Episode 4: Rocket Roundup

September 2018

@NASAKennedy
#NASARocketRanch

New episodes every month!

1
00:00:06,440 --> 00:00:02,750
I am the launch director for the launch

2
00:00:11,540 --> 00:00:06,450
services program and so it sounds like a

3
00:00:13,100 --> 00:00:11,550
pretty cool job it does it is EGS

4
00:00:20,620 --> 00:00:13,110
program chief engineer

5
00:00:29,279 --> 00:00:26,180
[Music]

6
00:00:32,530 --> 00:00:31,599
now passing through max Q maximum

7
00:00:35,979 --> 00:00:32,540
dynamic pressure

8
00:00:37,810 --> 00:00:35,989
welcome to space welcome to the rocket

9
00:00:40,210 --> 00:00:37,820
ranch I am Amanda Griffin

10
00:00:42,130 --> 00:00:40,220
earlier this month our host Joshua

11
00:00:44,170 --> 00:00:42,140
Santora sat down with two launch

12
00:00:46,899 --> 00:00:44,180
services program powerhouses Mick

13
00:00:48,579 --> 00:00:46,909

Waltman and Tim Dunn between the two of

14
00:00:50,110 --> 00:00:48,589
them I'm pretty sure they could power a

15
00:00:52,389 --> 00:00:50,120
rocket with their charisma alone and

16
00:00:54,479 --> 00:00:52,399
they have nearly four decades of launch

17
00:00:56,710 --> 00:00:54,489
services experience between them to boot

18
00:00:58,840 --> 00:00:56,720
since the recording of this interview

19
00:01:00,939 --> 00:00:58,850
the icesat-2 mission successfully

20
00:01:03,220 --> 00:01:00,949
launched on the last Delta - and the

21
00:01:05,710 --> 00:01:03,230
launch services program is now 5 for 5

22
00:01:07,029 --> 00:01:05,720
on successful missions this year with

23
00:01:09,100 --> 00:01:07,039
the six still to come

24
00:01:11,050 --> 00:01:09,110
needless to say these guys are pretty

25
00:01:13,870 --> 00:01:11,060
busy so let's get on with the rocket

26
00:01:16,740 --> 00:01:13,880
roundup today I am in the booth and

27
00:01:20,889 --> 00:01:16,750
joined by Tim Dunn and Mick Waltman of

28
00:01:22,180 --> 00:01:20,899
NASA's launch services program good day

29
00:01:23,859 --> 00:01:22,190
gentlemen I want to let you guys

30
00:01:25,300 --> 00:01:23,869
introduce yourselves briefly tell us a

31
00:01:26,800 --> 00:01:25,310
little bit about yourselves and kind of

32
00:01:28,510 --> 00:01:26,810
what your role is for NASA

33
00:01:32,590 --> 00:01:28,520
well Joshua thanks for having us today

34
00:01:34,060 --> 00:01:32,600
my name is Tim Dunn and I am the launch

35
00:01:38,260 --> 00:01:34,070
director for the launch services program

36
00:01:42,819 --> 00:01:38,270
and so sounds like a pretty cool job it

37
00:01:45,609 --> 00:01:42,829
does it is one of the coolest gosh make

38
00:01:46,870 --> 00:01:45,619

it's been almost 18 years almost 18 for

39
00:01:48,969 --> 00:01:46,880
both of us students thought we started

40
00:01:53,649 --> 00:01:48,979
it launchers from about the same time

41
00:01:55,300 --> 00:01:53,659
same year I think it was in 2099 2000 we

42
00:01:59,200 --> 00:01:55,310
both joined NASA's launch services

43
00:02:01,810 --> 00:01:59,210
program ironically we both joined in the

44
00:02:03,639 --> 00:02:01,820
electrical avionics branch and a couple

45
00:02:06,120 --> 00:02:03,649
years in that branch we both moved over

46
00:02:09,009 --> 00:02:06,130
and became vehicle systems engineers and

47
00:02:11,620 --> 00:02:09,019
just recently probably in the last five

48
00:02:14,080 --> 00:02:11,630
years we kind of split our ways Tim went

49
00:02:16,000 --> 00:02:14,090
to the launch managers office and I went

50
00:02:18,610 --> 00:02:16,010
to the fleet systems management area

51
00:02:20,440 --> 00:02:18,620
there for myself on Mik Waltman I'm the

52
00:02:23,110 --> 00:02:20,450
chief of fleet systems and integration

53
00:02:24,580 --> 00:02:23,120
in the program my branch is in charge of

54
00:02:26,890 --> 00:02:24,590
all the system engineering for the

55
00:02:28,599 --> 00:02:26,900
launch vehicles another cool job not

56
00:02:29,800 --> 00:02:28,609
quite as cool as the launch manager but

57
00:02:31,720 --> 00:02:29,810
it's pretty good it's pretty cool

58
00:02:33,220 --> 00:02:31,730
because we get to do all the engineering

59
00:02:35,110 --> 00:02:33,230
and assessments of all the launch

60
00:02:35,890 --> 00:02:35,120
vehicles that launch services program

61
00:02:37,599 --> 00:02:35,900
works with

62
00:02:41,349 --> 00:02:37,609
so you guys are both with the launch

63
00:02:42,760 --> 00:02:41,359

services program or LSP and you guys I

64
00:02:45,460 --> 00:02:42,770
would describe you guys it's kind of the

65
00:02:47,620 --> 00:02:45,470
some heroes of NASA and spaceflight for

66
00:02:48,850 --> 00:02:47,630
two decades now I'm expecting that

67
00:02:50,650 --> 00:02:48,860
people are surprised to hear you've been

68
00:02:52,030 --> 00:02:50,660
around for 20 years because my

69
00:02:53,680 --> 00:02:52,040
expectation is people would say well

70
00:02:55,960 --> 00:02:53,690
I've heard of the shuttle program I've

71
00:02:58,060 --> 00:02:55,970
heard of maybe SLS I've heard of SpaceX

72
00:02:59,490 --> 00:02:58,070
and Virgin Galactic and Boeing and all

73
00:03:02,230 --> 00:02:59,500
these other companies that are out there

74
00:03:04,450 --> 00:03:02,240
LSP what who are you and what do you do

75
00:03:06,610 --> 00:03:04,460
so so give me an overview of like what

76
00:03:08,860 --> 00:03:06,620
do you guys do as a program so I would

77
00:03:11,140 --> 00:03:08,870
say as a program that's named launch

78
00:03:13,480 --> 00:03:11,150
services program we have only been

79
00:03:17,140 --> 00:03:13,490
around since 1998 so this is our 20th

80
00:03:20,680 --> 00:03:17,150
year however the heritage of LSP really

81
00:03:23,170 --> 00:03:20,690
dates back into the late 50s and 60s

82
00:03:25,660 --> 00:03:23,180
so our predecessor organization that was

83
00:03:28,720 --> 00:03:25,670
located here at Kennedy Space Center was

84
00:03:31,480 --> 00:03:28,730
called NASA expendable launch vehicles

85
00:03:33,820 --> 00:03:31,490
okay so you know not a real jazzy name

86
00:03:35,980 --> 00:03:33,830
we need we need to tighten that up sure

87
00:03:38,170 --> 00:03:35,990
then we had we had a lot of expertise in

88
00:03:39,790 --> 00:03:38,180

expendable launch vehicles that were

89
00:03:42,880 --> 00:03:39,800
located at Goddard Space Flight Center

90
00:03:46,150 --> 00:03:42,890
and at the time Louis was right

91
00:03:49,900 --> 00:03:46,160
I just know Glenn Glenn okay right so in

92
00:03:51,730 --> 00:03:49,910
1998 NASA as an agency co-located all of

93
00:03:53,530 --> 00:03:51,740
that expertise in expendable launch

94
00:03:56,410 --> 00:03:53,540
vehicles here at Kennedy Space Center

95
00:03:58,780 --> 00:03:56,420
and gave us the the new branded name of

96
00:04:02,410 --> 00:03:58,790
launch services program so what we do

97
00:04:05,290 --> 00:04:02,420
right you know in just very short amount

98
00:04:08,520 --> 00:04:05,300
of time if I could summarize it it would

99
00:04:12,010 --> 00:04:08,530
be we match up the needs of spacecraft

100
00:04:14,830 --> 00:04:12,020
with the right size of the rocket so

101
00:04:16,960 --> 00:04:14,840
small spacecraft do in low Earth orbit

102
00:04:19,930 --> 00:04:16,970
activity small rocket and we don't just

103
00:04:22,330 --> 00:04:19,940
have one rocket we find what's best

104
00:04:23,680 --> 00:04:22,340
needed for the spacecraft customer to

105
00:04:25,360 --> 00:04:23,690
get them where they need and if that

106
00:04:27,990 --> 00:04:25,370
requires an ALICE five we do that that

107
00:04:31,030 --> 00:04:28,000
requires a delta 2 we do that Pegasus or

108
00:04:34,420 --> 00:04:31,040
Falcon 9 or a falcon 9 heavy delta 4

109
00:04:36,160 --> 00:04:34,430
heavy we have those all available to us

110
00:04:38,170 --> 00:04:36,170
to choose from as launch services

111
00:04:40,360 --> 00:04:38,180
program we have expertise in all those

112
00:04:42,790 --> 00:04:40,370
vehicles working with our contractors on

113
00:04:44,560 --> 00:04:42,800

those we we assess all that and

114
00:04:47,440 --> 00:04:44,570
determine what's needed so you could you

115
00:04:49,960 --> 00:04:47,450
could kind of say we broker right where

116
00:04:52,150 --> 00:04:49,970
the core where NASA's bridge to space if

117
00:04:54,650 --> 00:04:52,160
you will yeah with our spacecraft

118
00:04:57,350 --> 00:04:54,660
customer providing them or

119
00:04:59,330 --> 00:04:57,360
now what's unique about that and we can

120
00:05:00,860 --> 00:04:59,340
talk a little bit about this is compared

121
00:05:03,980 --> 00:05:00,870
to all the other programs people have

122
00:05:06,500 --> 00:05:03,990
heard about shuttle SLS all these launch

123
00:05:09,080 --> 00:05:06,510
services program we work with private

124
00:05:10,730 --> 00:05:09,090
contractors who build rockets so the

125
00:05:12,920 --> 00:05:10,740
United Launch alliances the Northrop

126
00:05:16,160 --> 00:05:12,930
Grumman innovation systems basic basic

127
00:05:18,650 --> 00:05:16,170
technology technology is you know and

128
00:05:20,660 --> 00:05:18,660
they they actually own and build and

129
00:05:22,640 --> 00:05:20,670
have done a lot of the design of these

130
00:05:23,660 --> 00:05:22,650
Rockets although some of the technology

131
00:05:26,510 --> 00:05:23,670
and stuffs been around for many many

132
00:05:28,760 --> 00:05:26,520
years they build these rockets we then

133
00:05:30,920 --> 00:05:28,770
work with them to make sure we have the

134
00:05:33,530 --> 00:05:30,930
right rocket for the right mission to

135
00:05:35,210 --> 00:05:33,540
make mission success and a lot of us as

136
00:05:37,040 --> 00:05:35,220
you heard from Tim and I Tim started

137
00:05:39,440 --> 00:05:37,050
back with McDonnell Douglas on the Delta

138
00:05:40,820 --> 00:05:39,450

myself with Gd Lockheed on Atlas we have

139
00:05:41,210 --> 00:05:40,830
a lot of background in those type of

140
00:05:43,820 --> 00:05:41,220
things

141
00:05:45,680 --> 00:05:43,830
and we came to NASA to help do that so

142
00:05:47,900 --> 00:05:45,690
that's one of the big differences that

143
00:05:49,640 --> 00:05:47,910
you probably why people didn't know

144
00:05:52,280 --> 00:05:49,650
about launch services program early on

145
00:05:55,040 --> 00:05:52,290
when shuttle was flying and stuff was is

146
00:05:58,160 --> 00:05:55,050
we are kind of brokering that with our

147
00:06:00,170 --> 00:05:58,170
private contractors yeah to get NASA's

148
00:06:03,200 --> 00:06:00,180
missions on orbit and one good thing

149
00:06:06,410 --> 00:06:03,210
that we like to tout for the taxpayers

150
00:06:08,360 --> 00:06:06,420
out there is that because we have this

151
00:06:11,240 --> 00:06:08,370
those that will be paying tax we have

152
00:06:14,390 --> 00:06:11,250
this stable of rockets in our catalog

153
00:06:16,700 --> 00:06:14,400
and so we're able to compete our needs

154
00:06:18,850 --> 00:06:16,710
against these multiple commercial

155
00:06:21,830 --> 00:06:18,860
providers awesome and thus get the best

156
00:06:23,890 --> 00:06:21,840
product and price awesome for the

157
00:06:26,540 --> 00:06:23,900
American taxpayer yeah and what's what's

158
00:06:28,700 --> 00:06:26,550
unique about that is is being rocket

159
00:06:30,500 --> 00:06:28,710
engineers that we are I'm probably

160
00:06:32,240 --> 00:06:30,510
dating myself here but all of us have a

161
00:06:35,510 --> 00:06:32,250
poster of all of our favorite Rockets

162
00:06:38,030 --> 00:06:35,520
you know that are in our offices and

163
00:06:40,150 --> 00:06:38,040

things like that but you know we kind of

164
00:06:42,800 --> 00:06:40,160
have that that centerfold picture if you

165
00:06:45,530 --> 00:06:42,810
taped up in our office of what our

166
00:06:46,940 --> 00:06:45,540
favorites are it's true it's a some

167
00:06:49,880 --> 00:06:46,950
really nerdy and geeky like you know

168
00:06:52,010 --> 00:06:49,890
that right like we are like you are we

169
00:06:55,880 --> 00:06:52,020
have no qualms about telling you that we

170
00:06:58,430 --> 00:06:55,890
are that's good you know our our program

171
00:06:59,810 --> 00:06:58,440
manager Amanda Matz kovitch we just

172
00:07:01,970 --> 00:06:59,820
recently did some work and she was

173
00:07:03,230 --> 00:07:01,980
telling somebody that you know if you

174
00:07:05,000 --> 00:07:03,240
really want to see my folks and how

175
00:07:07,010 --> 00:07:05,010
passionate about they are how they are

176
00:07:08,360 --> 00:07:07,020
about their jobs just go ask them what

177
00:07:09,980 --> 00:07:08,370
their hobbies are when they leave

178
00:07:12,530 --> 00:07:09,990
work you know they work on Rockets all

179
00:07:14,629 --> 00:07:12,540
day long and they love it but then they

180
00:07:16,909 --> 00:07:14,639
leave work and go ask him what they do a

181
00:07:19,460 --> 00:07:16,919
lot of us go play golf a lot of us do

182
00:07:21,170 --> 00:07:19,470
model rockets a lot of us do engineering

183
00:07:23,780 --> 00:07:21,180
things we work with outreach

184
00:07:25,879 --> 00:07:23,790
it's just what we like to do we yes we

185
00:07:28,280 --> 00:07:25,889
know we're nerdy and we love rockets so

186
00:07:29,810 --> 00:07:28,290
you guys did you guys grow up as NASA or

187
00:07:31,610 --> 00:07:29,820
space kids or is that something that

188
00:07:33,830 --> 00:07:31,620

really like it didn't happen until you

189
00:07:35,780 --> 00:07:33,840
got close to that launch so I guess I

190
00:07:37,760 --> 00:07:35,790
would say what Tim and I have learned

191
00:07:40,340 --> 00:07:37,770
working with each over each other over

192
00:07:44,029 --> 00:07:40,350
the years is and you can jump in here is

193
00:07:46,790 --> 00:07:44,039
we actually had very similar ideals and

194
00:07:49,100 --> 00:07:46,800
dreams growing up one of my favorite

195
00:07:53,779 --> 00:07:49,110
shows growing up was a Star Trek the

196
00:07:57,580 --> 00:07:53,789
original unfortunately you you will hear

197
00:08:00,350 --> 00:07:57,590
Tim wanted to be a certain character I

198
00:08:01,850 --> 00:08:00,360
believe his name was Captain Kirk

199
00:08:03,710 --> 00:08:01,860
Captain Kirk who didn't want to be

200
00:08:08,240 --> 00:08:03,720
captain critical question well that was

201
00:08:09,770 --> 00:08:08,250
me I wanted to be Scotty so I think it

202
00:08:11,270 --> 00:08:09,780
worked out great because I wanted to do

203
00:08:14,690 --> 00:08:11,280
engineering Tim became the launch

204
00:08:16,640 --> 00:08:14,700
manager you know he runs the launch but

205
00:08:19,670 --> 00:08:16,650
yeah we both loved Star Trek

206
00:08:21,290 --> 00:08:19,680
yeah mama model rock model rockets which

207
00:08:23,690 --> 00:08:21,300
by the way we still do today with

208
00:08:25,310 --> 00:08:23,700
students and outreach and stuff when we

209
00:08:26,930 --> 00:08:25,320
get asked you can't keep us away from

210
00:08:28,969 --> 00:08:26,940
doing either air rockets or model

211
00:08:31,070 --> 00:08:28,979
rockets Tim and I love to go out and do

212
00:08:35,000 --> 00:08:31,080
those still even as we are still

213
00:08:37,190 --> 00:08:35,010

youngsters at heart so yeah so yeah we

214
00:08:40,760 --> 00:08:37,200
had a lot of the same things growing up

215
00:08:44,300 --> 00:08:40,770
that that led us to this job really neat

216
00:08:47,300 --> 00:08:44,310
job so a little bit about myself I was

217
00:08:48,680 --> 00:08:47,310
born and raised in Alabama small town I

218
00:08:51,199 --> 00:08:48,690
went to school at the University of

219
00:08:53,180 --> 00:08:51,209
Alabama got an engineering degree the

220
00:08:54,920 --> 00:08:53,190
Air Force offered to pay for my

221
00:08:57,230 --> 00:08:54,930
schooling so I owed them a few years I

222
00:08:58,940 --> 00:08:57,240
went off and I flew satellites with the

223
00:09:01,130 --> 00:08:58,950
United States Air Force for a number of

224
00:09:03,890 --> 00:09:01,140
years Air Force was really good to me

225
00:09:06,650 --> 00:09:03,900
after that really cool first assignment

226
00:09:08,870 --> 00:09:06,660
flying satellites GPS satellites by the

227
00:09:11,329 --> 00:09:08,880
way I got to go back to graduate school

228
00:09:13,640 --> 00:09:11,339
got a graduate degree in orbital

229
00:09:16,310 --> 00:09:13,650
mechanics and the physics of space

230
00:09:19,400 --> 00:09:16,320
science and I parlayed that into an

231
00:09:21,079 --> 00:09:19,410
assignment here in Florida at Kennedy

232
00:09:21,390 --> 00:09:21,089
Space Center and Cape Canaveral Air

233
00:09:26,880 --> 00:09:21,400
Force

234
00:09:27,780 --> 00:09:26,890
crew and then I once you get launching

235
00:09:29,520 --> 00:09:27,790
your blood Mick

236
00:09:31,650 --> 00:09:29,530
what happened absolutely it stays in

237
00:09:33,210 --> 00:09:31,660
your blood so you couldn't leave Brevard

238
00:09:35,850 --> 00:09:33,220

County I couldn't leave Kennedy Space

239
00:09:37,940 --> 00:09:35,860
Center and Cape Canaveral and Here I am

240
00:09:40,920 --> 00:09:37,950
I was very fortunate to get a follow-on

241
00:09:42,270 --> 00:09:40,930
job offer from McDonnell Douglas did a

242
00:09:46,020 --> 00:09:42,280
little bit of work with the Delta 2

243
00:09:47,640 --> 00:09:46,030
rocket I grew up actually here in

244
00:09:49,010 --> 00:09:47,650
Florida and kind of bounced around a

245
00:09:51,810 --> 00:09:49,020
little bit but ended up in Tennessee

246
00:09:53,910 --> 00:09:51,820
with my dad travel in the southeast area

247
00:09:56,220 --> 00:09:53,920
so we did most of my stuff there in

248
00:09:57,900 --> 00:09:56,230
Tennessee I went to Tennessee

249
00:10:00,570 --> 00:09:57,910
Technological University for my

250
00:10:02,520 --> 00:10:00,580
electrical engineering degree started my

251
00:10:03,840 --> 00:10:02,530
masters in engineering management and

252
00:10:06,000 --> 00:10:03,850
electrical at the University of

253
00:10:09,030 --> 00:10:06,010
Tennessee go Vols sorry about the

254
00:10:12,000 --> 00:10:09,040
Alabama there and then came to Florida

255
00:10:14,610 --> 00:10:12,010
and finished that up here at UCF so a

256
00:10:17,250 --> 00:10:14,620
little bit of mixture in college life

257
00:10:20,040 --> 00:10:17,260
but you know enjoyed my engineering time

258
00:10:21,300 --> 00:10:20,050
they're a lot like Tim he went in the

259
00:10:23,220 --> 00:10:21,310
Air Force I came right out of college

260
00:10:26,580 --> 00:10:23,230
and went to work for the Department of

261
00:10:29,850 --> 00:10:26,590
Energy in Tennessee designing guidance

262
00:10:32,820 --> 00:10:29,860
chips for submarine missiles and then I

263
00:10:34,260 --> 00:10:32,830

got picked up by General Dynamics Marc

264
00:10:37,440 --> 00:10:34,270
Marietta Lockheed Martin that whole

265
00:10:40,440 --> 00:10:37,450
merger after shuttle Challenger and

266
00:10:41,910 --> 00:10:40,450
started working at complex 36 here at

267
00:10:44,190 --> 00:10:41,920
Cape Canaveral Air Force Station and

268
00:10:46,740 --> 00:10:44,200
like Tim said once you get that first

269
00:10:49,980 --> 00:10:46,750
launch in your blood you want to do that

270
00:10:51,540 --> 00:10:49,990
and so I did and fortunate enough we're

271
00:10:52,880 --> 00:10:51,550
still launching rockets still loving it

272
00:10:55,860 --> 00:10:52,890
working with the people we love and

273
00:10:57,960 --> 00:10:55,870
doing what we dream of every day so very

274
00:11:03,150 --> 00:10:57,970
similar career paths as you can see yeah

275
00:11:04,980 --> 00:11:03,160
although mik does wear that it's just a

276
00:11:07,590 --> 00:11:04,990
little bit and I wear that much more

277
00:11:10,160 --> 00:11:07,600
palatable trainers in red yeah yeah we

278
00:11:12,150 --> 00:11:10,170
we have a fun time with our SEC football

279
00:11:15,600 --> 00:11:12,160
when Tim and I started working together

280
00:11:17,400 --> 00:11:15,610
in LSP in 2000 we kind of found that

281
00:11:20,040 --> 00:11:17,410
bond that you know we had even though

282
00:11:22,080 --> 00:11:20,050
approach this from different tracks if

283
00:11:24,000 --> 00:11:22,090
you will or different ways we came to

284
00:11:26,130 --> 00:11:24,010
the same job of what we love to do and

285
00:11:27,720 --> 00:11:26,140
still love to do today yes absolutely

286
00:11:30,660 --> 00:11:27,730
that's awesome

287
00:11:33,720 --> 00:11:30,670
so know humans for launch services

288
00:11:34,240 --> 00:11:33,730

program as part of a spacecraft correct

289
00:11:39,070 --> 00:11:34,250
correct

290
00:11:41,560 --> 00:11:39,080
but pretty much every or I guess barring

291
00:11:43,780 --> 00:11:41,570
a few that flew on shuttle every NASA

292
00:11:47,080 --> 00:11:43,790
science mission since the inception

293
00:11:51,760 --> 00:11:47,090
another program in 99 98 is all LSP is

294
00:11:55,170 --> 00:11:51,770
that accurate I would say about 95 98

295
00:11:58,030 --> 00:11:55,180
percent there are some occasional

296
00:12:00,910 --> 00:11:58,040
missions that will fly as rideshare on

297
00:12:03,880 --> 00:12:00,920
maybe an Air Force launch or National

298
00:12:06,850 --> 00:12:03,890
Reconnaissance launch some have flown as

299
00:12:07,960 --> 00:12:06,860
rideshare on Soyuz missions and are then

300
00:12:10,420 --> 00:12:07,970
attached to the international space

301
00:12:13,390 --> 00:12:10,430
station but certainly anything that's

302
00:12:15,700 --> 00:12:13,400
large and is doing big science either

303
00:12:18,310 --> 00:12:15,710
here in Earth orbit or going

304
00:12:19,600 --> 00:12:18,320
interplanetary you can bet there was an

305
00:12:21,190 --> 00:12:19,610
LSP stamp on it

306
00:12:24,760 --> 00:12:21,200
if it's launched in the last 20 years

307
00:12:26,050 --> 00:12:24,770
yes awesome so tell me about kind of so

308
00:12:29,110 --> 00:12:26,060
obviously have a finite number of

309
00:12:31,750 --> 00:12:29,120
rockets available as your ride there's

310
00:12:34,090 --> 00:12:31,760
not an exponential number out there so

311
00:12:35,490 --> 00:12:34,100
what's the landscape looked like as far

312
00:12:37,540 --> 00:12:35,500
as the options that you've had

313
00:12:39,520 --> 00:12:37,550

historically and and are we seeing a

314
00:12:42,040 --> 00:12:39,530
change now it feels like there's a

315
00:12:43,960 --> 00:12:42,050
growing market in the in the commercial

316
00:12:47,320 --> 00:12:43,970
world absolutely growing market and

317
00:12:50,320 --> 00:12:47,330
again LSP is I would say out front in

318
00:12:53,200 --> 00:12:50,330
looking at the market and some of our

319
00:12:56,620 --> 00:12:53,210
venture class our next some of our new

320
00:12:59,200 --> 00:12:56,630
competitors or or emerging rockets that

321
00:13:01,360 --> 00:12:59,210
are coming up in out that you hear out

322
00:13:03,579 --> 00:13:01,370
there LSP is looking at those and

323
00:13:05,530 --> 00:13:03,589
working with them we we're always trying

324
00:13:07,510 --> 00:13:05,540
to strategically think ahead of what's

325
00:13:10,000 --> 00:13:07,520
the next best thing for NASA

326
00:13:11,920 --> 00:13:10,010
you know our science missions so people

327
00:13:14,470 --> 00:13:11,930
have probably seen Blue Origin you know

328
00:13:16,470 --> 00:13:14,480
or if they haven't they will soon you

329
00:13:20,380 --> 00:13:16,480
know are they will soon yeah and or

330
00:13:24,250 --> 00:13:20,390
rocket rocket labs right and launcher

331
00:13:26,980 --> 00:13:24,260
one started Firefly and we're working

332
00:13:28,510 --> 00:13:26,990
with these companies to understand their

333
00:13:31,420 --> 00:13:28,520
rockets to look at how they're doing

334
00:13:34,300 --> 00:13:31,430
business and and eventually maybe get

335
00:13:36,310 --> 00:13:34,310
them in as part of our catalog but you

336
00:13:38,500 --> 00:13:36,320
got to start somewhere and we have a lot

337
00:13:41,530 --> 00:13:38,510
of stuff coming down the pike a lot like

338
00:13:44,380 --> 00:13:41,540

people know SpaceX writes true when

339
00:13:46,840 --> 00:13:44,390
SpaceX first came on the scene which I

340
00:13:49,689 --> 00:13:46,850
can't believe has now been almost in

341
00:13:52,269 --> 00:13:49,699
eleven years ten sixteen years it's been

342
00:13:54,100 --> 00:13:52,279
a long time mm yeah but we think of them

343
00:13:55,540 --> 00:13:54,110
as just starting out right but they when

344
00:13:57,280 --> 00:13:55,550
they first started out we got involved

345
00:13:59,319 --> 00:13:57,290
with them and following their early

346
00:14:01,389 --> 00:13:59,329
launches and and looking at them and

347
00:14:03,340 --> 00:14:01,399
then eventually SpaceX became one of the

348
00:14:05,650 --> 00:14:03,350
Rockets we had available for our our

349
00:14:07,059 --> 00:14:05,660
customers so I mean I think we're always

350
00:14:09,280 --> 00:14:07,069
out there looking at the market and

351
00:14:11,949 --> 00:14:09,290
creating new opportunities yeah I think

352
00:14:14,610 --> 00:14:11,959
historically kind of as Mick and I were

353
00:14:17,410 --> 00:14:14,620
coming up through the 80s and early 90s

354
00:14:20,230 --> 00:14:17,420
there was generally like a smaller

355
00:14:22,240 --> 00:14:20,240
rockets some medium Rockets and then the

356
00:14:24,730 --> 00:14:22,250
bigger Rockets so Mick and I kind of

357
00:14:27,400 --> 00:14:24,740
grew up as we've talked about there was

358
00:14:31,389 --> 00:14:27,410
Pegasus has been around since I guess

359
00:14:33,009 --> 00:14:31,399
was that late 80s and early 90s and

360
00:14:36,160 --> 00:14:33,019
that's a very small market and then

361
00:14:39,040 --> 00:14:36,170
Delta 2 was in that kind of medium class

362
00:14:42,309 --> 00:14:39,050
Atlas and then the big rockets were

363
00:14:44,350 --> 00:14:42,319

Titan 4 and then Space Shuttle yeah so

364
00:14:46,629 --> 00:14:44,360
now and so we got to see the evolution

365
00:14:49,540 --> 00:14:46,639
of Atlas 5 and Delta for that that

366
00:14:51,879 --> 00:14:49,550
design was during our time right - to

367
00:14:53,710 --> 00:14:51,889
meet some bigger payloads when Titan

368
00:14:55,480 --> 00:14:53,720
went away so those were kind of our

369
00:14:57,490 --> 00:14:55,490
stable while we were growing up yeah so

370
00:14:59,920 --> 00:14:57,500
we were able to kind of see Titan be

371
00:15:02,620 --> 00:14:59,930
retired but lockheed-martin grow the

372
00:15:04,870 --> 00:15:02,630
Atlas - at the time into the Atlas 3 and

373
00:15:08,019 --> 00:15:04,880
then now Atlas 5 which has become just

374
00:15:10,569 --> 00:15:08,029
an absolute gold standard and launching

375
00:15:12,579 --> 00:15:10,579
and for large spacecraft and we got to

376
00:15:14,650 --> 00:15:12,589
see you know I just thought about this

377
00:15:16,840 --> 00:15:14,660
is we get we got to see companies who

378
00:15:19,480 --> 00:15:16,850
you know he worked for McDonnell Douglas

379
00:15:20,920 --> 00:15:19,490
I worked for Lockheed Martin and and you

380
00:15:23,740 --> 00:15:20,930
got to see these companies get together

381
00:15:26,290 --> 00:15:23,750
also inform in this case United Launch

382
00:15:28,210 --> 00:15:26,300
Alliance so you had two rocky companies

383
00:15:30,879 --> 00:15:28,220
who got together and created one and

384
00:15:32,259 --> 00:15:30,889
kind of merged technologies and and

385
00:15:34,329 --> 00:15:32,269
Rockets together to create another

386
00:15:36,400 --> 00:15:34,339
family right and they're even moving

387
00:15:38,530 --> 00:15:36,410
forward with the Vulcan rocket that's

388
00:15:42,460 --> 00:15:38,540

coming out their new design and Northrop

389
00:15:44,740 --> 00:15:42,470
Grumman started with their small Pegasus

390
00:15:47,050 --> 00:15:44,750
they've built an ant Ari's vehicle that

391
00:15:48,759 --> 00:15:47,060
we we have and look at and they're now

392
00:15:52,240 --> 00:15:48,769
looking at another vehicle cars

393
00:15:54,340 --> 00:15:52,250
oh man mega yeah larger rockets so Ellis

394
00:15:56,829 --> 00:15:54,350
market is continuing to grow as mick

395
00:15:59,290 --> 00:15:56,839
said you know we keep building

396
00:16:00,580 --> 00:15:59,300
relationships with all of these emerging

397
00:16:03,250 --> 00:16:00,590
launch service

398
00:16:06,310 --> 00:16:03,260
and rocket providers and look forward to

399
00:16:07,870 --> 00:16:06,320
that first launch for Blue Origin here

400
00:16:09,519 --> 00:16:07,880
in a few years actually going back a

401
00:16:10,930 --> 00:16:09,529
little history wise I'm like I'm excited

402
00:16:13,510 --> 00:16:10,940
about that one because they're launching

403
00:16:15,730 --> 00:16:13,520
gonna be launching off a complex 36 ok

404
00:16:18,090 --> 00:16:15,740
Jude earlier which is where I started my

405
00:16:20,380 --> 00:16:18,100
career launching Atlas rockets which got

406
00:16:22,780 --> 00:16:20,390
decommissioned and Blue Origin moved in

407
00:16:27,000 --> 00:16:22,790
and start rebuilding and to that point

408
00:16:33,130 --> 00:16:27,010
also back just recently July 12th of

409
00:16:35,290 --> 00:16:33,140
2018 complex Space Launch Complex 17 was

410
00:16:38,590 --> 00:16:35,300
taken down where Delta twos launched out

411
00:16:41,170 --> 00:16:38,600
of for many many years and now that's

412
00:16:44,050 --> 00:16:41,180
look that's being repurposed by another

413
00:16:46,269 --> 00:16:44,060

launch come right correct to do so it's

414
00:16:48,280 --> 00:16:46,279
exciting for Tim and I to see some of

415
00:16:51,370 --> 00:16:48,290
these changes and how the market evolves

416
00:16:53,350 --> 00:16:51,380
from there big big year anniversary year

417
00:16:55,210 --> 00:16:53,360
for you all congratulations to the

418
00:16:57,910 --> 00:16:55,220
program into you guys thank you any

419
00:16:59,560 --> 00:16:57,920
place a huge year I don't know that

420
00:17:01,660 --> 00:16:59,570
there's ever been a year with this many

421
00:17:02,980 --> 00:17:01,670
launches this close together talk a

422
00:17:04,960 --> 00:17:02,990
little bit about kind of this year for

423
00:17:06,280 --> 00:17:04,970
you guys as a program well I'm gonna I'm

424
00:17:07,840 --> 00:17:06,290
gonna jump in real quick cuz I'll let

425
00:17:09,309 --> 00:17:07,850
Tim talk about the year but I will say

426
00:17:11,860 --> 00:17:09,319
it's an exciting year for us it's our

427
00:17:14,050 --> 00:17:11,870
20th anniversary we're so happy to be

428
00:17:15,970 --> 00:17:14,060
here and for all the years we've been

429
00:17:18,189 --> 00:17:15,980
with the program this is one of the

430
00:17:20,559 --> 00:17:18,199
busiest years we have and let you talk

431
00:17:23,710 --> 00:17:20,569
about that so for just a moment let me

432
00:17:25,660 --> 00:17:23,720
kind of summarize 2018 and then I want

433
00:17:27,250 --> 00:17:25,670
to go on Joshua I'm not sure how much

434
00:17:32,460 --> 00:17:27,260
time you have because I can talk for a

435
00:17:37,390 --> 00:17:35,320
Rockside you know - what's exciting

436
00:17:40,150 --> 00:17:37,400
about 2018 is that we're launching on

437
00:17:42,040 --> 00:17:40,160
six different rocket configurations yeah

438
00:17:44,919 --> 00:17:42,050

so we're launching on a couple of Atlas

439
00:17:47,020 --> 00:17:44,929
five configurations we mentioned Falcon

440
00:17:49,450 --> 00:17:47,030
9 launch tests we're launching on

441
00:17:53,110 --> 00:17:49,460
Pegasus we're launching on the delta 4

442
00:17:55,660 --> 00:17:53,120
heavy and finally next up for us is the

443
00:17:57,430 --> 00:17:55,670
Delta - yeah so Nick and I are both

444
00:17:58,930 --> 00:17:57,440
individually blessed to be in the

445
00:18:01,030 --> 00:17:58,940
positions that we are absolutely

446
00:18:03,130 --> 00:18:01,040
absolutely love our jobs but I would say

447
00:18:04,120 --> 00:18:03,140
our program launch services program here

448
00:18:05,980 --> 00:18:04,130
at Kennedy Space Center

449
00:18:07,690 --> 00:18:05,990
I mean we're blessed to have the job

450
00:18:10,300 --> 00:18:07,700
that the government has entrusted to us

451
00:18:11,950 --> 00:18:10,310
yeah we're a family I refer to it

452
00:18:12,509 --> 00:18:11,960
sometimes as a dysfunctional family but

453
00:18:17,129 --> 00:18:12,519
we're still

454
00:18:19,139 --> 00:18:17,139
successful dysfunction absolutely we are

455
00:18:20,879 --> 00:18:19,149
we love working with everybody we have

456
00:18:22,619 --> 00:18:20,889
so we are Tim's right we're blessed to

457
00:18:25,739 --> 00:18:22,629
be around so through our 20 year history

458
00:18:27,779 --> 00:18:25,749
we've had very busy years and we may

459
00:18:29,999 --> 00:18:27,789
have had a year or two as busy as this

460
00:18:32,729 --> 00:18:30,009
year but 2018 is particularly busy for

461
00:18:36,389 --> 00:18:32,739
us six launches this year we're very

462
00:18:38,399 --> 00:18:36,399
fortunate here we are and we've had four

463
00:18:41,579 --> 00:18:38,409

of our six launches successfully

464
00:18:43,949 --> 00:18:41,589
occurred a lot of tremendous amount of

465
00:18:45,719 --> 00:18:43,959
work have gone into those launches in a

466
00:18:47,549 --> 00:18:45,729
couple historic ones too I mean there is

467
00:18:50,039 --> 00:18:47,559
story what have you got for a second

468
00:18:51,690 --> 00:18:50,049
that we've only attempted four so far so

469
00:18:55,349 --> 00:18:51,700
we have four successful out of four

470
00:18:57,479 --> 00:18:55,359
attempts well to go for with two more to

471
00:19:01,049 --> 00:18:57,489
go yeah so you're right I wouldn't say

472
00:19:05,159 --> 00:19:01,059
attempted we actually launched like we

473
00:19:06,239 --> 00:19:05,169
only launched four of the six and

474
00:19:07,560 --> 00:19:06,249
hopefully we're going to talk about the

475
00:19:10,049 --> 00:19:07,570
other two but you know I was saying

476
00:19:12,449 --> 00:19:10,059
historic year for us too Tim Tim and I

477
00:19:15,449 --> 00:19:12,459
like to talk about as one in particular

478
00:19:17,249 --> 00:19:15,459
starting off the year was our goes our

479
00:19:18,659 --> 00:19:17,259
satellite which was the follow that I

480
00:19:20,519 --> 00:19:18,669
mean goes s you're right which was a

481
00:19:21,810 --> 00:19:20,529
follow on to goes our right that we've

482
00:19:24,180 --> 00:19:21,820
done here before which is the new

483
00:19:26,369 --> 00:19:24,190
weather satellite all first-of-its-kind

484
00:19:28,799 --> 00:19:26,379
bringing all kinds of data back for

485
00:19:31,619 --> 00:19:28,809
weather and scientists and then insight

486
00:19:36,119 --> 00:19:31,629
which was a very historic launch for us

487
00:19:37,769 --> 00:19:36,129
it was our first Mars mission off of the

488
00:19:42,149 --> 00:19:37,779

west coast out of Vandenberg Air Force

489
00:19:44,759 --> 00:19:42,159
Base and then recently we had the Tesla

490
00:19:46,489 --> 00:19:44,769
that's true we launched for the second

491
00:19:49,319 --> 00:19:46,499
time as a program off of a Falcon 9

492
00:19:50,789 --> 00:19:49,329
tests which is a really cool satellite

493
00:19:53,969 --> 00:19:50,799
that's out there in space right now

494
00:19:57,089 --> 00:19:53,979
looking for other earth-like planets is

495
00:19:58,379 --> 00:19:57,099
equal to Kepler absolutely yes do some

496
00:19:59,609 --> 00:19:58,389
homework there's some cool science out

497
00:20:01,049 --> 00:19:59,619
there happening right now and then the

498
00:20:03,180 --> 00:20:01,059
one and then the one we just launched

499
00:20:05,279 --> 00:20:03,190
which was a lot of work for the team and

500
00:20:07,319 --> 00:20:05,289
as soon as so we're so proud of the

501
00:20:09,449 --> 00:20:07,329
program how much effort was put in by

502
00:20:12,180 --> 00:20:09,459
him every buy was that so hard

503
00:20:17,879 --> 00:20:12,190
what rocket was that that was a delta 4

504
00:20:19,289 --> 00:20:17,889
heavy heavy first one for LSP launch

505
00:20:21,930 --> 00:20:19,299
versus program

506
00:20:24,479 --> 00:20:21,940
heavy mission and we launched a

507
00:20:26,130 --> 00:20:24,489
satellite Parker Solar Probe now named

508
00:20:28,320 --> 00:20:26,140
after dr. Eugene Parker

509
00:20:29,670 --> 00:20:28,330
who first time NASA's ever done that is

510
00:20:31,590 --> 00:20:29,680
named a satellite after somebody who's

511
00:20:34,110 --> 00:20:31,600
still living he was here for the launch

512
00:20:35,880 --> 00:20:34,120
and so excited to see that go but that

513
00:20:38,370 --> 00:20:35,890

was a historic mission to because on its

514
00:20:40,950 --> 00:20:38,380
way to the Sun yeah mission it's going

515
00:20:42,930 --> 00:20:40,960
to quote touch touch we're very excited

516
00:20:46,590 --> 00:20:42,940
about that but let's talk for a moment

517
00:20:48,480 --> 00:20:46,600
about delta 4 heavy our first launch as

518
00:20:51,810 --> 00:20:48,490
a program on that rock yeah it was a

519
00:20:54,390 --> 00:20:51,820
huge rocket it's like it's hard to

520
00:20:56,610 --> 00:20:54,400
describe how big this rocket is and the

521
00:20:58,580 --> 00:20:56,620
the incredible team that United Launch

522
00:21:02,070 --> 00:20:58,590
Alliance has them that has put together

523
00:21:03,930 --> 00:21:02,080
designed and prepares that rocket for

524
00:21:05,640 --> 00:21:03,940
launch yeah it is I mean you think about

525
00:21:07,890 --> 00:21:05,650
it compared to some of the other rockets

526
00:21:10,380 --> 00:21:07,900
and our stable right delta 4 heavy has

527
00:21:12,420 --> 00:21:10,390
three common booster cores yeah so

528
00:21:14,010 --> 00:21:12,430
there's there's the extra work that has

529
00:21:15,990 --> 00:21:14,020
to go in there and integrating three

530
00:21:18,450 --> 00:21:16,000
cores together to lift off from earth

531
00:21:21,300 --> 00:21:18,460
the exact same time three core so think

532
00:21:23,340 --> 00:21:21,310
of three rock sitting side by side tied

533
00:21:25,350 --> 00:21:23,350
together on the launch pad as the first

534
00:21:26,160 --> 00:21:25,360
stage each one with its own engine and

535
00:21:28,770 --> 00:21:26,170
rs-68

536
00:21:31,260 --> 00:21:28,780
a engine that provides a lot of power to

537
00:21:32,730 --> 00:21:31,270
get out of Earth's atmosphere but yeah

538
00:21:34,710 --> 00:21:32,740

like Tim said that trying to integrate

539
00:21:36,090 --> 00:21:34,720
all that together which is just the

540
00:21:38,070 --> 00:21:36,100
first stage right and what we when we

541
00:21:40,110 --> 00:21:38,080
call a first stage that's just the part

542
00:21:42,150 --> 00:21:40,120
of the rocket that we use to get out of

543
00:21:44,640 --> 00:21:42,160
Earth's atmosphere it's a it's just the

544
00:21:47,400 --> 00:21:44,650
first basic part the in our case the

545
00:21:49,620 --> 00:21:47,410
power lots of power its provide us that

546
00:21:51,840 --> 00:21:49,630
velocity and speed to leave Earth's

547
00:21:53,730 --> 00:21:51,850
orbit and then of course we have a

548
00:21:56,700 --> 00:21:53,740
second stage which is sitting on top of

549
00:21:59,280 --> 00:21:56,710
that first stage which we refer to as a

550
00:22:02,280 --> 00:21:59,290
booster but the second stage is a small

551
00:22:03,720 --> 00:22:02,290
motor and not really small for Delta for

552
00:22:06,270 --> 00:22:03,730
I shouldn't say that right it's actually

553
00:22:08,610 --> 00:22:06,280
a pretty large Delta cryogenic separate

554
00:22:11,940 --> 00:22:08,620
second stage which uses high-performance

555
00:22:13,890 --> 00:22:11,950
fuels and to get the spacecraft on its

556
00:22:15,930 --> 00:22:13,900
way once it's into its intermediate

557
00:22:18,300 --> 00:22:15,940
orbit and then a mission unique thing a

558
00:22:21,270 --> 00:22:18,310
thing we did specifically for delta 4

559
00:22:23,280 --> 00:22:21,280
heavy was we added a third stage solid

560
00:22:25,710 --> 00:22:23,290
rocket motor we don't fly many third

561
00:22:28,230 --> 00:22:25,720
stages but this solid rocket motor that

562
00:22:30,360 --> 00:22:28,240
we've had great heritage with northrop

563
00:22:32,790 --> 00:22:30,370

grumman designed and developed this

564
00:22:35,730 --> 00:22:32,800
third stage and that was the the final

565
00:22:38,520 --> 00:22:35,740
push that parker Solar Probe needed to

566
00:22:39,630 --> 00:22:38,530
get it on that intersecting orbit with

567
00:22:41,370 --> 00:22:39,640
the Sun

568
00:22:43,590 --> 00:22:41,380
incredible mission you were saying do

569
00:22:45,150 --> 00:22:43,600
your homework on some of the others I'm

570
00:22:48,510 --> 00:22:45,160
sure a lot of people out there that are

571
00:22:50,370 --> 00:22:48,520
listening to us today have seen that in

572
00:22:51,480 --> 00:22:50,380
the news and I would say go check that

573
00:22:55,110 --> 00:22:51,490
out because it's a real exciting

574
00:22:56,700 --> 00:22:55,120
missioning 60 years in the making to do

575
00:22:59,700 --> 00:22:56,710
something like this to get this close to

576
00:23:01,410 --> 00:22:59,710
the Sun yeah we covered a good bid that

577
00:23:07,920 --> 00:23:01,420
content with Nicky Fox dr. Nikki Fox

578
00:23:10,770 --> 00:23:07,930
yeah I want to make sure we we touch on

579
00:23:13,830 --> 00:23:10,780
these last two so yes still to come we

580
00:23:15,270 --> 00:23:13,840
have we have the final Delta 2 mission

581
00:23:18,480 --> 00:23:15,280
the little brother I'll call it up the

582
00:23:20,640 --> 00:23:18,490
Delta 4 and then icon on board a Pegasus

583
00:23:22,470 --> 00:23:20,650
so give us a real quick kind of a

584
00:23:24,300 --> 00:23:22,480
snapshot those two launches look like

585
00:23:27,390 --> 00:23:24,310
I'm gonna let Tim I'm gonna do Pegasus

586
00:23:30,300 --> 00:23:27,400
first because as you said the Delta 2 is

587
00:23:31,830 --> 00:23:30,310
our final Delta to launch and both of us

588
00:23:34,020 --> 00:23:31,840

have a lot of history with the Delta 2

589
00:23:34,620 --> 00:23:34,030
but Tim has you heard from his

590
00:23:37,440 --> 00:23:34,630
background

591
00:23:39,540 --> 00:23:37,450
James Air Force early on Tim has a

592
00:23:42,360 --> 00:23:39,550
tremendous amount of that and this will

593
00:23:44,430 --> 00:23:42,370
be an emotional emotional rocket launch

594
00:23:46,650 --> 00:23:44,440
for him and so I'll let him talk the

595
00:23:48,770 --> 00:23:46,660
Delta 2 but to correct you just a moment

596
00:23:51,630 --> 00:23:48,780
when you said little brother of Delta 4

597
00:23:53,610 --> 00:23:51,640
and Tim made agree or disagree I don't

598
00:23:58,980 --> 00:23:53,620
know but I would say actually I think

599
00:24:00,630 --> 00:23:58,990
Delta 4 was the evolved brother he might

600
00:24:03,090 --> 00:24:00,640
be a little bigger a little more stout

601
00:24:05,250 --> 00:24:03,100
Delta 4 was the evolved little brother

602
00:24:06,900 --> 00:24:05,260
when he don't diffuse Wow the family

603
00:24:11,640 --> 00:24:06,910
tree in a certain way you might call

604
00:24:14,550 --> 00:24:11,650
Delta 4 the grandchild but on that note

605
00:24:17,520 --> 00:24:14,560
I'll pop this is really quick icon

606
00:24:19,050 --> 00:24:17,530
mission which is our honest fear mission

607
00:24:21,510 --> 00:24:19,060
that's coming up it will be our last

608
00:24:23,790 --> 00:24:21,520
mission of the year is launching on a

609
00:24:26,580 --> 00:24:23,800
Pegasus XL launch vehicle which is a

610
00:24:29,400 --> 00:24:26,590
unique airdrop vehicle that we actually

611
00:24:32,130 --> 00:24:29,410
mount to the bottom of a modified l-1011

612
00:24:34,380 --> 00:24:32,140
aircraft an airplane which is a more or

613
00:24:37,080 --> 00:24:34,390

less a commercial it was a plane it was

614
00:24:39,290 --> 00:24:37,090
a commercial plane you know for us Josh

615
00:24:42,740 --> 00:24:39,300
that's older guys we remember the l-1011

616
00:24:45,710 --> 00:24:42,750
for you is locking advice for you

617
00:24:51,260 --> 00:24:45,720
I would compare that to you know us the

618
00:24:53,630 --> 00:24:51,270
new Boeing you know 767 oh but but the

619
00:24:55,670 --> 00:24:53,640
l-1011 was a mighty plane wide-body

620
00:24:57,710 --> 00:24:55,680
plane that was used for transporting

621
00:24:59,930 --> 00:24:57,720
folks all over the world back in his day

622
00:25:03,140 --> 00:24:59,940
but Northrop Grumman innovation systems

623
00:25:05,360 --> 00:25:03,150
took a an l-1011 and modified it to be

624
00:25:07,250 --> 00:25:05,370
able to put this Pegasus XL rocket under

625
00:25:09,680 --> 00:25:07,260
the belly of the plane the plane

626
00:25:12,770 --> 00:25:09,690
actually is called stargazer and so

627
00:25:15,800 --> 00:25:12,780
stargazer takes Pegasus and we lift off

628
00:25:19,370 --> 00:25:15,810
we go to 39,000 feet and once we're at

629
00:25:22,550 --> 00:25:19,380
39,000 feet and Tim as launch manager

630
00:25:25,400 --> 00:25:22,560
and the launch team give the go for

631
00:25:27,320 --> 00:25:25,410
launch we drop the L we dropped the

632
00:25:29,150 --> 00:25:27,330
Pegasus five seconds later it auto

633
00:25:31,550 --> 00:25:29,160
ignites itself and heads off into space

634
00:25:33,680 --> 00:25:31,560
to deliver Ikon on its way for its

635
00:25:36,020 --> 00:25:33,690
science so we're really excited about

636
00:25:38,090 --> 00:25:36,030
that mission it's we always liked

637
00:25:42,610 --> 00:25:38,100
working with Pegasus it's a it's a as

638
00:25:47,660 --> 00:25:45,410

asked you two quick questions about that

639
00:25:49,640 --> 00:25:47,670
mission and the Pegasus in general how

640
00:25:51,890 --> 00:25:49,650
big is the Pegasus compared to that

641
00:25:55,010 --> 00:25:51,900
commercial plane just to get people a

642
00:25:56,930 --> 00:25:55,020
feeling for how big it is and why launch

643
00:25:58,640 --> 00:25:56,940
from an airplane like that seems like a

644
00:25:59,900 --> 00:25:58,650
really weird thing why not just do it

645
00:26:03,350 --> 00:25:59,910
like every other rocket and go from the

646
00:26:05,180 --> 00:26:03,360
ground so so airdrop has some advantages

647
00:26:07,250 --> 00:26:05,190
for smaller payloads and that's what

648
00:26:10,370 --> 00:26:07,260
Pegasus is Right thousand kilograms or

649
00:26:12,020 --> 00:26:10,380
less type of payload and you can you can

650
00:26:16,910 --> 00:26:12,030
put a smaller payload on there science

651
00:26:18,530 --> 00:26:16,920
payload and use the l-1011 instead of

652
00:26:20,870 --> 00:26:18,540
having it launched from the ground you

653
00:26:23,630 --> 00:26:20,880
can get to 39,000 feet and give it a

654
00:26:25,310 --> 00:26:23,640
little bit of early start if you will

655
00:26:28,040 --> 00:26:25,320
right to get out of Earth's atmosphere

656
00:26:30,620 --> 00:26:28,050
right so you're at 39,000 feet so you

657
00:26:33,350 --> 00:26:30,630
don't need quite as much energy in your

658
00:26:35,150 --> 00:26:33,360
fuels and your boost to get out of the

659
00:26:37,220 --> 00:26:35,160
Earth's atmosphere and go so that's one

660
00:26:39,410 --> 00:26:37,230
of the advantages to the smaller rocket

661
00:26:40,970 --> 00:26:39,420
on the l-1011 the airdrop vehicle right

662
00:26:42,890 --> 00:26:40,980
Tim we'll talk a little bit about Delta

663
00:26:44,450 --> 00:26:42,900

2 and some of the solids and stuff we

664
00:26:46,700 --> 00:26:44,460
need to put on here but that's one of

665
00:26:48,860 --> 00:26:46,710
the advantages other advantage is what

666
00:26:50,480 --> 00:26:48,870
play exists the most in the summertime

667
00:26:52,100 --> 00:26:50,490
Florida weather

668
00:26:54,310 --> 00:26:52,110
yeah weather well guess what happens

669
00:26:56,440 --> 00:26:54,320
when you fly to 39,000 feet

670
00:26:58,090 --> 00:26:56,450
not so much weather

671
00:27:00,700 --> 00:26:58,100
the biggest thing you have to deal with

672
00:27:02,830 --> 00:27:00,710
at 39,000 feet is the temperature and so

673
00:27:04,780 --> 00:27:02,840
we designed the rocket and and all the

674
00:27:07,120 --> 00:27:04,790
components to meet that cold temperature

675
00:27:08,530 --> 00:27:07,130
while you're cruising at 39,000 feet so

676
00:27:10,690 --> 00:27:08,540
Tim's absolutely right you you pretty

677
00:27:13,750 --> 00:27:10,700
much take the weather out of the

678
00:27:15,970 --> 00:27:13,760
equation for launch day right right

679
00:27:18,210 --> 00:27:15,980
because the Pegasus okay so the Pegasus

680
00:27:19,510 --> 00:27:18,220
is actually only 50 inches in diameter

681
00:27:21,700 --> 00:27:19,520
okay

682
00:27:23,650 --> 00:27:21,710
just over four feet just over four feet

683
00:27:26,650 --> 00:27:23,660
50 inches in diameter

684
00:27:29,860 --> 00:27:26,660
underneath the l-1011 right and the

685
00:27:32,860 --> 00:27:29,870
length of the Pegasus is about mmm would

686
00:27:34,360 --> 00:27:32,870
that be about 42 feet 42 to 50 feet I

687
00:27:36,340 --> 00:27:34,370
always try to in my mind always remember

688
00:27:39,280 --> 00:27:36,350

5050 but it's actually a little bit less

689
00:27:41,590 --> 00:27:39,290
than 50 feet long with a delta wing on

690
00:27:43,030 --> 00:27:41,600
it so it's a pretty small rocket I mean

691
00:27:45,100 --> 00:27:43,040
I don't want to take away from it it's a

692
00:27:48,190 --> 00:27:45,110
mighty rocket of what it's designed to

693
00:27:51,790 --> 00:27:48,200
do for but compared to a delta ii or an

694
00:27:54,310 --> 00:27:51,800
atlas v or a delta 4 heavy or a falcon 9

695
00:27:56,650 --> 00:27:54,320
it's it's it's small in diameter and

696
00:27:59,290 --> 00:27:56,660
small in length right so you think of

697
00:28:01,450 --> 00:27:59,300
that 50 less than 50 feet long and 50

698
00:28:04,270 --> 00:28:01,460
inches in diameter and the wingspan of

699
00:28:06,190 --> 00:28:04,280
an l-1011 is about two to two and a half

700
00:28:08,260 --> 00:28:06,200
times that okay right so you're looking

701
00:28:10,270 --> 00:28:08,270
a hundred and fifty feet roughly hundred

702
00:28:11,770 --> 00:28:10,280
two so it they give you an idea of the

703
00:28:14,140 --> 00:28:11,780
wingspan and how that sits underneath

704
00:28:15,640 --> 00:28:14,150
the belly of the of the l-1011 but very

705
00:28:17,490 --> 00:28:15,650
important Northrop Grumman has been

706
00:28:20,590 --> 00:28:17,500
doing this for years this will be our

707
00:28:23,050 --> 00:28:20,600
44th Pegasus Northrop Grumman is

708
00:28:25,630 --> 00:28:23,060
launched I believe that's correct and

709
00:28:28,600 --> 00:28:25,640
we're really excited and getting that

710
00:28:30,910 --> 00:28:28,610
off the off the ground but but our next

711
00:28:33,130 --> 00:28:30,920
one out yeah our NASA two which is

712
00:28:34,330 --> 00:28:33,140
always the most father a most hip

713
00:28:36,670 --> 00:28:34,340

forward which is always the most

714
00:28:38,290 --> 00:28:36,680
important one is next which it's which

715
00:28:39,880 --> 00:28:38,300
whatever is next is the most important

716
00:28:41,470 --> 00:28:39,890
one and that I'm gonna I'm gonna turn

717
00:28:42,970 --> 00:28:41,480
that over to Tim because it is a very

718
00:28:44,950 --> 00:28:42,980
special rocket and we have a lot of

719
00:28:47,080 --> 00:28:44,960
heritage with it so next up for launch

720
00:28:49,990 --> 00:28:47,090
services program we're gonna launch the

721
00:28:52,870 --> 00:28:50,000
final delta ii and the payload there is

722
00:28:55,210 --> 00:28:52,880
i set two and it will be the final

723
00:28:57,070 --> 00:28:55,220
launch so we are in our 30th year of

724
00:28:59,770 --> 00:28:57,080
flight with the delta ii launch vehicle

725
00:29:05,230 --> 00:28:59,780
it's had its debut flight on Valentine's

726
00:29:08,200 --> 00:29:05,240
Day February 14 1989 and so it's a it's

727
00:29:09,570 --> 00:29:08,210
a has become known as the industry

728
00:29:12,690 --> 00:29:09,580
workhorse

729
00:29:15,900 --> 00:29:12,700
Delta 2 is not a huge rocket it's in

730
00:29:17,460 --> 00:29:15,910
itself it's not tiny but it's not tights

731
00:29:23,550 --> 00:29:17,470
it's yeah it's only eight feet in

732
00:29:25,170 --> 00:29:23,560
diameter yeah it's it's we call we refer

733
00:29:27,360 --> 00:29:25,180
to it as a medium class rocket but now

734
00:29:29,430 --> 00:29:27,370
it's a it's a mighty workhorse and has

735
00:29:31,080 --> 00:29:29,440
been for NASA special about Delta 2 is

736
00:29:34,070 --> 00:29:31,090
this is gonna be the hundred and fifty

737
00:29:38,220 --> 00:29:34,080
fifth flight and the final one for for

738
00:29:41,100 --> 00:29:38,230

Delta two and it kind of created its own

739
00:29:43,530 --> 00:29:41,110
market in that medium class of launch

740
00:29:46,730 --> 00:29:43,540
vehicles because it became known as that

741
00:29:50,670 --> 00:29:46,740
workhorse that dependable reliable

742
00:29:53,210 --> 00:29:50,680
relatively low-cost launcher and so our

743
00:29:57,480 --> 00:29:53,220
spacecraft a lot on the science side

744
00:29:59,970 --> 00:29:57,490
decided back in the early 90s let's just

745
00:30:03,540 --> 00:29:59,980
design our spacecraft to fit on Delta 2

746
00:30:06,450 --> 00:30:03,550
so it kind of grew its own class and

747
00:30:07,410 --> 00:30:06,460
size of spacecraft market which I want

748
00:30:09,570 --> 00:30:07,420
to get into that some more in a little

749
00:30:10,920 --> 00:30:09,580
bit but that's very backwards of how

750
00:30:11,970 --> 00:30:10,930
most everything else works for you guys

751
00:30:13,110 --> 00:30:11,980
Kurt right correct

752
00:30:15,720 --> 00:30:13,120
right so we'll come back to that that's

753
00:30:17,280 --> 00:30:15,730
really interesting yeah what and and to

754
00:30:18,900 --> 00:30:17,290
just kind of elaborate on that one of

755
00:30:22,290 --> 00:30:18,910
the things that was unique about Delta 2

756
00:30:24,780 --> 00:30:22,300
back in the 80s when it came around it

757
00:30:26,250 --> 00:30:24,790
was a it was a big block buy or what

758
00:30:28,860 --> 00:30:26,260
that means is they bought a lot of

759
00:30:31,080 --> 00:30:28,870
rockets the Air Force did and Tim was

760
00:30:33,420 --> 00:30:31,090
part of that in the with their GPS

761
00:30:34,680 --> 00:30:33,430
satellites way back then and that kind

762
00:30:36,810 --> 00:30:34,690
of got things going but like Tim said

763
00:30:39,060 --> 00:30:36,820

they started designing the satellites to

764
00:30:40,530 --> 00:30:39,070
fit on the rocket so little backwards

765
00:30:43,500 --> 00:30:40,540
and what we normally do but it worked

766
00:30:45,930 --> 00:30:43,510
yeah nASA has benefited greatly from the

767
00:30:49,350 --> 00:30:45,940
Delta heritage of launch vehicles dating

768
00:30:52,770 --> 00:30:49,360
back to 1960 in Delta 1 but focusing on

769
00:30:55,230 --> 00:30:52,780
Delta 2 the Air Force we have to we'll

770
00:30:57,630 --> 00:30:55,240
take a moment here and pay homage to our

771
00:31:00,780 --> 00:30:57,640
partners the United States Air Force if

772
00:31:04,290 --> 00:31:00,790
not for them sure Delta the fleet could

773
00:31:06,780 --> 00:31:04,300
have easily been retired in about 1986

774
00:31:10,470 --> 00:31:06,790
yeah actually production on Delta

775
00:31:12,180 --> 00:31:10,480
vehicles was halted it was 1981 because

776
00:31:14,700 --> 00:31:12,190
if you recall what happened in that year

777
00:31:17,430 --> 00:31:14,710
or that time frame was shuttle started

778
00:31:19,080 --> 00:31:17,440
from yeah and the government said we are

779
00:31:21,630 --> 00:31:19,090
going to deploy all commercial

780
00:31:23,280 --> 00:31:21,640
satellites from shuttle and the Air

781
00:31:26,280 --> 00:31:23,290
Force meanwhile had

782
00:31:29,130 --> 00:31:26,290
Atlas the Atlas one in the Atlas do this

783
00:31:31,970 --> 00:31:29,140
was coming online they also had Titan so

784
00:31:34,620 --> 00:31:31,980
they really didn't need the Delta

785
00:31:36,150 --> 00:31:34,630
anymore but the in missional was

786
00:31:38,160 --> 00:31:36,160
supposed to be flying space shuttle was

787
00:31:39,660 --> 00:31:38,170
he almost exactly just delivering Palin

788
00:31:41,190 --> 00:31:39,670

after payload multiple times it was

789
00:31:43,080 --> 00:31:41,200
supposed to it was referred to as the

790
00:31:44,520 --> 00:31:43,090
semi truck of space right it was

791
00:31:47,120 --> 00:31:44,530
supposed to deliver a lot of things on

792
00:31:50,490 --> 00:31:47,130
orbit and they all that and then in 1986

793
00:31:52,290 --> 00:31:50,500
Ronald Reagan declared that you know we

794
00:31:53,850 --> 00:31:52,300
would not we would launch we wouldn't

795
00:31:57,930 --> 00:31:53,860
launch commercial satellites on shuttle

796
00:31:59,700 --> 00:31:57,940
anymore sure so Delta so the Animas Air

797
00:32:01,470 --> 00:31:59,710
Force needed to get these newly

798
00:32:03,570 --> 00:32:01,480
developed Global Positioning satellites

799
00:32:05,480 --> 00:32:03,580
on orbit previously they were going to

800
00:32:07,650 --> 00:32:05,490
fly on the shuttle now they're being

801
00:32:10,980 --> 00:32:07,660
manifested on expendable launch vehicles

802
00:32:13,560 --> 00:32:10,990
the Air Force said hey let's go redesign

803
00:32:15,330 --> 00:32:13,570
the last version of the Delta one let's

804
00:32:17,820 --> 00:32:15,340
call it Delta two let's upgrade it make

805
00:32:19,950 --> 00:32:17,830
it a little beefier launch bigger

806
00:32:22,050 --> 00:32:19,960
payloads they provided that

807
00:32:25,170 --> 00:32:22,060
infrastructure here at Cape Canaveral

808
00:32:27,420 --> 00:32:25,180
Air Force Station in complex 17 and so

809
00:32:29,910 --> 00:32:27,430
it was kind of on that foundation that

810
00:32:32,850 --> 00:32:29,920
the nasa science community was able to

811
00:32:34,910 --> 00:32:32,860
leverage and say wow let's let's go back

812
00:32:37,230 --> 00:32:34,920
to delta with the slightly smaller

813
00:32:39,510 --> 00:32:37,240

spacecraft for science purpose so it is

814
00:32:41,190 --> 00:32:39,520
the final delta ii for us as LSP for the

815
00:32:43,500 --> 00:32:41,200
production of delta ii out of space

816
00:32:45,390 --> 00:32:43,510
launch complex-2 out of Vandenberg but

817
00:32:46,920 --> 00:32:45,400
you know and why I said earlier it's a

818
00:32:49,740 --> 00:32:46,930
little emotional for Tim it's not only

819
00:32:51,330 --> 00:32:49,750
the end of an era for delta ii but you

820
00:32:56,850 --> 00:32:51,340
know this is the third time Tim's had to

821
00:32:58,380 --> 00:32:56,860
say goodbye to Delta - yeah so I know I

822
00:33:00,900 --> 00:32:58,390
haven't had a lot of experience cuz I'm

823
00:33:03,390 --> 00:33:00,910
not as uh as invested in the history of

824
00:33:04,110 --> 00:33:03,400
NASA but I know that there were a few

825
00:33:06,420 --> 00:33:04,120
years ago.we

826
00:33:09,150 --> 00:33:06,430
Delta twos were gone and all of a sudden

827
00:33:11,850 --> 00:33:09,160
Delta twos were back so so NASA in

828
00:33:16,260 --> 00:33:11,860
September of 2011 we launched the Grail

829
00:33:18,540 --> 00:33:16,270
mission off of 17b which was the last

830
00:33:20,370 --> 00:33:18,550
supposed to be the last Delta - right

831
00:33:22,470 --> 00:33:20,380
and on the East Coast from the East

832
00:33:24,420 --> 00:33:22,480
Coast we had a month later we went out

833
00:33:26,940 --> 00:33:24,430
west to Vandenberg to launch the NPP

834
00:33:29,700 --> 00:33:26,950
mission which was the absolute final

835
00:33:32,430 --> 00:33:29,710
last one the last one ever right and so

836
00:33:34,230 --> 00:33:32,440
and and and no.9 was the nav star

837
00:33:36,280 --> 00:33:34,240
mission which was an Air Force mission

838
00:33:38,410 --> 00:33:36,290

on 17a and that was

839
00:33:39,910 --> 00:33:38,420
the last mission off 17 a so 17 a and B

840
00:33:43,750 --> 00:33:39,920
were decommissioned on the East Coast

841
00:33:46,450 --> 00:33:43,760
okay and then NPP last launch off of

842
00:33:48,070 --> 00:33:46,460
space launch complex-2 so Jim you know

843
00:33:50,980 --> 00:33:48,080
Tim had to say goodbye during all that

844
00:33:53,380 --> 00:33:50,990
time and then a few years later it's

845
00:33:55,420 --> 00:33:53,390
right in ula United Launch Alliance who

846
00:34:00,120 --> 00:33:55,430
builds the Delta line and the Atlas line

847
00:34:04,750 --> 00:34:00,130
they said but wait we have a few more

848
00:34:06,340 --> 00:34:04,760
and NASA had four science missions that

849
00:34:10,780 --> 00:34:06,350
had just come out and been approved

850
00:34:13,780 --> 00:34:10,790
right the oco-2 mission the SMAP mission

851
00:34:16,210 --> 00:34:13,790
which is soil moisture mission the

852
00:34:18,400 --> 00:34:16,220
Jaypee ss1 mission whether says weather

853
00:34:22,450 --> 00:34:18,410
satellite that we just launched recently

854
00:34:24,250 --> 00:34:22,460
and and of course icesat-2 and they all

855
00:34:27,659 --> 00:34:24,260
approach lung services program and

856
00:34:31,270 --> 00:34:27,669
they're all within the delta ii range of

857
00:34:35,620 --> 00:34:31,280
way garment requirements and so NASA

858
00:34:38,800 --> 00:34:35,630
turned ula on to manufacture the last

859
00:34:42,580 --> 00:34:38,810
four Delta Delta twos and that's where

860
00:34:46,750 --> 00:34:42,590
we are today so I can honestly say that

861
00:34:58,660 --> 00:34:46,760
there are no more parts left the there's

862
00:35:01,060 --> 00:34:58,670
always a few extra time they're there

863
00:35:03,130 --> 00:35:01,070

United Launch Alliance does have some

864
00:35:07,360 --> 00:35:03,140
parts out there for our fifth fifth

865
00:35:10,780 --> 00:35:07,370
vehicle but it I believe it will find

866
00:35:15,390 --> 00:35:10,790
its way to some other areas so I I can

867
00:35:19,960 --> 00:35:15,400
probably with 99.9% certainty say

868
00:35:22,000 --> 00:35:19,970
icesat-2 is the final awesome hey guys

869
00:35:24,040 --> 00:35:22,010
we need to wrap it up I wanted to ask

870
00:35:25,720 --> 00:35:24,050
you to give me a little bit of feedback

871
00:35:28,030 --> 00:35:25,730
kind of your opinion if you if you could

872
00:35:30,640 --> 00:35:28,040
leave people with one piece of knowledge

873
00:35:32,980 --> 00:35:30,650
or understanding about what LSP does

874
00:35:34,350 --> 00:35:32,990
about how important it is what would you

875
00:35:41,320 --> 00:35:34,360
say

876
00:35:44,890 --> 00:35:41,330
services program is the government

877
00:35:48,420 --> 00:35:44,900
organization that provides the mission

878
00:35:50,109 --> 00:35:48,430
assurance capability the analytical

879
00:35:55,450 --> 00:35:50,119
capability

880
00:35:57,009 --> 00:35:55,460
that gives us the best chance that we're

881
00:36:00,249 --> 00:35:57,019
going to have a hundred percent mission

882
00:36:02,829 --> 00:36:00,259
success for whatever science or robotic

883
00:36:05,289 --> 00:36:02,839
spacecraft we're about to launch we have

884
00:36:08,980 --> 00:36:05,299
some of the finest engineers and

885
00:36:11,499 --> 00:36:08,990
analysts worldwide it's just amazing

886
00:36:14,529 --> 00:36:11,509
when Mick and I get to walk the halls of

887
00:36:15,940 --> 00:36:14,539
LSP on a daily basis the people that we

888
00:36:18,150 --> 00:36:15,950

interact with and that have been

889
00:36:20,920 --> 00:36:18,160
assembled and everyone is just so

890
00:36:25,180 --> 00:36:20,930
enthusiastic about doing the job doing

891
00:36:28,509 --> 00:36:25,190
it right and just absolutely loves

892
00:36:29,920 --> 00:36:28,519
Rockets loves the spacecraft loves the

893
00:36:33,039 --> 00:36:29,930
fact that they're part of something

894
00:36:34,809 --> 00:36:33,049
special for humankind yeah I totally

895
00:36:36,039 --> 00:36:34,819
agree Tim I think launchers problem we

896
00:36:39,069 --> 00:36:36,049
have some folks that are just

897
00:36:41,470 --> 00:36:39,079
world-renowned people that are called

898
00:36:43,749 --> 00:36:41,480
upon by other agencies called on by

899
00:36:46,120 --> 00:36:43,759
other contractors sometimes to provide

900
00:36:48,759 --> 00:36:46,130
input we we have a great team and when I

901
00:36:50,980 --> 00:36:48,769
say team it's it's really I heard too it

902
00:36:53,380 --> 00:36:50,990
earlier it's a family I mean the whole

903
00:36:55,569 --> 00:36:53,390
LSP program from the top down is a

904
00:36:58,420 --> 00:36:55,579
family and the other thing I would say

905
00:37:01,329 --> 00:36:58,430
is everybody we work with that I I know

906
00:37:03,549 --> 00:37:01,339
is so passionate about their jobs and

907
00:37:05,049 --> 00:37:03,559
what we do and making history because

908
00:37:08,109 --> 00:37:05,059
that's what we feel like we do is every

909
00:37:10,269 --> 00:37:08,119
day working for NASA working on some of

910
00:37:13,630 --> 00:37:10,279
NASA's most important scientific and

911
00:37:15,670 --> 00:37:13,640
robotic missions we make history doing

912
00:37:18,430 --> 00:37:15,680
that right it's it's just exciting for

913
00:37:20,440 --> 00:37:18,440

us to get to do that our number one job

914
00:37:22,630 --> 00:37:20,450
is to make sure our spacecraft customers

915
00:37:25,569 --> 00:37:22,640
meet their requirements and get on orbit

916
00:37:29,079 --> 00:37:25,579
successfully exactly where they need to

917
00:37:31,960 --> 00:37:29,089
be on the specific orbit they need to

918
00:37:33,670 --> 00:37:31,970
get their science done and and we do not

919
00:37:35,890 --> 00:37:33,680
take that lightly in launch services

920
00:37:37,930 --> 00:37:35,900
program that is that is part of our

921
00:37:39,759 --> 00:37:37,940
mission is to open up the universe you

922
00:37:41,799 --> 00:37:39,769
know for our space for our people and

923
00:37:43,749 --> 00:37:41,809
spacecraft to get things done and and

924
00:37:45,759 --> 00:37:43,759
yeah we talk Rockets all day long but

925
00:37:47,979 --> 00:37:45,769
we're we're in it to make sure our

926
00:37:49,900 --> 00:37:47,989
spacecraft customer succeeds awesome

927
00:37:51,759 --> 00:37:49,910
well Tim mink thanks for being in booth

928
00:37:53,019 --> 00:37:51,769
with me today thanks thanks to his phone

929
00:37:55,660 --> 00:37:53,029
it was a blast

930
00:37:57,789 --> 00:37:55,670
and good luck with Delta 2 good luck

931
00:38:00,200 --> 00:37:57,799
with Ikon and good luck with the future

932
00:38:02,299 --> 00:38:00,210
of science and space

933
00:38:03,829 --> 00:38:02,309
after recording this podcast our host

934
00:38:05,270 --> 00:38:03,839
Joshua Santoro had the honor of being

935
00:38:07,579 --> 00:38:05,280
the launch commentator for the last

936
00:38:09,650 --> 00:38:07,589
Delta to fly out this historic launch on

937
00:38:11,089 --> 00:38:09,660
September 15th was a great success and

938
00:38:18,829 --> 00:38:11,099

will hold a special place in the hearts

939
00:38:24,829 --> 00:38:18,839
of Tim Dunn and Nick Waldman Green is

940
00:38:33,380 --> 00:38:24,839
great ten nine eight seven six five four

941
00:38:35,450 --> 00:38:33,390
three two one liftoff of the final delta

942
00:38:36,859 --> 00:38:35,460
to launching nearly three decades of

943
00:38:40,040 --> 00:38:36,869
science research and exploration

944
00:38:41,720 --> 00:38:40,050
missions lifting icesat-2 on a quest to

945
00:38:44,170 --> 00:38:41,730
explore the polar ice sheets of our

946
00:38:47,390 --> 00:38:44,180
constantly changing home planet

947
00:38:49,040 --> 00:38:47,400
Godspeed delta ii and thank you for your

948
00:38:51,680 --> 00:38:49,050
almost 30 years of unparalleled

949
00:38:53,359 --> 00:38:51,690
excellence you all made this look easy

950
00:38:55,370 --> 00:38:53,369
this is rocket science it is not easy

951
00:38:57,410 --> 00:38:55,380
but the team looks like they just did a

952
00:38:58,819 --> 00:38:57,420
great job pulling together today but on

953
00:39:01,280 --> 00:38:58,829
a personal level Tim we know that you

954
00:39:02,720 --> 00:39:01,290
love the Delta 2 obviously you are

955
00:39:04,250 --> 00:39:02,730
committed to every mission and do a

956
00:39:05,079 --> 00:39:04,260
phenomenal job so what's this one for

957
00:39:07,460 --> 00:39:05,089
you personally

958
00:39:08,770 --> 00:39:07,470
besides being excited what does it mean

959
00:39:13,490 --> 00:39:08,780
to you personally

960
00:39:16,039 --> 00:39:13,500
well obviously I'm a little bit sad I'm

961
00:39:18,980 --> 00:39:16,049
thrilled with mission success and that

962
00:39:21,950 --> 00:39:18,990
we were able to close the chapter on

963
00:39:24,730 --> 00:39:21,960

Delta 2 with a huge success of an

964
00:39:27,700 --> 00:39:24,740
incredibly important science payload

965
00:39:31,130 --> 00:39:27,710
icesat-2 is going to do cutting-edge

966
00:39:32,329 --> 00:39:31,140
scientific data gathering the precision

967
00:39:33,260 --> 00:39:32,339
measurements it's going to make from

968
00:39:36,890 --> 00:39:33,270
space they're just going to be

969
00:39:39,049 --> 00:39:36,900
incredible so to be able to say that we

970
00:39:40,990 --> 00:39:39,059
launched this very important science

971
00:39:44,660 --> 00:39:41,000
mission on the final flight of the

972
00:39:46,549 --> 00:39:44,670
industry workhorse is just a huge

973
00:39:49,339 --> 00:39:46,559
accomplishment for the entire team and

974
00:39:52,099 --> 00:39:49,349
so I have a lot of personal feelings

975
00:39:55,450 --> 00:39:52,109
about Delta 2 but I'm really just a very

976
00:39:59,599 --> 00:39:55,460
small part of the entire team and I just

977
00:40:02,930 --> 00:39:59,609
proud honored humbled to be part of this

978
00:40:06,349 --> 00:40:02,940
team that gets to closed chapter on this

979
00:40:08,210 --> 00:40:06,359
incredible rocket I'm Joshua Santora and

980
00:40:10,099 --> 00:40:08,220
that's our show thanks for stopping by

981
00:40:12,460 --> 00:40:10,109
the rocket range and special thanks to

982
00:40:14,680 --> 00:40:12,470
our guests our aspiring Trekkies

983
00:40:17,230 --> 00:40:14,690
Waltman and tim done to learn more about

984
00:40:20,050 --> 00:40:17,240
all things rockets go to nasa.gov slash

985
00:40:21,580 --> 00:40:20,060
launch services there are also several

986
00:40:23,170 --> 00:40:21,590
nasa podcasts you can check out - one

987
00:40:26,040 --> 00:40:23,180
more about what's happening at all of

988
00:40:27,910 --> 00:40:26,050

our centers at nasa.gov slash podcasts a

989
00:40:30,310 --> 00:40:27,920
special shout out to our producer

990
00:40:32,740 --> 00:40:30,320
Jessica Wanda Happy Trails to you until

991
00:40:34,780 --> 00:40:32,750
we meet again our sound man Dan Casper

992
00:40:36,640 --> 00:40:34,790
and Frankie Martin editor Michelle stone

993
00:40:39,160 --> 00:40:36,650
and our production manager Amanda

994
00:40:40,660 --> 00:40:39,170
Griffin tune in next month as we wrangle

995
00:40:42,940 --> 00:40:40,670
some ranch hands you may not expect to

996
00:40:45,160 --> 00:40:42,950
find around these parts and remember on

997
00:40:46,020 --> 00:40:45,170
the rocket range even the sky isn't the

998
00:40:52,300 --> 00:40:46,030
limit