going to be integrated even in ccdf2 to

1504
00:52:43,109 --> 00:52:41,680
begin with but it's a beginning so now

1505
00:52:45,510 --> 00:52:43,119
we've got to get to a critical design

1506
00:52:47,349 --> 00:52:45,520
state which is really a very important

1507
00:52:49,109 --> 00:52:47,359
step because that is at that point now

1508
00:52:50,950 --> 00:52:49,119
you have a design now you got to do the

1509
00:52:52,710 --> 00:52:50,960
next step which is certify that vehicle

1510
00:52:54,150 --> 00:52:52,720
make sure you can go fly what you

1511
00:52:55,990 --> 00:52:54,160
designed and as you go through

1512
00:52:57,430 --> 00:52:56,000
certification lots of issues lots of

1513
00:53:00,309 --> 00:52:57,440

problems i'm sure we'll have to work

1514
00:53:02,309 --> 00:53:00,319
through and so that's a that's a pretty

1515
00:53:04,390 --> 00:53:02,319
heavy-duty period of time in order to

1516
00:53:06,390 --> 00:53:04,400
get to that certification once all that

1517
00:53:08,710 --> 00:53:06,400
is done and

1518
00:53:10,390 --> 00:53:08,720
the partners come forward and i say we

1519
00:53:12,470 --> 00:53:10,400
have a certified system nasa has been

1520
00:53:14,150 --> 00:53:12,480
working with them the whole time we as

1521
00:53:15,510 --> 00:53:14,160
the program will step up and say all

1522
00:53:17,190 --> 00:53:15,520
right we think that this vehicle is not

1523
00:53:19,910 --> 00:53:17,200
certified at that point we're going to

1524
00:53:21,910 --> 00:53:19,920
go to the nasa community the nasa agency

1525
00:53:23,510 --> 00:53:21,920
and look for approval to say we can now

1526
00:53:26,470 --> 00:53:23,520
certify that vehicle it's at that point

1527
00:53:28,710 --> 00:53:26,480
we can go fly services so in terms of

1528
00:53:31,030 --> 00:53:28,720
when and how much money i think a lot of

1529
00:53:33,349 --> 00:53:31,040
that is still all being debated but the

1530
00:53:34,630 --> 00:53:33,359
idea is we would like to have services

1531
00:53:36,230 --> 00:53:34,640
ready to go to international space

1532
00:53:37,910 --> 00:53:36,240
station

1533
00:53:39,670 --> 00:53:37,920
in about the middle of the decade now

1534
00:53:41,510 --> 00:53:39,680
can we get there you saw a number of

1535
00:53:43,270 --> 00:53:41,520
possibilities that can get there

1536
00:53:45,430 --> 00:53:43,280
how much funding we have is all going to

1537
00:53:47,190 --> 00:53:45,440
be dependent on how we can work through

1538
00:53:48,950 --> 00:53:47,200

the things we have to get through and

1539
00:53:50,309 --> 00:53:48,960
then of course in the political realm

1540
00:53:51,910 --> 00:53:50,319
and so we have to work through all those

1541
00:53:54,069 --> 00:53:51,920
but the goal is to try if we have enough

1542
00:53:55,670 --> 00:53:54,079
funding to try to keep competition as

1543
00:53:57,270 --> 00:53:55,680
long as we can

1544
00:53:59,750 --> 00:53:57,280
and also to try to get services by the

1545
00:54:01,270 --> 00:53:59,760
middle of the decade

1546
00:54:02,150 --> 00:54:01,280
okay now we're ready for the question

1547
00:54:04,870 --> 00:54:02,160
here

1548
00:54:06,230 --> 00:54:04,880
i'm alan boyle with msnbc i wanted to

1549
00:54:07,829 --> 00:54:06,240
ask rob

1550
00:54:09,670 --> 00:54:07,839
you mentioned that some of the

1551
00:54:11,190 --> 00:54:09,680
milestones for suborbital flight are

1552
00:54:13,270 --> 00:54:11,200
specified in the space

1553
00:54:16,230 --> 00:54:13,280
act agreement i

1554
00:54:18,549 --> 00:54:16,240
maybe i misunderstand stood but can you

1555
00:54:20,790 --> 00:54:18,559
tell what the status of the suborbital

1556
00:54:23,030 --> 00:54:20,800
development program is when you expect

1557
00:54:24,950 --> 00:54:23,040
to fly and are you willing to match

1558
00:54:26,549 --> 00:54:24,960
mark's invitation for people to come

1559
00:54:28,710 --> 00:54:26,559
visit you

1560
00:54:30,710 --> 00:54:28,720
i'm not that far away so it won't be

1561
00:54:32,549 --> 00:54:30,720
that much of a trip i realize that ellen

1562
00:54:35,109 --> 00:54:32,559
um and there will be a time yes um

1563
00:54:38,230 --> 00:54:35,119

that'll match that invitation um the the

1564
00:54:41,270 --> 00:54:38,240
suborbital program um the the the tests

1565
00:54:43,030 --> 00:54:41,280
of the pusher escape system um are part

1566
00:54:45,430 --> 00:54:43,040
of our ccdev2 agreement the other

1567
00:54:47,109 --> 00:54:45,440
milestones that we're working internally

1568
00:54:49,030 --> 00:54:47,119
with internal funding uh for the

1569
00:54:50,870 --> 00:54:49,040
suborbital program are not part of that

1570
00:54:52,630 --> 00:54:50,880
that ccdev2 agreement all the milestones

1571
00:54:53,589 --> 00:54:52,640
that are in our cc2 agreement and all

1572
00:54:56,150 --> 00:54:53,599
the dates

1573
00:54:58,150 --> 00:54:56,160
all the the number the the funding

1574
00:54:59,750 --> 00:54:58,160
associated with those dates are are

1575
00:55:01,430 --> 00:54:59,760
public and in the uh the summary that

1576
00:55:03,829 --> 00:55:01,440
nasa released so uh and they're

1577
00:55:05,910 --> 00:55:03,839
available on the nasa website so

1578
00:55:07,670 --> 00:55:05,920
that's that's what i was referring to so

1579
00:55:10,309 --> 00:55:07,680
we don't we don't release launch dates

1580
00:55:12,069 --> 00:55:10,319
uh it would be um

1581
00:55:14,470 --> 00:55:12,079
yeah it's just it's not something we

1582
00:55:16,710 --> 00:55:14,480
that we do so okay

1583
00:55:20,390 --> 00:55:16,720
okay right here

1584
00:55:22,950 --> 00:55:20,400
thank you hi tom costello with nbc news

1585
00:55:24,470 --> 00:55:22,960
a lot of people thousands of people have

1586
00:55:25,990 --> 00:55:24,480
lost their jobs who are losing their

1587
00:55:28,390 --> 00:55:26,000
jobs because the shuttle program is

1588
00:55:29,910 --> 00:55:28,400

being retired do any of you anticipate

1589
00:55:31,510 --> 00:55:29,920
hiring any of these people over the

1590
00:55:32,390 --> 00:55:31,520
course of the next few weeks months

1591
00:55:34,630 --> 00:55:32,400
years

1592
00:55:36,549 --> 00:55:34,640
and secondly can you address

1593
00:55:37,829 --> 00:55:36,559
how you envision the astronaut role will

1594
00:55:39,430 --> 00:55:37,839
you be hiring your own private

1595
00:55:41,589 --> 00:55:39,440
astronauts will you be using astronaut

1596
00:55:42,950 --> 00:55:41,599
nasa astronauts but if you could get to

1597
00:55:44,390 --> 00:55:42,960
the first point first i think a lot of

1598
00:55:45,910 --> 00:55:44,400
people are anxious about their jobs

1599
00:55:46,829 --> 00:55:45,920
right now

1600
00:55:49,109 --> 00:55:46,839
okay

1601
00:55:50,710 --> 00:55:49,119
um i'll take a shot at it first first of

1602
00:55:51,990 --> 00:55:50,720
all i'm not going to you know

1603
00:55:53,510 --> 00:55:52,000
these are trying times i'm not going to

1604
00:55:57,589 --> 00:55:53,520
comment on the overall economy i'll let

1605
00:55:59,510 --> 00:55:57,599
i'll let phil do that the uh we are

1606
00:56:01,910 --> 00:55:59,520
i'm going to i'm going to trust my

1607
00:56:03,510 --> 00:56:01,920
customer to handle that one um the the

1608
00:56:05,349 --> 00:56:03,520
uh um

1609
00:56:07,750 --> 00:56:05,359
we are hiring absolutely we're looking

1610
00:56:09,270 --> 00:56:07,760
first for passionate you know passionate

1611
00:56:11,109 --> 00:56:09,280
hard-working folks that are that are

1612
00:56:13,030 --> 00:56:11,119
excited about space flight i can say

1613
00:56:14,309 --> 00:56:13,040

we've already hired a few folks from the

1614
00:56:16,309 --> 00:56:14,319
from the community down here from the

1615
00:56:18,789 --> 00:56:16,319
space coast they're they're working for

1616
00:56:20,470 --> 00:56:18,799
us up in kent they're doing terrifically

1617
00:56:23,190 --> 00:56:20,480
we're excited to have them and we would

1618
00:56:25,430 --> 00:56:23,200
um the space shuttle is the world's only

1619
00:56:27,349 --> 00:56:25,440
reusable space system um

1620
00:56:28,829 --> 00:56:27,359
and uh it's partially reusable however

1621
00:56:29,910 --> 00:56:28,839
the the

1622
00:56:31,270 --> 00:56:29,920
the uh

1623
00:56:33,270 --> 00:56:31,280
knowledge and lessons learned that that

1624
00:56:34,549 --> 00:56:33,280
community has gained through that are

1625
00:56:35,990 --> 00:56:34,559
those are people that are welcomed on

1626
00:56:38,390 --> 00:56:36,000
our team and so we're looking for the

1627
00:56:39,270 --> 00:56:38,400
right folks and and we encourage them to

1628
00:56:42,150 --> 00:56:39,280
to

1629
00:56:42,950 --> 00:56:42,160
and and uh

1630
00:56:45,990 --> 00:56:42,960
and

1631
00:56:47,990 --> 00:56:46,000
see about getting on board so thank you

1632
00:56:49,030 --> 00:56:48,000
well i'll thank you for the question i

1633
00:56:50,710 --> 00:56:49,040
and i think

1634
00:56:52,470 --> 00:56:50,720
from our perspective i'd like to be a

1635
00:56:54,309 --> 00:56:52,480
little bit more tangible not only are we

1636
00:56:56,309 --> 00:56:54,319
thinking about it we are doing it we've

1637
00:56:58,710 --> 00:56:56,319
opened up offices in houston we're in

1638
00:57:01,670 --> 00:56:58,720

the process of opening up office here in

1639
00:57:03,910 --> 00:57:01,680
in the florida area we've held job fairs

1640
00:57:05,589 --> 00:57:03,920
in many of the nasa centers around the

1641
00:57:07,270 --> 00:57:05,599
country we're going to continue to do

1642
00:57:08,710 --> 00:57:07,280
that we've put on more than 100 people

1643
00:57:10,789 --> 00:57:08,720
on our team over the last year we're

1644
00:57:13,030 --> 00:57:10,799
going to continue to expand

1645
00:57:14,870 --> 00:57:13,040
one of the things that one realizes is

1646
00:57:16,950 --> 00:57:14,880
that many of these skills and talents

1647
00:57:18,630 --> 00:57:16,960
are needed for the future and if you

1648
00:57:20,309 --> 00:57:18,640
recall my high-tech presentation this

1649
00:57:21,910 --> 00:57:20,319
looks like a space shuttle and it and it

1650
00:57:23,670 --> 00:57:21,920
functions like a space shuttle and acts

1651
00:57:25,270 --> 00:57:23,680
like it and there are many of those jobs

1652
00:57:26,950 --> 00:57:25,280
and skill sets that are necessary to

1653
00:57:29,030 --> 00:57:26,960
turn around the shuttle to move it to

1654
00:57:30,710 --> 00:57:29,040
get it back to flight that we think are

1655
00:57:32,309 --> 00:57:30,720
going to be a very natural progression

1656
00:57:33,829 --> 00:57:32,319
over to our vehicle

1657
00:57:35,190 --> 00:57:33,839
are any of us going to hire the kinds of

1658
00:57:37,589 --> 00:57:35,200
numbers that we're talking about i don't

1659
00:57:39,190 --> 00:57:37,599
think so but we're certainly going to be

1660
00:57:41,190 --> 00:57:39,200
able to bring some of those people on

1661
00:57:43,030 --> 00:57:41,200
board and many of the critical skills

1662
00:57:45,030 --> 00:57:43,040
that are necessary so that nasa has the

1663
00:57:47,270 --> 00:57:45,040

ability to look at other programs in the

1664
00:57:49,829 --> 00:57:47,280
future that's our goal to make make sure

1665
00:57:51,430 --> 00:57:49,839
those skill sets remain in in play

1666
00:57:53,270 --> 00:57:51,440
either in our companies or somehow

1667
00:57:54,870 --> 00:57:53,280
within the nasa centers we're also

1668
00:57:56,470 --> 00:57:54,880
reaching out to all the nasa centers

1669
00:57:58,950 --> 00:57:56,480
that are applicable to this kind of

1670
00:58:00,870 --> 00:57:58,960
program and asking them how we could

1671
00:58:02,549 --> 00:58:00,880
work together is it possible for us to

1672
00:58:03,829 --> 00:58:02,559
use their skill sets their people their

1673
00:58:05,349 --> 00:58:03,839
facilities

1674
00:58:07,109 --> 00:58:05,359
because it's not just people it's being

1675
00:58:09,190 --> 00:58:07,119
able to maintain the facilities that are

1676
00:58:11,190 --> 00:58:09,200
critical to our country's future and and

1677
00:58:13,750 --> 00:58:11,200
we're engaged in that right now not as a

1678
00:58:14,789 --> 00:58:13,760
theoretical exercise as a practical one

1679
00:58:16,870 --> 00:58:14,799
if we're going to do what we're going to

1680
00:58:19,270 --> 00:58:16,880
do by the time frames that we're talking

1681
00:58:20,390 --> 00:58:19,280
about we need to be able to realize one

1682
00:58:21,990 --> 00:58:20,400
thing that we're not going to be able to

1683
00:58:24,390 --> 00:58:22,000
start from scratch we have to be able to

1684
00:58:26,069 --> 00:58:24,400
use the skill sets the knowledge the the

1685
00:58:28,309 --> 00:58:26,079
abilities of those great people around

1686
00:58:30,069 --> 00:58:28,319
the nasa organization in and out

1687
00:58:33,990 --> 00:58:30,079
contractors as well as government

1688
00:58:37,510 --> 00:58:35,270

i can tell you that

1689
00:58:40,230 --> 00:58:37,520
spacex uh hired me i used to work for

1690
00:58:43,030 --> 00:58:40,240
the shuttle program

1691
00:58:45,109 --> 00:58:43,040
but so um there's there's demonstrable

1692
00:58:47,829 --> 00:58:45,119
evidence right there but uh you know it

1693
00:58:49,270 --> 00:58:47,839
this is a very difficult time uh and i

1694
00:58:51,109 --> 00:58:49,280
it's great to be back down here at the

1695
00:58:53,349 --> 00:58:51,119
cape and i spent a bunch of time last

1696
00:58:55,829 --> 00:58:53,359
night with people i'm working in the

1697
00:58:56,870 --> 00:58:55,839
shuttle and space station programs and i

1698
00:58:59,829 --> 00:58:56,880
know they're they're going through a lot

1699
00:59:02,390 --> 00:58:59,839
of turmoil and it's a time of transition

1700
00:59:04,710 --> 00:59:02,400
the the people working in those groups

1701
00:59:07,270 --> 00:59:04,720
are really top-notch people incredibly

1702
00:59:09,510 --> 00:59:07,280
talented dedicated hard-working people

1703
00:59:11,990 --> 00:59:09,520
uh with very unique skills so i'm sure

1704
00:59:14,390 --> 00:59:12,000
as we go forward and at spacex and we we

1705
00:59:16,549 --> 00:59:14,400
take the next steps uh spacex believes

1706
00:59:19,190 --> 00:59:16,559
in in in hiring the best and brightest

1707
00:59:20,950 --> 00:59:19,200
people from all over and when there's a

1708
00:59:22,390 --> 00:59:20,960
good fit i'm sure

1709
00:59:25,030 --> 00:59:22,400
we'll we'll have some more of our

1710
00:59:27,109 --> 00:59:25,040
brethren coming over as well

1711
00:59:28,710 --> 00:59:27,119
and from from boeing's perspective it's

1712
00:59:29,990 --> 00:59:28,720
just a little bit different scenario a

1713
00:59:32,470 --> 00:59:30,000

goodly portion of the folks you

1714
00:59:34,230 --> 00:59:32,480
mentioned whose jobs are tied to shuttle

1715
00:59:38,390 --> 00:59:34,240
are boeing employees

1716
00:59:39,270 --> 00:59:38,400
so during ccdev1 we utilize the skills

1717
00:59:45,670 --> 00:59:39,280
from

1718
00:59:47,670 --> 00:59:45,680
that were working in huntsville

1719
00:59:50,390 --> 00:59:47,680
as we move in fact already we're

1720
00:59:53,109 --> 00:59:50,400
transitioning those folks onto

1721
00:59:56,309 --> 00:59:53,119
ccdev2 those folks on shuttle and we're

1722
00:59:58,069 --> 00:59:56,319
working real hard to make sure that we

1723
01:00:00,230 --> 00:59:58,079
capture the right kind of skills and

1724
01:00:01,829 --> 01:00:00,240
resources that are going to be needed as

1725
01:00:03,910 --> 01:00:01,839
we move ahead in the future so we're

1726
01:00:06,150 --> 01:00:03,920
already going down that road

1727
01:00:07,990 --> 01:00:06,160
you also asked about flight crew

1728
01:00:09,990 --> 01:00:08,000
and how we'd be doing that so we have

1729
01:00:11,589 --> 01:00:10,000
some work to do with

1730
01:00:13,589 --> 01:00:11,599
ed in his office

1731
01:00:16,950 --> 01:00:13,599
you know the transportation part of this

1732
01:00:18,630 --> 01:00:16,960
as ed mentioned is is not ready to be

1733
01:00:20,390 --> 01:00:18,640
worked out for

1734
01:00:21,990 --> 01:00:20,400
some number of years possibly our

1735
01:00:23,829 --> 01:00:22,000
internal baseline right now is that on

1736
01:00:24,710 --> 01:00:23,839
the missions to space station that one

1737
01:00:26,230 --> 01:00:24,720
of the

1738
01:00:27,750 --> 01:00:26,240

astronauts that

1739
01:00:29,109 --> 01:00:27,760
was going to station would also be

1740
01:00:31,030 --> 01:00:29,119
trained to fly the

1741
01:00:34,230 --> 01:00:31,040
capsule and so that we would

1742
01:00:36,150 --> 01:00:34,240
work the flight crew that way

1743
01:00:37,670 --> 01:00:36,160
the test pilots for our initial flight

1744
01:00:39,589 --> 01:00:37,680
were still working on whether those

1745
01:00:40,789 --> 01:00:39,599
would be boeing badged employees or nasa

1746
01:00:42,230 --> 01:00:40,799
astronauts

1747
01:00:45,750 --> 01:00:42,240
so those are questions to be answered

1748
01:00:51,270 --> 01:00:48,630
okay this will be the last question

1749
01:00:53,190 --> 01:00:51,280
thanks uh james dean with florida today

1750
01:00:54,390 --> 01:00:53,200
uh wondering if any of you are gonna

1751
01:00:56,150 --> 01:00:54,400
have an opportunity to meet with the

1752
01:00:58,390 --> 01:00:56,160
president tomorrow given that uh

1753
01:00:59,670 --> 01:00:58,400
commercial crew got off the ground on on

1754
01:01:01,270 --> 01:00:59,680
his watch

1755
01:01:03,750 --> 01:01:01,280
and um

1756
01:01:06,470 --> 01:01:03,760
also just wondered if if you know in

1757
01:01:07,829 --> 01:01:06,480
talk about reducing minimizing the gap

1758
01:01:09,349 --> 01:01:07,839
can can you just

1759
01:01:11,670 --> 01:01:09,359
offer a little bit of a big picture

1760
01:01:13,829 --> 01:01:11,680
reminder of

1761
01:01:14,710 --> 01:01:13,839
how you are going to do that in other

1762
01:01:17,510 --> 01:01:14,720
words

1763
01:01:19,750 --> 01:01:17,520

reducing it from from what what options

1764
01:01:21,430 --> 01:01:19,760
were out there

1765
01:01:22,549 --> 01:01:21,440
the gap will end whenever you fly of

1766
01:01:25,510 --> 01:01:22,559
course but

1767
01:01:27,270 --> 01:01:25,520
it sounds like 2014 2015 is the best

1768
01:01:30,789 --> 01:01:27,280
case scenario is

1769
01:01:34,150 --> 01:01:32,230
is the nation really much better off

1770
01:01:36,549 --> 01:01:34,160
than it might have been under

1771
01:01:38,230 --> 01:01:36,559
constellation

1772
01:01:40,150 --> 01:01:38,240
i'll start again thank you for the

1773
01:01:41,910 --> 01:01:40,160
question uh i have my family here with

1774
01:01:43,349 --> 01:01:41,920
me to go watch the launch tomorrow and i

1775
01:01:46,390 --> 01:01:43,359
would be ecstatic to meet the president

1776
01:01:47,190 --> 01:01:46,400
so uh if that's an invitation

1777
01:01:48,870 --> 01:01:47,200
but

1778
01:01:51,190 --> 01:01:48,880
i would love to do that um love to have

1779
01:01:53,349 --> 01:01:51,200
that opportunity um related to the gap

1780
01:01:55,270 --> 01:01:53,359
uh i think the best way we can close the

1781
01:01:57,190 --> 01:01:55,280
gap is stay focused and as an earlier

1782
01:01:59,109 --> 01:01:57,200
questioner pointed out i mean we're not

1783
01:02:01,670 --> 01:01:59,119
as far along we haven't demonstrated a

1784
01:02:03,109 --> 01:02:01,680
system like the falcon 9 and dragon um

1785
01:02:04,950 --> 01:02:03,119
but but we're going to continue to stay

1786
01:02:05,750 --> 01:02:04,960
focused on our on our path we're going

1787
01:02:07,270 --> 01:02:05,760
to work

1788
01:02:08,950 --> 01:02:07,280

our partnership with nasa and stay

1789
01:02:11,270 --> 01:02:08,960
focused on meeting these milestones step

1790
01:02:13,030 --> 01:02:11,280
by step and and we hope to

1791
01:02:14,309 --> 01:02:13,040
when we have a system to field

1792
01:02:16,870 --> 01:02:14,319
we'll know it's ready because because

1793
01:02:18,150 --> 01:02:16,880
nasa and and we will be uh be able to

1794
01:02:20,870 --> 01:02:18,160
conclude that it's ready to go and put

1795
01:02:23,910 --> 01:02:20,880
people into space okay thank you

1796
01:02:25,589 --> 01:02:23,920
james hi thanks for the question um we

1797
01:02:27,349 --> 01:02:25,599
one of the things i think one that we'd

1798
01:02:29,510 --> 01:02:27,359
like to point out about this program is

1799
01:02:32,230 --> 01:02:29,520
that it is a milestone based program

1800
01:02:34,630 --> 01:02:32,240
and that's important because we get paid

1801
01:02:36,150 --> 01:02:34,640
after we perform and i think one of the

1802
01:02:37,829 --> 01:02:36,160
hallmarks and one of the the really

1803
01:02:39,829 --> 01:02:37,839
strong parts of the commercial crew

1804
01:02:41,190 --> 01:02:39,839
development program is that is that

1805
01:02:42,870 --> 01:02:41,200
there's co-investment and there's

1806
01:02:45,190 --> 01:02:42,880
performance milestones what that means

1807
01:02:46,549 --> 01:02:45,200
is that if any of us are unable to

1808
01:02:47,990 --> 01:02:46,559
perform their milestones there's a

1809
01:02:49,829 --> 01:02:48,000
protection for the government that they

1810
01:02:51,829 --> 01:02:49,839
don't spend the money that that would

1811
01:02:53,589 --> 01:02:51,839
have been set out to do that as it

1812
01:02:56,150 --> 01:02:53,599
relates to the gap that's that's a

1813
01:02:58,230 --> 01:02:56,160

method by which it self-adjusts meaning

1814
01:02:59,750 --> 01:02:58,240
that those companies that are successful

1815
01:03:01,349 --> 01:02:59,760
will continue to move forward we'll

1816
01:03:03,349 --> 01:03:01,359
continue to get funding will continue to

1817
01:03:04,230 --> 01:03:03,359
advance and those who are not won't get

1818
01:03:06,150 --> 01:03:04,240
paid

1819
01:03:08,789 --> 01:03:06,160
and there's a balancing mechanism there

1820
01:03:10,390 --> 01:03:08,799
i don't think we can answer what this is

1821
01:03:12,150 --> 01:03:10,400
compared to other programs or what other

1822
01:03:14,549 --> 01:03:12,160
programs might have been we don't know

1823
01:03:16,150 --> 01:03:14,559
and we'll never know but i do know that

1824
01:03:17,750 --> 01:03:16,160
by virtue of the nature of the program

1825
01:03:20,870 --> 01:03:17,760
we're highly intended to

1826
01:03:22,870 --> 01:03:20,880
to produce a safe affordable vehicle and

1827
01:03:24,870 --> 01:03:22,880
if we don't then work all of us who

1828
01:03:26,470 --> 01:03:24,880
don't are going to be exiting the stage

1829
01:03:28,549 --> 01:03:26,480
and from our company's perspective we're

1830
01:03:30,069 --> 01:03:28,559
very much focused on doing that we have

1831
01:03:31,990 --> 01:03:30,079
all our milestones planned through

1832
01:03:32,950 --> 01:03:32,000
flight and we know exactly what we need

1833
01:03:35,589 --> 01:03:32,960
to do and

1834
01:03:37,750 --> 01:03:35,599
now it's a time for execution

1835
01:03:39,589 --> 01:03:37,760
regarding the president i i'm sorry that

1836
01:03:41,829 --> 01:03:39,599
uh i can't tell you because i'm sworn to

1837
01:03:43,670 --> 01:03:41,839
secrecy about that

1838
01:03:45,990 --> 01:03:43,680

but uh we look forward to seeing him

1839
01:03:48,390 --> 01:03:46,000
here and we do think that's a very nice

1840
01:03:50,470 --> 01:03:48,400
gesture and and

1841
01:03:51,990 --> 01:03:50,480
and comment on his ability and interest

1842
01:03:54,630 --> 01:03:52,000
in the space program by him coming down

1843
01:03:56,789 --> 01:03:54,640
here with his family

1844
01:03:59,270 --> 01:03:56,799
yeah um i have not received mark's super

1845
01:04:01,430 --> 01:03:59,280
secret presidential invitation so i

1846
01:04:02,549 --> 01:04:01,440
guess i'm out in the cold uh

1847
01:04:04,589 --> 01:04:02,559
we did actually get to meet the

1848
01:04:07,829 --> 01:04:04,599
president after uh we came back from

1849
01:04:09,670 --> 01:04:07,839
sts-132 my last flight on atlantis

1850
01:04:11,109 --> 01:04:09,680
we got to go down and visit him in the

1851
01:04:12,710 --> 01:04:11,119
oval office and i can tell you he's an

1852
01:04:14,069 --> 01:04:12,720
extremely large supporter of space

1853
01:04:16,710 --> 01:04:14,079
flight in general

1854
01:04:18,950 --> 01:04:16,720
and uh that and he believes in in the

1855
01:04:21,109 --> 01:04:18,960
commercial crew concept as well

1856
01:04:24,309 --> 01:04:21,119
he sees that he understands the value

1857
01:04:25,990 --> 01:04:24,319
and a valuable role that nasa has played

1858
01:04:28,230 --> 01:04:26,000
over over the course of its existence

1859
01:04:30,069 --> 01:04:28,240
and as not only in the science of

1860
01:04:32,470 --> 01:04:30,079
technology it generates but also the

1861
01:04:34,230 --> 01:04:32,480
impact it had upon all of us and many of

1862
01:04:36,549 --> 01:04:34,240
us sitting up here at the table do what

1863
01:04:39,589 --> 01:04:36,559

we do today because of being inspired by

1864
01:04:41,270 --> 01:04:39,599
what nasa did in the past so um he wants

1865
01:04:44,150 --> 01:04:41,280
that he wants to make sure that nasa

1866
01:04:46,870 --> 01:04:44,160
continues to to lead and and uh and as

1867
01:04:48,309 --> 01:04:46,880
far as the uh shrinking the gap uh

1868
01:04:49,190 --> 01:04:48,319
that's that's that's something we're all

1869
01:04:50,150 --> 01:04:49,200
trying to

1870
01:04:52,710 --> 01:04:50,160
to do

1871
01:04:53,910 --> 01:04:52,720
uh you know after the the next two

1872
01:04:55,589 --> 01:04:53,920
shuttle flights

1873
01:04:57,670 --> 01:04:55,599
we won't have a capability to get humans

1874
01:04:59,910 --> 01:04:57,680
into space on an american vehicle

1875
01:05:01,190 --> 01:04:59,920
um we're in a partnership with with the

1876
01:05:03,029 --> 01:05:01,200
russians and the other countries on the

1877
01:05:04,470 --> 01:05:03,039
space station we're not being a good

1878
01:05:06,630 --> 01:05:04,480
partner if we don't come to the table

1879
01:05:09,510 --> 01:05:06,640
with our own capabilities and so i think

1880
01:05:11,430 --> 01:05:09,520
we're all dedicated to shrinking that

1881
01:05:13,990 --> 01:05:11,440
gap as quickly and as efficiently and as

1882
01:05:15,829 --> 01:05:14,000
safely as we can

1883
01:05:17,750 --> 01:05:15,839
i'd add just a couple comments on to

1884
01:05:19,430 --> 01:05:17,760
your question i think i'm hopeful that

1885
01:05:21,670 --> 01:05:19,440
as we go through

1886
01:05:23,750 --> 01:05:21,680
this launch in the next launch and

1887
01:05:25,589 --> 01:05:23,760
complete the shuttle program that the

1888
01:05:29,029 --> 01:05:25,599

awareness of the fact that we don't have

1889
01:05:31,270 --> 01:05:29,039
a u.s capability to transport astronauts

1890
01:05:32,470 --> 01:05:31,280
will gain momentum and so there'll be

1891
01:05:34,309 --> 01:05:32,480
momentum

1892
01:05:36,230 --> 01:05:34,319
within the congressional process to

1893
01:05:38,069 --> 01:05:36,240
ensure that we have the funding that's

1894
01:05:40,630 --> 01:05:38,079
required to execute the schedules that

1895
01:05:42,390 --> 01:05:40,640
we've shown today and are able to

1896
01:05:44,069 --> 01:05:42,400
to

1897
01:05:46,309 --> 01:05:44,079
shorten the gap

1898
01:05:47,510 --> 01:05:46,319
by that method

1899
01:05:48,710 --> 01:05:47,520
the other thing that you asked a little

1900
01:05:51,190 --> 01:05:48,720
bit about

1901
01:05:52,309 --> 01:05:51,200
wouldn't if it goes longer

1902
01:05:53,990 --> 01:05:52,319
would it not be any different than

1903
01:05:57,029 --> 01:05:54,000
constellation i would say a couple

1904
01:06:01,510 --> 01:05:58,789
the the vehicles of constellation were

1905
01:06:03,990 --> 01:06:01,520
designed for exploration beyond leo and

1906
01:06:05,990 --> 01:06:04,000
and also could do the leo job so they

1907
01:06:07,910 --> 01:06:06,000
they might not be as affordable probably

1908
01:06:10,150 --> 01:06:07,920
wouldn't have been as affordable as the

1909
01:06:12,230 --> 01:06:10,160
systems that we're working on

1910
01:06:14,630 --> 01:06:12,240
that are primarily focused on just leo

1911
01:06:16,150 --> 01:06:14,640
low earth orbit so we can have simpler

1912
01:06:18,870 --> 01:06:16,160
systems smaller rockets that kind of

1913
01:06:20,549 --> 01:06:18,880

thing and as i mentioned earlier by

1914
01:06:22,549 --> 01:06:20,559
lowering the cost of transportation to

1915
01:06:24,870 --> 01:06:22,559
leo there are funds available for

1916
01:06:26,950 --> 01:06:24,880
developing vehicles and

1917
01:06:27,910 --> 01:06:26,960
and i'm doing exploration beyond leo so

1918
01:06:30,390 --> 01:06:27,920
i think

1919
01:06:32,870 --> 01:06:30,400
the um there's more figures of merit to

1920
01:06:35,029 --> 01:06:32,880
judge the comparison than just on the

1921
01:06:36,630 --> 01:06:35,039
schedule would be the comment

1922
01:06:38,150 --> 01:06:36,640
tina i guess

1923
01:06:39,190 --> 01:06:38,160
i'd like to say that

1924
01:06:41,750 --> 01:06:39,200
you know what

1925
01:06:43,750 --> 01:06:41,760
the gap is a gap in capability and so we

1926
01:06:45,349 --> 01:06:43,760
have to go work that what john said was

1927
01:06:48,069 --> 01:06:45,359
very good about the constellation

1928
01:06:48,789 --> 01:06:48,079
program and whatever falls from that now

1929
01:06:50,230 --> 01:06:48,799
that

1930
01:06:52,390 --> 01:06:50,240
hopefully nasa will be able to go do

1931
01:06:54,390 --> 01:06:52,400
exploration that's the systems that get

1932
01:06:57,190 --> 01:06:54,400
us beyond leo so if we get affordable

1933
01:06:59,349 --> 01:06:57,200
systems from these folks for lao we have

1934
01:07:00,950 --> 01:06:59,359
more money to go spend on going to do

1935
01:07:02,870 --> 01:07:00,960
more exploration

1936
01:07:04,870 --> 01:07:02,880
and you know i grew up in the late 60s

1937
01:07:07,829 --> 01:07:04,880
and early 70s and when the shuttle when

1938
01:07:09,829 --> 01:07:07,839

the apollo program ended in 72 i was

1939
01:07:11,349 --> 01:07:09,839
like one of the few kids in class that

1940
01:07:12,309 --> 01:07:11,359
would ask the teacher if they could put

1941
01:07:16,950 --> 01:07:12,319
on

1942
01:07:19,190 --> 01:07:16,960
apollo stuff live it seemed like at

1943
01:07:20,789 --> 01:07:19,200
least a little bit of it and after it

1944
01:07:23,109 --> 01:07:20,799
ended i'm like well what's next you know

1945
01:07:24,630 --> 01:07:23,119
i was only a t not even a teenager yet

1946
01:07:27,190 --> 01:07:24,640
what is next what are these guys going

1947
01:07:29,829 --> 01:07:27,200
to do next um and it was quiet for a few

1948
01:07:33,109 --> 01:07:29,839
years but there wasn't any change in my

1949
01:07:34,870 --> 01:07:33,119
desire as a as a teenager now and

1950
01:07:36,870 --> 01:07:34,880
someone going into high school to want

1951
01:07:38,549 --> 01:07:36,880
to go study engineering or want to go

1952
01:07:40,549 --> 01:07:38,559
study technical stuff i want to be a

1953
01:07:42,390 --> 01:07:40,559
pilot and i want to be an engineer and

1954
01:07:44,309 --> 01:07:42,400
so it wasn't you know that really got

1955
01:07:47,190 --> 01:07:44,319
codified when we started seeing

1956
01:07:49,510 --> 01:07:47,200
enterprise and its missions and so that

1957
01:07:51,510 --> 01:07:49,520
was the icing on the cake but the in the

1958
01:07:53,109 --> 01:07:51,520
inspiring fact

1959
01:07:55,190 --> 01:07:53,119
had already happened and that was that

1960
01:07:57,270 --> 01:07:55,200
we were leaders in space we were the

1961
01:08:00,230 --> 01:07:57,280
first ones to the moon we were the first

1962
01:08:03,990 --> 01:08:00,240
ones to put uh our the space lab system

1963
01:08:05,430 --> 01:08:04,000

up and so to me today the gap is yeah

1964
01:08:07,109 --> 01:08:05,440
there's a technical gap we got to go

1965
01:08:08,870 --> 01:08:07,119
close which is getting our american

1966
01:08:11,190 --> 01:08:08,880
astronauts into space

1967
01:08:13,829 --> 01:08:11,200
the second thing is the gap to continue

1968
01:08:15,750 --> 01:08:13,839
to inspire the fact that the next

1969
01:08:17,430 --> 01:08:15,760
generation of kids who are in junior

1970
01:08:18,470 --> 01:08:17,440
high in high school today are going to

1971
01:08:20,709 --> 01:08:18,480
want to go

1972
01:08:22,870 --> 01:08:20,719
be high-tech jobs and go work in space

1973
01:08:24,709 --> 01:08:22,880
in the future that's the gap i'm most

1974
01:08:26,709 --> 01:08:24,719
concerned about and i think by doing the

1975
01:08:28,870 --> 01:08:26,719
cc dev activity and the following

1976
01:08:30,950 --> 01:08:28,880
activities we are showing very clearly

1977
01:08:36,309 --> 01:08:30,960
that there is a future for folks who

1978
01:08:40,309 --> 01:08:38,709
okay for more information on ccdev2

1979
01:08:43,110 --> 01:08:40,319
please go to the nasa website at

1980
01:08:44,390 --> 01:08:43,120
www.nasa.gov

1981
01:08:45,990 --> 01:08:44,400
thank you very much for your questions