1
00:00:03,590 --> 00:00:02,389
hi and welcome to the Apollo Saturn v

2
00:00:06,230 --> 00:00:03,600
Center at the Kennedy Space Center

3
00:00:08,150 --> 00:00:06,240
Visitor Complex I'm Bethany hall and we

4
00:00:10,459 --> 00:00:08,160
are about to explore a pivotal moment in

5
00:00:12,440 --> 00:00:10,469
American history where humans left Earth

6
00:00:15,049 --> 00:00:12,450
from Cape Kennedy and set off to stand

7
00:00:16,039 --> 00:00:15,059
on another world every astronaut that

8
00:00:17,960 --> 00:00:16,049
stepped foot on the moon

9
00:00:20,510 --> 00:00:17,970
launched atop a Saturn five rocket like

10
00:00:22,490 --> 00:00:20,520
the one you see behind me this Saturn 5

11
00:00:25,340 --> 00:00:22,500
is only one of three remaining Saturn 5

12
00:00:27,529 --> 00:00:25,350
rockets in the United States the Saturn

13
00:00:29,660 --> 00:00:27,539

5 is divided into three stages if you

14
00:00:32,600 --> 00:00:29,670
look up you will see the first stage of

15
00:00:34,790 --> 00:00:32,610
the Saturn 5 rocket five f-1 engines

16
00:00:37,639 --> 00:00:34,800
consumed five hundred and thirty four

17
00:00:39,740 --> 00:00:37,649
thousand gallons of fuel in 168 seconds

18
00:00:41,869 --> 00:00:39,750
to propel the rocket by the time the

19
00:00:44,299 --> 00:00:41,879
rocket was 40 miles in the air it was

20
00:00:46,760 --> 00:00:44,309
traveling at an incredible 5,000 miles

21
00:00:49,330 --> 00:00:46,770
per hour to give you an idea of how much

22
00:00:52,970 --> 00:00:49,340
power that really is the rocket produced

23
00:00:57,920 --> 00:00:52,980
7.6 million pounds of thrust that's more

24
00:01:00,260 --> 00:00:57,930
than 85 Hoover dams to to deliver fuel

25
00:01:01,880 --> 00:01:00,270
rapidly to the rocket turbo pumps had to

26
00:01:04,039 --> 00:01:01,890
be designed that could deliver the fuel

27
00:01:06,469 --> 00:01:04,049
at an incredible pace and here's a

28
00:01:08,450 --> 00:01:06,479
spin-off bonus those turbo pumps were

29
00:01:11,270 --> 00:01:08,460
the precursor to a lot of technology you

30
00:01:12,859 --> 00:01:11,280
see in today's artificial hearts but

31
00:01:14,480 --> 00:01:12,869
we're here to talk about the astronauts

32
00:01:16,280 --> 00:01:14,490
that chose to propel themselves to the

33
00:01:18,440 --> 00:01:16,290
moon in the command module atop this

34
00:01:20,539 --> 00:01:18,450
rocket if you'll come with me to my left

35
00:01:22,730 --> 00:01:20,549
you will see the Apollo command and

36
00:01:25,370 --> 00:01:22,740
service module it's divided into two

37
00:01:27,140 --> 00:01:25,380
sections the first cone-shaped section

38
00:01:30,499 --> 00:01:27,150

is where the astronauts would rise it's

39
00:01:32,990 --> 00:01:30,509
the command module it's 10 feet 7 inches

40
00:01:35,630 --> 00:01:33,000
tall and just shy of 13 feet in diameter

41
00:01:37,490 --> 00:01:35,640
a small space by any stretch for the

42
00:01:39,499 --> 00:01:37,500
three astronauts making the three-day

43
00:01:42,140 --> 00:01:39,509
quarter million mile trip to the moon

44
00:01:44,090 --> 00:01:42,150
the second cylinder shape section is the

45
00:01:46,069 --> 00:01:44,100
service module it contained the

46
00:01:48,350 --> 00:01:46,079
electrical power and propulsion for the

47
00:01:50,749 --> 00:01:48,360
command module it also had space for

48
00:01:52,280 --> 00:01:50,759
consumables like food and water that the

49
00:01:55,130 --> 00:01:52,290
astronauts would need on their journey

50
00:01:56,780 --> 00:01:55,140
prior to reentry the eye the command

51
00:01:58,580 --> 00:01:56,790
module would separate from the service

52
00:01:59,510 --> 00:01:58,590
module and the service module will burn

53
00:02:01,760 --> 00:01:59,520
up in the atmosphere

54
00:02:03,469 --> 00:02:01,770
while the command module would prepare

55
00:02:04,300 --> 00:02:03,479
for splashdown in the ocean safely

56
00:02:07,149 --> 00:02:04,310
bringing our Astro

57
00:02:08,650 --> 00:02:07,159
home NASA launched 19 of these

58
00:02:10,870 --> 00:02:08,660
throughout the course of the Apollo

59
00:02:13,270 --> 00:02:10,880
program but only nine transported humans

60
00:02:14,830 --> 00:02:13,280
to the moon in a moment you will get to

61
00:02:17,410 --> 00:02:14,840
see the command module from the Apollo

62
00:02:19,540 --> 00:02:17,420
14 mission but first I'm going to send

63
00:02:22,930 --> 00:02:19,550

you to Joshua San Sora for a closer look

64
00:02:24,520 --> 00:02:22,940
at the second stage Joshua we're now

65
00:02:26,650 --> 00:02:24,530
here alongside this hat earned five

66
00:02:29,020 --> 00:02:26,660
rocket at the top of the first stage and

67
00:02:31,570 --> 00:02:29,030
the bottom of the second stage that

68
00:02:33,250 --> 00:02:31,580
second stage uses five J two engines to

69
00:02:35,080 --> 00:02:33,260
produce about a million pounds of thrust

70
00:02:38,140 --> 00:02:35,090
to propel the rocket through the

71
00:02:39,280 --> 00:02:38,150
uppermost part of Earth's atmosphere wow

72
00:02:40,900 --> 00:02:39,290
this thing is huge

73
00:02:44,380 --> 00:02:40,910
to this day it's still the tallest

74
00:02:46,809 --> 00:02:44,390
rocket to ever fly at about 363 feet

75
00:02:49,660 --> 00:02:46,819
tall that's about 60 feet taller than

76
00:02:51,580 --> 00:02:49,670
the Statue of Liberty because this

77
00:02:53,440 --> 00:02:51,590
rocket and this exhibit are so massive

78
00:02:54,820 --> 00:02:53,450
we wanted to show you this scale model

79
00:02:57,039 --> 00:02:54,830
to give you a little bit better

80
00:03:00,009 --> 00:02:57,049
perspective of how big this thing is

81
00:03:02,320 --> 00:03:00,019
so the bottom up to here is the first

82
00:03:04,809 --> 00:03:02,330
stage and then from there to here is the

83
00:03:06,670 --> 00:03:04,819
second stage we have the third stage the

84
00:03:08,410 --> 00:03:06,680
lunar lander and then the capsule where

85
00:03:13,650 --> 00:03:08,420
the astronauts would ultimately sit so

86
00:03:18,580 --> 00:03:16,449
well the first stage of the Saturn 5

87
00:03:21,160 --> 00:03:18,590
rocket was used to mostly get the rocket

88
00:03:22,330 --> 00:03:21,170

off the ground which it did great it

89
00:03:25,000 --> 00:03:22,340
actually would run out of fuel at about

90
00:03:26,770 --> 00:03:25,010
42 miles and altitude at that point that

91
00:03:29,349 --> 00:03:26,780
first stage would separate and fall back

92
00:03:30,910 --> 00:03:29,359
to earth and land in the ocean then the

93
00:03:32,949 --> 00:03:30,920
second stage engines would light and

94
00:03:34,930 --> 00:03:32,959
that would carry the rocket into Earth

95
00:03:36,729 --> 00:03:34,940
orbit and then once its fuel was

96
00:03:39,129 --> 00:03:36,739
expended it would separate and fall back

97
00:03:41,289 --> 00:03:39,139
to earth as well that third stage down

98
00:03:45,129 --> 00:03:41,299
there would be used to mostly get us

99
00:03:47,309 --> 00:03:45,139
from Earth orbit to moon orbit once in

100
00:03:49,479 --> 00:03:47,319
orbit around the moon for Apollo 11

101
00:03:52,150 --> 00:03:49,489
astronauts Neil Armstrong and Buzz

102
00:03:53,710 --> 00:03:52,160
Aldrin flew the lunar lander and

103
00:03:56,860 --> 00:03:53,720
actually landed on the surface of the

104
00:03:59,849 --> 00:03:56,870
Moon on that Lander was a plaque that

105
00:04:02,349 --> 00:03:59,859
read we come in peace for all mankind

106
00:04:05,620 --> 00:04:02,359
indeed this was a historic moment for

107
00:04:09,789 --> 00:04:05,630
America but this was also a moment of

108
00:04:12,039 --> 00:04:09,799
global inspiration and unity as over 600

109
00:04:14,650 --> 00:04:12,049
million people tuned in to watch those

110
00:04:17,080 --> 00:04:14,660
first steps on the moon on television

111
00:04:19,960 --> 00:04:17,090
for a brief moment the world was united

112
00:04:22,390 --> 00:04:19,970
in in unity together in its celebration

113
00:04:26,860 --> 00:04:22,400

of this historic achievement for all

114
00:04:29,050 --> 00:04:26,870
mankind one of the things that made the

115
00:04:31,900 --> 00:04:29,060
Apollo program so incredible is that it

116
00:04:33,970 --> 00:04:31,910
started in 1963 we were in full swing

117
00:04:36,940 --> 00:04:33,980
with the Gemini program and we were just

118
00:04:38,410 --> 00:04:36,950
winding down Project Mercury we were

119
00:04:40,720 --> 00:04:38,420
building rockets of vastly different

120
00:04:42,370 --> 00:04:40,730
sizes constructing the enormous Vehicle

121
00:04:44,590 --> 00:04:42,380
Assembly Building we're creating these

122
00:04:47,020 --> 00:04:44,600
giant launch pads and we're training

123
00:04:50,590 --> 00:04:47,030
crews to do things that nobody's ever

124
00:04:52,030 --> 00:04:50,600
done before it really is this moment

125
00:04:53,770 --> 00:04:52,040
where when we land on the moon where

126
00:04:55,420 --> 00:04:53,780
it's this culmination of just an

127
00:04:57,010 --> 00:04:55,430
incredible journey and Neil and Buzz

128
00:04:59,980 --> 00:04:57,020
both recognized that it really was an

129
00:05:01,210 --> 00:04:59,990
accomplishment for all mankind just

130
00:05:02,950 --> 00:05:01,220
around the corner over there there's

131
00:05:05,140 --> 00:05:02,960
actually a number of headlines copies of

132
00:05:07,210 --> 00:05:05,150
headlines from around the world from

133
00:05:10,210 --> 00:05:07,220
back in 1969 capturing those first few

134
00:05:13,270 --> 00:05:10,220
steps on the moon can you imagine what

135
00:05:15,850 --> 00:05:13,280
the headlines will say on our next giant

136
00:05:19,120 --> 00:05:15,860
leap in space exploration what will they

137
00:05:20,290 --> 00:05:19,130
say when we walk on the moon again how

138
00:05:24,550 --> 00:05:20,300

about walking on the Mars what will

139
00:05:27,670 --> 00:05:24,560
those headlines say back in 1969 50

140
00:05:29,230 --> 00:05:27,680
years ago we were still 14 years from

141
00:05:31,630 --> 00:05:29,240
the first time that an American woman

142
00:05:33,760 --> 00:05:31,640
would fly into space and we've made no

143
00:05:36,330 --> 00:05:33,770
mystery that women will be there for the

144
00:05:38,230 --> 00:05:36,340
next giant leaps in space exploration

145
00:05:41,320 --> 00:05:38,240
could you be a part of one of those

146
00:05:43,000 --> 00:05:41,330
headlines we want to show you some

147
00:05:44,800 --> 00:05:43,010
artifacts from the Apollo program now

148
00:05:47,020 --> 00:05:44,810
and Bethenny's actually found some of

149
00:05:49,150 --> 00:05:47,030
those in our vault over here welcome to

150
00:05:51,190 --> 00:05:49,160
the ball there are a lot of artifacts in

151
00:05:52,750 --> 00:05:51,200
this room too many to go into everything

152
00:05:54,430 --> 00:05:52,760
today but I did want to highlight a few

153
00:05:56,890 --> 00:05:54,440
major items for you as you look around

154
00:05:58,750 --> 00:05:56,900
if you'll look over here you will see

155
00:06:01,720 --> 00:05:58,760
the command module for the Apollo 14

156
00:06:04,180 --> 00:06:01,730
mission nicknamed Kitty Hawk the Apollo

157
00:06:06,430 --> 00:06:04,190
14 crew had some trouble docking with

158
00:06:08,320 --> 00:06:06,440
the lunar module on tarus it took the

159
00:06:10,000 --> 00:06:08,330
crew six attempts before a hard shock

160
00:06:12,670 --> 00:06:10,010
was achieved and that's not the only

161
00:06:15,100 --> 00:06:12,680
problem they encountered during a test a

162
00:06:17,350 --> 00:06:15,110
short in the lunar modules abort switch

163
00:06:18,820 --> 00:06:17,360

was discovered if triggered this would

164
00:06:19,930 --> 00:06:18,830
have caused an abort during the lunar

165
00:06:22,930 --> 00:06:19,940
modules descent

166
00:06:25,690 --> 00:06:22,940
despite all this Antares made the most

167
00:06:26,869 --> 00:06:25,700
precise landing to date coming in only

168
00:06:28,399 --> 00:06:26,879
87 feet

169
00:06:31,850 --> 00:06:28,409
they're planned target in the Frau Moore

170
00:06:33,019 --> 00:06:31,860
region of the moon the Apollo 14 capsule

171
00:06:36,049 --> 00:06:33,029
brought back with it

172
00:06:37,579 --> 00:06:36,059
94 pounds of lunar rock and soil this

173
00:06:39,409 --> 00:06:37,589
was scheduled to go to a hundred and

174
00:06:41,329 --> 00:06:39,419
eighty-seven scientific teams in the

175
00:06:43,969 --> 00:06:41,339
United States and fourteen other

176
00:06:46,489 --> 00:06:43,979
countries for study and analysis if you

177
00:06:48,169 --> 00:06:46,499
look over here you will see a sample of

178
00:06:52,100 --> 00:06:48,179
the lunar rock from the Apollo 15

179
00:06:54,859 --> 00:06:52,110
mission this is believed to be 3.7

180
00:06:56,179 --> 00:06:54,869
billion years old now come with me

181
00:06:58,639 --> 00:06:56,189
we're gonna take a look at some

182
00:07:00,379 --> 00:06:58,649
spacesuits along the wall if you'll come

183
00:07:02,779 --> 00:07:00,389
over here you will see a wall of

184
00:07:04,639 --> 00:07:02,789
spacesuits the spacesuit is a complex

185
00:07:08,179 --> 00:07:04,649
modern armor that the astronauts have to

186
00:07:10,219 --> 00:07:08,189
wear to explore space the astronauts

187
00:07:11,929 --> 00:07:10,229
Apollo suits I'm sorry how to do things

188
00:07:14,329 --> 00:07:11,939

the mercury and Gemini suits could not

189
00:07:16,279 --> 00:07:14,339
they had to enable astronauts to walk on

190
00:07:18,109 --> 00:07:16,289
the moon the astronauts had to be able

191
00:07:19,759 --> 00:07:18,119
to traverse rocky terrain and they had

192
00:07:21,889 --> 00:07:19,769
to be able to walk away from the lunar

193
00:07:24,259 --> 00:07:21,899
lander and here's a fun fact if you're

194
00:07:26,119 --> 00:07:24,269
wearing athletic shoes chances are you

195
00:07:28,219 --> 00:07:26,129
are walking on Apollo spin-off

196
00:07:30,350 --> 00:07:28,229
technology much of the spacesuit

197
00:07:32,329 --> 00:07:30,360
technology is used in the external shell

198
00:07:34,850 --> 00:07:32,339
of athletic shoes and also in the

199
00:07:37,009 --> 00:07:34,860
fabrication process if you'll look over

200
00:07:38,959 --> 00:07:37,019
here you will see Alan Shepards

201
00:07:41,629 --> 00:07:38,969
spacesuit still covered in lunar dust

202
00:07:43,309 --> 00:07:41,639
and that's the spacesuit serve as a

203
00:07:45,859 --> 00:07:43,319
reminder that spaceflight is not without

204
00:07:48,499 --> 00:07:45,869
risk next we're going back to Joshua

205
00:07:51,170 --> 00:07:48,509
who's in the Apollo 1 tribute we're here

206
00:07:52,730 --> 00:07:51,180
now at the Apollo 1 tribute and as you

207
00:07:56,569 --> 00:07:52,740
walk in there's a sign that reads ad

208
00:07:58,369 --> 00:07:56,579
astra per aspera that is a latin phrase

209
00:08:01,850 --> 00:07:58,379
that means a rough road leads to the

210
00:08:04,549 --> 00:08:01,860
Stars the Apollo program began with the

211
00:08:07,639 --> 00:08:04,559
loss of an entire crew it really was a

212
00:08:11,899 --> 00:08:07,649
rough road that led to the moon on

213
00:08:14,569 --> 00:08:11,909

January 27 1967 during a pre-flight test

214
00:08:14,989 --> 00:08:14,579
in preparation for Apollo 1 a fire broke

215
00:08:17,359 --> 00:08:14,999
out

216
00:08:19,249 --> 00:08:17,369
on the command module and they were

217
00:08:21,980 --> 00:08:19,259
unable to open a hatch and the entire

218
00:08:25,790 --> 00:08:21,990
crew was trapped inside astronauts

219
00:08:30,650 --> 00:08:25,800
Virgil Gus Grissom Edward white and

220
00:08:35,839 --> 00:08:32,450
they were scheduled to fly just a few

221
00:08:37,820 --> 00:08:35,849
weeks later on February 21st 1967 and

222
00:08:40,190 --> 00:08:37,830
here you can actually see these are the

223
00:08:42,529 --> 00:08:40,200
the hatch elements to that command

224
00:08:46,910 --> 00:08:42,539
module this is what they what failed

225
00:08:47,540 --> 00:08:46,920
during that pre-launch test because of

226
00:08:49,070 --> 00:08:47,550
that failure

227
00:08:50,720 --> 00:08:49,080
there was a redesign effort done to

228
00:08:53,630 --> 00:08:50,730
create an entirely new design which you

229
00:08:55,250 --> 00:08:53,640
can see over here and that redesign was

230
00:08:55,910 --> 00:08:55,260
made so that it could be opened in five

231
00:09:02,270 --> 00:08:55,920
seconds

232
00:09:04,400 --> 00:09:02,280
this display ultimately serves as a

233
00:09:07,250 --> 00:09:04,410
reminder of the tremendous effort made

234
00:09:10,550 --> 00:09:07,260
to improve and increase safety for our

235
00:09:13,580 --> 00:09:10,560
crews and for the entire program after

236
00:09:15,200 --> 00:09:13,590
the accident NASA spent time slowing

237
00:09:18,020 --> 00:09:15,210
things down and looking at every single

238
00:09:19,430 --> 00:09:18,030

piece of that rocket and spacecraft as a

239
00:09:21,290 --> 00:09:19,440
result there were a number of things

240
00:09:23,870 --> 00:09:21,300
that were were changed to improve safety

241
00:09:25,910 --> 00:09:23,880
and allowed us to successfully land with

242
00:09:29,000 --> 00:09:25,920
12 men on the surface of the Moon during

243
00:09:30,590 --> 00:09:29,010
that Apollo program it can be easy and

244
00:09:33,080 --> 00:09:30,600
it's appropriate to think of these men

245
00:09:36,050 --> 00:09:33,090
as as astronauts and icons and heroes

246
00:09:38,210 --> 00:09:36,060
but these three men they were just that

247
00:09:42,530 --> 00:09:38,220
they were men they were sons and

248
00:09:47,030 --> 00:09:42,540
brothers and husbands and fathers to

249
00:09:48,500 --> 00:09:47,040
their kids they were just dad Gus he

250
00:09:49,970 --> 00:09:48,510
loved engineering and he was actively

251
00:09:52,580 --> 00:09:49,980
involved in the work done on his own

252
00:09:55,610 --> 00:09:52,590
aircraft and spacecraft he also loved to

253
00:09:57,740 --> 00:09:55,620
fish he loved cars Edie was an amazing

254
00:09:59,870 --> 00:09:57,750
athlete his event was the 400 meter

255
00:10:03,380 --> 00:09:59,880
hurdles and he actually almost made the

256
00:10:05,120 --> 00:10:03,390
Olympic team Roger was known for taking

257
00:10:07,730 --> 00:10:05,130
special care with everything that he did

258
00:10:10,280 --> 00:10:07,740
and he also loved sport shooting and he

259
00:10:13,450 --> 00:10:10,290
loved to cook if you could ask these

260
00:10:16,730 --> 00:10:13,460
guys any question what would you ask him

261
00:10:18,950 --> 00:10:16,740
later Michael Collins the command module

262
00:10:21,980 --> 00:10:18,960
pilot for Apollo 11 reflected on their

263
00:10:24,230 --> 00:10:21,990

sacrifice and he said this Apollo one

264
00:10:26,290 --> 00:10:24,240
tragically cost three lives but I think

265
00:10:29,420 --> 00:10:26,300
it saved more than three lives later

266
00:10:30,680 --> 00:10:29,430
without it very likely we would have not

267
00:10:34,210 --> 00:10:30,690
landed on the moon by the end of the

268
00:10:36,860 --> 00:10:34,220
decade these three brave individuals

269
00:10:39,380 --> 00:10:36,870
gave their lives in pursuit of space

270
00:10:41,510 --> 00:10:39,390
exploration and their sacrifice led to

271
00:10:44,329 --> 00:10:41,520
further testing and redesign that

272
00:10:45,949 --> 00:10:44,339
enabled us to successfully a

273
00:10:48,710 --> 00:10:45,959
the charge given by President Kennedy

274
00:10:50,720 --> 00:10:48,720
back in 1961 and that charge was that we

275
00:10:52,519 --> 00:10:50,730
should safely land a man on the moon and

276
00:10:55,970 --> 00:10:52,529
bring him home safely before the end of

277
00:10:59,090 --> 00:10:55,980
the decade we called this space a

278
00:11:04,460 --> 00:10:59,100
tribute because a tribute reminds us of

279
00:11:07,519 --> 00:11:04,470
what these men made possible all right

280
00:11:09,679 --> 00:11:07,529
so I am here now with four-time Space

281
00:11:11,509 --> 00:11:09,689
Shuttle astronaut and current center

282
00:11:13,129 --> 00:11:11,519
director for the Kennedy Space Center

283
00:11:15,799 --> 00:11:13,139
Bob Cabana thanks Bob for joining us Oh

284
00:11:18,439 --> 00:11:15,809
my plate Rajesh so we just came from the

285
00:11:20,449 --> 00:11:18,449
Apollo one tribute and and the question

286
00:11:23,869 --> 00:11:20,459
I want to start with is to kind of just

287
00:11:26,119 --> 00:11:23,879
ask how do we deal with that how do we

288
00:11:28,489 --> 00:11:26,129

kind of engage with that topic the idea

289
00:11:30,799 --> 00:11:28,499
of losing crew 52 years later and we've

290
00:11:33,139 --> 00:11:30,809
had a couple losses since then so how as

291
00:11:33,650 --> 00:11:33,149
we move forward in time do we make sense

292
00:11:36,290 --> 00:11:33,660
of that

293
00:11:39,049 --> 00:11:36,300
well first off Josh what we're doing is

294
00:11:41,179 --> 00:11:39,059
not without risk anything worth doing is

295
00:11:43,040 --> 00:11:41,189
not without risk sure isn't is a

296
00:11:45,369 --> 00:11:43,050
midshipman at the Naval Academy I had to

297
00:11:47,929 --> 00:11:45,379
memorize all these famous naval sings in

298
00:11:51,139 --> 00:11:47,939
John Paul Jones had one and it was he

299
00:11:52,549 --> 00:11:51,149
who will not risk cannot win so you have

300
00:11:55,639 --> 00:11:52,559
to take a little risk in order to

301
00:11:57,290 --> 00:11:55,649
succeed it's something great and going

302
00:11:59,949 --> 00:11:57,300
to the moon was phenomenal when you

303
00:12:02,600 --> 00:11:59,959
think back on the challenge that

304
00:12:04,819 --> 00:12:02,610
President Kennedy gave our nation back

305
00:12:07,249 --> 00:12:04,829
then no we hadn't we've just flown a

306
00:12:09,169 --> 00:12:07,259
suborbital flight and he said I want you

307
00:12:09,679 --> 00:12:09,179
on the moon within this decade eight

308
00:12:12,259 --> 00:12:09,689
years later

309
00:12:15,980 --> 00:12:12,269
we're walking on the moon that was

310
00:12:19,699 --> 00:12:15,990
amazing so when I look back on it hey

311
00:12:23,919 --> 00:12:19,709
first off it was awful that we lost that

312
00:12:27,499 --> 00:12:23,929
crew American heroes all just great guys

313
00:12:29,809 --> 00:12:27,509

but we learned from it all right the

314
00:12:31,429 --> 00:12:29,819
spacecraft was better because of it we

315
00:12:33,739 --> 00:12:31,439
made it to the moon because of Apollo

316
00:12:36,980 --> 00:12:33,749
while all that they learned from that

317
00:12:40,460 --> 00:12:36,990
accident unfortunately we tend to have

318
00:12:42,489 --> 00:12:40,470
to relearn our mistakes in the past and

319
00:12:45,139 --> 00:12:42,499
what it really comes down to is on

320
00:12:48,949 --> 00:12:45,149
something like this it's the necessity

321
00:12:50,989 --> 00:12:48,959
to have configuration management they

322
00:12:53,059 --> 00:12:50,999
have control of the process to make sure

323
00:12:55,730 --> 00:12:53,069
that you do all the testing and that

324
00:12:57,199 --> 00:12:55,740
everybody has a voice in the decisions

325
00:12:57,440 --> 00:12:57,209
that are made that all the information

326
00:13:03,740 --> 00:12:57,450
is

327
00:13:05,750 --> 00:13:03,750
don't become accustomed to things not

328
00:13:06,920 --> 00:13:05,760
being ranked well this wasn't right but

329
00:13:09,020 --> 00:13:06,930
nothing bad happened

330
00:13:11,510 --> 00:13:09,030
all right and it's such a good point and

331
00:13:14,180 --> 00:13:11,520
and so you always have to be on the

332
00:13:17,060 --> 00:13:14,190
lookout for you know what's not right

333
00:13:19,040 --> 00:13:17,070
what is the impact of it and then if you

334
00:13:20,630 --> 00:13:19,050
can try and think of everything that can

335
00:13:23,300 --> 00:13:20,640
possibly go wrong when we were training

336
00:13:25,220 --> 00:13:23,310
to fly in space we had this guy he was

337
00:13:27,980 --> 00:13:25,230
called the sim suit the simulation

338
00:13:30,350 --> 00:13:27,990

supervisor right and it was his job to

339
00:13:31,790 --> 00:13:30,360
challenge the crew in the Mission

340
00:13:33,830 --> 00:13:31,800
Control team doing integrated

341
00:13:35,300 --> 00:13:33,840
simulations and they came up with

342
00:13:37,970 --> 00:13:35,310
scenarios that were just unbelievable

343
00:13:39,590 --> 00:13:37,980
but they tried to think of every

344
00:13:41,750 --> 00:13:39,600
possible thing that could go wrong

345
00:13:44,390 --> 00:13:41,760
during a mission and then they piled him

346
00:13:47,150 --> 00:13:44,400
up you know but it was forcing the crew

347
00:13:51,590 --> 00:13:47,160
and the team to work together to solve

348
00:13:53,060 --> 00:13:51,600
the problems unfortunately we lost the

349
00:13:55,400 --> 00:13:53,070
Apollo 1 crew and I'm really proud of

350
00:13:58,820 --> 00:13:55,410
the exhibit that you showed everybody

351
00:14:01,220 --> 00:13:58,830
how we remember those guys is really

352
00:14:03,590 --> 00:14:01,230
important that we don't forget the same

353
00:14:06,530 --> 00:14:03,600
with Challenger in Columbia so going

354
00:14:08,510 --> 00:14:06,540
forward the thing is you can't let

355
00:14:10,850 --> 00:14:08,520
something like that stop you if it's

356
00:14:14,360 --> 00:14:10,860
really worth doing you know you you have

357
00:14:16,340 --> 00:14:14,370
to persevere and charge on and the true

358
00:14:17,810 --> 00:14:16,350
measure of a person isn't the mistakes

359
00:14:19,850 --> 00:14:17,820
that he or she makes it's how did they

360
00:14:21,380 --> 00:14:19,860
respond to them did they let them bring

361
00:14:21,770 --> 00:14:21,390
them down and yeah admire them in the

362
00:14:23,660 --> 00:14:21,780
muck

363
00:14:26,270 --> 00:14:23,670

yeah or do they rise above them and go

364
00:14:27,470 --> 00:14:26,280
on so it's awesome yeah and I think that

365
00:14:29,510 --> 00:14:27,480
that's a really good way to kind of like

366
00:14:31,850 --> 00:14:29,520
wrap up that thought of saying we move

367
00:14:33,170 --> 00:14:31,860
on not forgetting them but kind of just

368
00:14:36,050 --> 00:14:33,180
to honor them and that's kinda what we

369
00:14:37,280 --> 00:14:36,060
mentioned there is just that the tribute

370
00:14:40,070 --> 00:14:37,290
is there to remind us of what they made

371
00:14:42,320 --> 00:14:40,080
possible absolutely and so I don't want

372
00:14:44,300 --> 00:14:42,330
to kind of lose the other point you can

373
00:14:45,620 --> 00:14:44,310
I don't know if like hey we went on to

374
00:14:47,450 --> 00:14:45,630
do some really amazing things and we

375
00:14:48,740 --> 00:14:47,460
continue to do amazing things I am so I

376
00:14:50,930 --> 00:14:48,750
want you to kind of explain where we are

377
00:14:56,150 --> 00:14:50,940
now because this is a really neat spot

378
00:14:58,640 --> 00:14:56,160
so this is all the control panels and

379
00:15:00,830 --> 00:14:58,650
systems that were in the launch control

380
00:15:02,630 --> 00:15:00,840
center in the firing room these are the

381
00:15:04,790 --> 00:15:02,640
actual consoles these are yeah these are

382
00:15:07,430 --> 00:15:04,800
the this is historical and and it's set

383
00:15:10,190 --> 00:15:07,440
up exactly as it was when we launched

384
00:15:12,470 --> 00:15:10,200
Apollo to the moon and that was

385
00:15:14,870 --> 00:15:12,480
oh darn cool I I had the privilege of

386
00:15:16,460 --> 00:15:14,880
seen an Apollo launch which which I did

387
00:15:18,980 --> 00:15:16,470
not get the chance to do I'm a trellis I

388
00:15:21,650 --> 00:15:18,990

I was a midshipman at the Naval Academy

389
00:15:26,060 --> 00:15:21,660
in the physics Honor Society came down

390
00:15:29,120 --> 00:15:26,070
to KSC in April of 1970 that spring to

391
00:15:32,030 --> 00:15:29,130
see Apollo 13 launch and there's another

392
00:15:35,629 --> 00:15:32,040
we triumph over adversity man right the

393
00:15:38,629 --> 00:15:35,639
team came together and were able to to

394
00:15:40,400 --> 00:15:38,639
make that work and say that crew but it

395
00:15:42,680 --> 00:15:40,410
was awesome and I remember being in the

396
00:15:44,930 --> 00:15:42,690
Vehicle Assembly Building and seeing the

397
00:15:46,400 --> 00:15:44,940
Saturn 5 rocket seeing stacked up to go

398
00:15:48,829 --> 00:15:46,410
to the moon and watching that big Saturn

399
00:15:50,509 --> 00:15:48,839
5 take off you know that's what that's

400
00:15:53,120 --> 00:15:50,519
what really planted the spark in me that

401
00:15:55,189 --> 00:15:53,130
said maybe I could do this Jim Lovell

402
00:15:56,900 --> 00:15:55,199
was a Naval Academy graduate he was a

403
00:15:58,790 --> 00:15:56,910
naval aviator in a test pilot and an

404
00:16:00,230 --> 00:15:58,800
astronaut maybe I could do that when I

405
00:16:02,139 --> 00:16:00,240
graduate I just wanted to fly airplanes

406
00:16:04,819 --> 00:16:02,149
but one thing kind of led to another

407
00:16:06,920 --> 00:16:04,829
sure and so this spot specifically were

408
00:16:08,990 --> 00:16:06,930
at the Kennedy Space Center the Apollo

409
00:16:10,370 --> 00:16:09,000
Saturn 5 Center so people get an

410
00:16:11,900 --> 00:16:10,380
actually coming it to see this kind of

411
00:16:13,730 --> 00:16:11,910
what you see on the other side over here

412
00:16:15,680 --> 00:16:13,740
is actually kind of a standing area

413
00:16:17,870 --> 00:16:15,690

there's some seating as well or if you

414
00:16:19,730 --> 00:16:17,880
come through this building you get to

415
00:16:22,310 --> 00:16:19,740
come in and kind of see a cool it's kind

416
00:16:24,199 --> 00:16:22,320
of a mock what recap of what a launch

417
00:16:26,000 --> 00:16:24,209
simulation Amsler absolutely they well

418
00:16:28,189 --> 00:16:26,010
it's not just a launch simulation it's

419
00:16:29,870 --> 00:16:28,199
it's the Apollo 8 mission to the moon

420
00:16:31,670 --> 00:16:29,880
yeah the first one to the moon and they

421
00:16:33,350 --> 00:16:31,680
run through and they're talking and the

422
00:16:36,949 --> 00:16:33,360
consoles light up and they actually play

423
00:16:38,900 --> 00:16:36,959
the footage and sound that was you don't

424
00:16:41,840 --> 00:16:38,910
see people but you hear all the sounds

425
00:16:43,880 --> 00:16:41,850
that from the voice loops as we launched

426
00:16:46,130 --> 00:16:43,890
that mission which is cool to get to

427
00:16:48,590 --> 00:16:46,140
hear that historical context absolutely

428
00:16:51,710 --> 00:16:48,600
and so as we kind of think about the

429
00:16:53,150 --> 00:16:51,720
history of this place very there's a

430
00:16:54,889 --> 00:16:53,160
more modern look to them but we're in

431
00:16:57,740 --> 00:16:54,899
the process now of preparing consoles

432
00:17:00,050 --> 00:16:57,750
very similarly to move on to the future

433
00:17:01,160 --> 00:17:00,060
so I wish you know okay you're gonna

434
00:17:02,960 --> 00:17:01,170
have to do this again we're going to

435
00:17:05,210 --> 00:17:02,970
take a firing room one I know what it

436
00:17:06,980 --> 00:17:05,220
looks like guys from everyone in the

437
00:17:10,730 --> 00:17:06,990
launch control center we're gonna launch

438
00:17:13,370 --> 00:17:10,740

the next man and the first woman to go

439
00:17:15,679 --> 00:17:13,380
to the moon in 2024 and it's gonna be

440
00:17:17,720 --> 00:17:15,689
awesome and what's really cool the

441
00:17:19,549 --> 00:17:17,730
launch director yes yes first female

442
00:17:20,600 --> 00:17:19,559
launch director Charlie Blackwell

443
00:17:22,699 --> 00:17:20,610
Thompson is going to be the one that

444
00:17:23,570 --> 00:17:22,709
says go so I'm gonna I'm gonna ask you

445
00:17:24,860 --> 00:17:23,580
this question because I did

446
00:17:27,470 --> 00:17:24,870
some homework and I couldn't find out

447
00:17:29,120 --> 00:17:27,480
the real answer all right but is she the

448
00:17:30,860 --> 00:17:29,130
first female launch director period

449
00:17:32,450 --> 00:17:30,870
because I couldn't find another female

450
00:17:33,680 --> 00:17:32,460
lab director anywhere charlie is the

451
00:17:35,240 --> 00:17:33,690
first one so doesn't matter if it's

452
00:17:36,350 --> 00:17:35,250
necessary it's all been man before you I

453
00:17:38,660 --> 00:17:36,360
know okay

454
00:17:41,000 --> 00:17:38,670
I can't speak for other countries but I

455
00:17:42,980 --> 00:17:41,010
don't know of any but for NASA she is

456
00:17:46,490 --> 00:17:42,990
the definitely the first one okay cool

457
00:17:48,440 --> 00:17:46,500
so kind of what's uh what's coming up so

458
00:17:50,240 --> 00:17:48,450
you say 2024 right so what give me a

459
00:17:52,520 --> 00:17:50,250
kind of a absolute an overview of like

460
00:17:55,280 --> 00:17:52,530
how do we get to 2024 so here's the plan

461
00:17:57,620 --> 00:17:55,290
right now we were trying to get to the

462
00:18:02,030 --> 00:17:57,630
moon right send folks back and build

463
00:18:05,000 --> 00:18:02,040

this gateway this docking station if you

464
00:18:07,550 --> 00:18:05,010
will this waypoint on the way to getting

465
00:18:09,200 --> 00:18:07,560
to the lunar surface so that's what

466
00:18:11,270 --> 00:18:09,210
we're gonna do but we've accelerated it

467
00:18:14,360 --> 00:18:11,280
so the plan now is we're gonna fly the

468
00:18:17,090 --> 00:18:14,370
first test flight SLS and Orion the

469
00:18:19,910 --> 00:18:17,100
Space Launch System it's this big rocket

470
00:18:22,280 --> 00:18:19,920
that's not quite as big as a Saturn five

471
00:18:24,110 --> 00:18:22,290
with the Orion spacecraft which holds

472
00:18:27,410 --> 00:18:24,120
for astronauts instead of three like

473
00:18:29,060 --> 00:18:27,420
Apollo and we're gonna go around the

474
00:18:31,310 --> 00:18:29,070
moon without a crew all right

475
00:18:35,690 --> 00:18:31,320
and we're shooting for that end of 2020

476
00:18:38,510 --> 00:18:35,700
early 21 and then in 2022 we're gonna

477
00:18:40,040 --> 00:18:38,520
fly a Ryan again this time with the crew

478
00:18:43,310 --> 00:18:40,050
on board to the moon but they're not

479
00:18:45,620 --> 00:18:43,320
gonna land and then the plan is in 2024

480
00:18:48,980 --> 00:18:45,630
we're actually gonna send humans

481
00:18:50,690 --> 00:18:48,990
Americans back to the moon and we'll get

482
00:18:53,750 --> 00:18:50,700
that first woman on the moon and that

483
00:18:56,090 --> 00:18:53,760
first the vice president told us the

484
00:18:57,860 --> 00:18:56,100
next next people to go the moon they're

485
00:18:59,450 --> 00:18:57,870
gonna be Americans is to me the next man

486
00:19:02,240 --> 00:18:59,460
and the first woman to set foot on the

487
00:19:05,780 --> 00:19:02,250
moon so in order to do that we're

488
00:19:07,520 --> 00:19:05,790

building this gateway this docking

489
00:19:08,870 --> 00:19:07,530
station around the moon and we've

490
00:19:11,360 --> 00:19:08,880
already left the contract for the

491
00:19:13,910 --> 00:19:11,370
powerful polishing element it's gonna

492
00:19:17,980 --> 00:19:13,920
power this thing and then it's going to

493
00:19:20,390 --> 00:19:17,990
have mm-hmm we're still defining exactly

494
00:19:22,010 --> 00:19:20,400
the for sure it is it's going to be a

495
00:19:24,500 --> 00:19:22,020
little smaller than when it starts out

496
00:19:27,560 --> 00:19:24,510
there's gonna be a phase one and it'll

497
00:19:30,230 --> 00:19:27,570
have a habitability utilization module

498
00:19:33,260 --> 00:19:30,240
and it'll have a lander attached to it

499
00:19:34,050 --> 00:19:33,270
so I Ryan will dock with this and then

500
00:19:39,330 --> 00:19:34,060
the

501
00:19:43,080 --> 00:19:39,340
lunar surface and back again and what's

502
00:19:44,940 --> 00:19:43,090
cool about the Gateway is that it's in

503
00:19:47,070 --> 00:19:44,950
an orbit with this power propulsion

504
00:19:49,440 --> 00:19:47,080
element that allows access to anywhere

505
00:19:51,870 --> 00:19:49,450
on the lunar surface so this time when

506
00:19:54,150 --> 00:19:51,880
we go back to the moon we're not just

507
00:19:55,920 --> 00:19:54,160
going for a two or three-day camping

508
00:19:57,990 --> 00:19:55,930
trip right we're going to stay

509
00:20:00,090 --> 00:19:58,000
we're setting up sustainable operations

510
00:20:01,320 --> 00:20:00,100
and that's really key so from phase one

511
00:20:04,410 --> 00:20:01,330
we'll go to phase two

512
00:20:06,510 --> 00:20:04,420
we'll have more elements and more

513
00:20:08,910 --> 00:20:06,520

science will be obliged downtown you've

514
00:20:11,100 --> 00:20:08,920
got lots of cool stuff so the thing is

515
00:20:12,810 --> 00:20:11,110
we're not going alone we're going with

516
00:20:15,030 --> 00:20:12,820
our commercial partners and with our

517
00:20:16,800 --> 00:20:15,040
international partners in this program

518
00:20:19,800 --> 00:20:16,810
this is really cool it's called Artemis

519
00:20:22,680 --> 00:20:19,810
the twin sister of Apollo personals and

520
00:20:25,260 --> 00:20:22,690
Artemis yeah all right and so going back

521
00:20:28,650 --> 00:20:25,270
to the moon the program it's no longer

522
00:20:30,210 --> 00:20:28,660
Apollo now we have the Artemis program

523
00:20:33,120 --> 00:20:30,220
and what we want to create is the

524
00:20:35,910 --> 00:20:33,130
Artemis generation you know think about

525
00:20:37,830 --> 00:20:35,920
the population of the world half the

526
00:20:40,350 --> 00:20:37,840
world wasn't even born when we went to

527
00:20:43,440 --> 00:20:40,360
the moon and you know we have a whole

528
00:20:46,380 --> 00:20:43,450
new generation that we need to to excite

529
00:20:49,620 --> 00:20:46,390
in and stimulate that interest in

530
00:20:51,780 --> 00:20:49,630
science and technology and math and be

531
00:20:53,940 --> 00:20:51,790
able to you know just do all the great

532
00:20:55,680 --> 00:20:53,950
things that our nation does with a whole

533
00:20:58,050 --> 00:20:55,690
new generation I think it's gonna be

534
00:20:59,940 --> 00:20:58,060
inspiring so I want to see the Artemis

535
00:21:02,310 --> 00:20:59,950
generation excited about going back to

536
00:21:04,620 --> 00:21:02,320
the Ionian and this is the stepping

537
00:21:07,110 --> 00:21:04,630
stone that's gonna get us to Mars all

538
00:21:08,670 --> 00:21:07,120

the systems what we learn how to operate

539
00:21:11,220 --> 00:21:08,680
away from planet Earth and that harsh

540
00:21:13,170 --> 00:21:11,230
void of space for extended periods of

541
00:21:15,930 --> 00:21:13,180
time having reliable systems to keep

542
00:21:19,110 --> 00:21:15,940
crews alive it's gonna be awesome so

543
00:21:21,240 --> 00:21:19,120
what we want to kind of speak to the

544
00:21:22,470 --> 00:21:21,250
Artemis generation absolutely we ask

545
00:21:23,550 --> 00:21:22,480
them to send us some questions and they

546
00:21:25,530 --> 00:21:23,560
did and we're gonna come to Bethany in

547
00:21:27,240 --> 00:21:25,540
just a second but the first one we got

548
00:21:28,170 --> 00:21:27,250
this several times and so I wanted to

549
00:21:29,750 --> 00:21:28,180
pose it to you it's a little of a hard

550
00:21:33,210 --> 00:21:29,760
question sure do you seem to like those

551
00:21:35,070 --> 00:21:33,220
so the question came in what how do you

552
00:21:38,280 --> 00:21:35,080
respond to people who say we're not

553
00:21:42,360 --> 00:21:38,290
gonna make 2024 like we can't do it well

554
00:21:45,270 --> 00:21:42,370
we can do it if we have the the national

555
00:21:47,370 --> 00:21:45,280
resolve and the and the funding to make

556
00:21:51,260 --> 00:21:47,380
it happen we can do it

557
00:21:55,010 --> 00:21:51,270
you know this NASA team and I know

558
00:21:57,300 --> 00:21:55,020
specifically this paint at KSC it if you

559
00:21:58,740 --> 00:21:57,310
provide them with the resources and

560
00:22:00,090 --> 00:21:58,750
point them in the right direction they

561
00:22:03,840 --> 00:22:00,100
can make anything happen

562
00:22:06,510 --> 00:22:03,850
so we can do this and you know even if

563
00:22:08,850 --> 00:22:06,520

it's towards the end of 2024 in their

564
00:22:11,310 --> 00:22:08,860
early 25 we're going to do it we can

565
00:22:13,260 --> 00:22:11,320
make this happen we have the ability and

566
00:22:15,900 --> 00:22:13,270
the technology we just need to ensure

567
00:22:18,090 --> 00:22:15,910
that we get the funding and impress

568
00:22:19,860 --> 00:22:18,100
ahead and we're moving full speed we're

569
00:22:21,600 --> 00:22:19,870
doing things a lot quicker with our

570
00:22:23,520 --> 00:22:21,610
procurements the type of procurements

571
00:22:25,920 --> 00:22:23,530
that we're using how we're partnering

572
00:22:27,690 --> 00:22:25,930
with industry and commercial space we

573
00:22:29,280 --> 00:22:27,700
can do this yeah we don't have time to

574
00:22:30,540 --> 00:22:29,290
get invested a but I think it's really

575
00:22:33,270 --> 00:22:30,550
interesting if you do some homework on

576
00:22:34,410 --> 00:22:33,280
the partnerships of NASA we're operating

577
00:22:36,720 --> 00:22:34,420
so much differently than we did

578
00:22:39,090 --> 00:22:36,730
absolutely been ten years ago absolutely

579
00:22:40,380 --> 00:22:39,100
but let's go and take some questions now

580
00:22:41,490 --> 00:22:40,390
I know that there's by some viewers that

581
00:22:43,650 --> 00:22:41,500
are anxious to hear their questions ask

582
00:22:46,920 --> 00:22:43,660
what did it feel like to float in space

583
00:22:48,930 --> 00:22:46,930
for the first time oh gosh I wish I wish

584
00:22:51,720 --> 00:22:48,940
I could take like a five or six year old

585
00:22:55,280 --> 00:22:51,730
up in space okay that's what I felt like

586
00:22:59,100 --> 00:22:55,290
it is so cool to be weightless in space

587
00:23:01,260 --> 00:22:59,110
it's just it's effortless now I will

588
00:23:04,470 --> 00:23:01,270

admit some folks get what's called SAS

589
00:23:06,630 --> 00:23:04,480
space that seems like a really polite

590
00:23:11,820 --> 00:23:06,640
way to say that they got nauseous I

591
00:23:14,490 --> 00:23:11,830
think it but everybody adapts to zero-g

592
00:23:16,620 --> 00:23:14,500
within about you know 12 to 24 hours and

593
00:23:19,560 --> 00:23:16,630
and we have medications that we can take

594
00:23:22,560 --> 00:23:19,570
to calm that Nyjah but it's so fun it's

595
00:23:24,570 --> 00:23:22,570
just effortless you know in what's

596
00:23:25,920 --> 00:23:24,580
really cool is long time fliers and

597
00:23:29,040 --> 00:23:25,930
short term fliers you can tell the

598
00:23:31,770 --> 00:23:29,050
difference I feel like Sergei krikalev

599
00:23:33,990 --> 00:23:31,780
and my Russian crew made on my last

600
00:23:35,940 --> 00:23:34,000
flight and Sergei at that time had more

601
00:23:38,220 --> 00:23:35,950
time in space than any other human in

602
00:23:40,140 --> 00:23:38,230
the world right and to watch him move

603
00:23:41,670 --> 00:23:40,150
through the space station and through

604
00:23:43,470 --> 00:23:41,680
this shuttle it was just it was

605
00:23:46,020 --> 00:23:43,480
effortless it was like poetry in motion

606
00:23:48,360 --> 00:23:46,030
like watching ballet he was he was that

607
00:23:51,649 --> 00:23:48,370
cool as he floated through space and we

608
00:23:52,879 --> 00:23:51,659
do stupid astronaut tricks play with our

609
00:23:54,289 --> 00:23:52,889
that's why I tell people when they talk

610
00:23:56,089 --> 00:23:54,299
about astronauts in space I'm like

611
00:23:57,409 --> 00:23:56,099
they're just big kids like watching at

612
00:24:00,019 --> 00:23:57,419
mealtime they're like throwing food

613
00:24:03,560 --> 00:24:00,029

around it's it's not we don't throw food

614
00:24:06,289 --> 00:24:03,570
no wait sorry wrong time wrong term we

615
00:24:07,999 --> 00:24:06,299
might flip food to a friend or whatever

616
00:24:09,200 --> 00:24:08,009
but we don't throw it okay that's

617
00:24:11,119 --> 00:24:09,210
important I guess there's no food fights

618
00:24:12,859 --> 00:24:11,129
in space no no it's just a unique way of

619
00:24:14,180 --> 00:24:12,869
passing the food I got you know you

620
00:24:16,009 --> 00:24:14,190
don't hand somebody a treat

621
00:24:18,589 --> 00:24:16,019
can I have that sure and you just touch

622
00:24:20,089 --> 00:24:18,599
it like that slowly floats over awesome

623
00:24:22,099 --> 00:24:20,099
very cool let's take another question

624
00:24:23,930 --> 00:24:22,109
you mentioned poetry and we had a

625
00:24:26,269 --> 00:24:23,940
question that astronaut Collins has said

626
00:24:29,149 --> 00:24:26,279
the next astronaut should be a poet what

627
00:24:31,399 --> 00:24:29,159
do you think of that uh I you know I

628
00:24:35,239 --> 00:24:31,409
think there's a little bit of poet in

629
00:24:38,419 --> 00:24:35,249
all of us yeah al worden flew on Apollo

630
00:24:41,839 --> 00:24:38,429
and went to the moon he was in the

631
00:24:44,029 --> 00:24:41,849
command module fun you know orbiting the

632
00:24:47,719 --> 00:24:44,039
moon was Resik who was down on the lunar

633
00:24:49,969 --> 00:24:47,729
surface but L L writes poetry and

634
00:24:52,399 --> 00:24:49,979
I can't think of the name of it right

635
00:24:55,700 --> 00:24:52,409
now but he's got an awesome poem about

636
00:24:59,570 --> 00:24:55,710
going to the moon and I think you know

637
00:25:01,369 --> 00:24:59,580
someday space is going to be open to to

638
00:25:04,879 --> 00:25:01,379

everybody we've got a ways to go to make

639
00:25:06,950 --> 00:25:04,889
that happen but I believe that all of us

640
00:25:08,149 --> 00:25:06,960
shouldn't focus on just any one thing

641
00:25:11,899 --> 00:25:08,159
all right

642
00:25:13,729 --> 00:25:11,909
I was a math major in in college and

643
00:25:16,099 --> 00:25:13,739
I've got a lot of engineering and

644
00:25:19,310 --> 00:25:16,109
aerospace engineering in order to be a

645
00:25:21,919 --> 00:25:19,320
test pilot in an astronaut but I also

646
00:25:23,149 --> 00:25:21,929
love to read I love the humanities I

647
00:25:26,479 --> 00:25:23,159
love music

648
00:25:30,019 --> 00:25:26,489
so you can't you have to be open to

649
00:25:31,129 --> 00:25:30,029
everything so I want to ask you a

650
00:25:33,499 --> 00:25:31,139
question kind of thinking about the

651
00:25:35,450 --> 00:25:33,509
future and um on a technical may be

652
00:25:36,830 --> 00:25:35,460
technical maybe not technical but what

653
00:25:38,629 --> 00:25:36,840
are some of the biggest challenges that

654
00:25:40,159 --> 00:25:38,639
that we kind of face moving forward

655
00:25:42,109 --> 00:25:40,169
thinking about just human exploration

656
00:25:43,399 --> 00:25:42,119
like because we're so much smarter than

657
00:25:45,440 --> 00:25:43,409
we were when we were flying shuttle

658
00:25:47,089 --> 00:25:45,450
Shara flying Apollo so where are the

659
00:25:48,649 --> 00:25:47,099
challenges lie ahead we still have a lot

660
00:25:50,570 --> 00:25:48,659
of challenges in front of us I'm the

661
00:25:52,279 --> 00:25:50,580
biggest challenge for us is we leave

662
00:25:55,159 --> 00:25:52,289
planet Earth for extended periods of

663
00:25:58,519 --> 00:25:55,169

time is getting outside the radiation

664
00:26:00,829 --> 00:25:58,529
belt that protects the magnetosphere the

665
00:26:03,170 --> 00:26:00,839
Van Allen belts that protects the earth

666
00:26:06,320 --> 00:26:03,180
from radiation

667
00:26:09,020 --> 00:26:06,330
radiations going to be huge as we go to

668
00:26:11,120 --> 00:26:09,030
Mars as we stay on the moon for extended

669
00:26:13,790 --> 00:26:11,130
periods of time we're gonna have to have

670
00:26:16,580 --> 00:26:13,800
some way to protect the crew from the

671
00:26:19,400 --> 00:26:16,590
higher radiation that we have there you

672
00:26:21,080 --> 00:26:19,410
know we still have we need to have a

673
00:26:23,120 --> 00:26:21,090
better understanding of the impacts of

674
00:26:26,180 --> 00:26:23,130
extended stays in microgravity on the

675
00:26:28,460 --> 00:26:26,190
human system Scott Kelly of course was

676
00:26:30,860 --> 00:26:28,470
in space for a year you know we've

677
00:26:32,900 --> 00:26:30,870
learned now that on some astronauts

678
00:26:35,210 --> 00:26:32,910
especially on longer duration flights

679
00:26:38,330 --> 00:26:35,220
there's impact to the optical nerve

680
00:26:40,730 --> 00:26:38,340
edema there's a swelling that can impact

681
00:26:42,860 --> 00:26:40,740
vision and it may or may not be

682
00:26:45,860 --> 00:26:42,870
permanent so you know there's there's

683
00:26:48,460 --> 00:26:45,870
still a lot to learn about how we keep

684
00:26:50,510 --> 00:26:48,470
this hidden system alive in that

685
00:26:52,100 --> 00:26:50,520
microgravity that harsh void of space

686
00:26:54,260 --> 00:26:52,110
sure sure

687
00:26:56,270 --> 00:26:54,270
let's take another question how did your

688
00:27:01,580 --> 00:26:56,280

perspective change when looking down at

689
00:27:04,220 --> 00:27:01,590
Earth okay so you know I'd seen the

690
00:27:07,160 --> 00:27:04,230
Earth from an airplane from 40,000 feet

691
00:27:08,360 --> 00:27:07,170
it looks pretty cool and I wish I would

692
00:27:11,330 --> 00:27:08,370
have had the view that the Apollo

693
00:27:13,760 --> 00:27:11,340
astronauts had you know that blue marble

694
00:27:16,310 --> 00:27:13,770
floating in that black void of space but

695
00:27:19,040 --> 00:27:16,320
on the space shuttle when you're up

696
00:27:20,570 --> 00:27:19,050
about you know 220 nautical miles above

697
00:27:24,080 --> 00:27:20,580
the earth I mean you see the curvature

698
00:27:25,670 --> 00:27:24,090
of the earth and you can see over 1,500

699
00:27:28,100 --> 00:27:25,680
miles in any one direction

700
00:27:30,350 --> 00:27:28,110
and you see that harsh black void of

701
00:27:32,390 --> 00:27:30,360
space and there's this thin little hazy

702
00:27:34,040 --> 00:27:32,400
line over the earth and that's our

703
00:27:36,560 --> 00:27:34,050
atmosphere that's that's all it's

704
00:27:38,960 --> 00:27:36,570
protecting us from that harsh void with

705
00:27:41,270 --> 00:27:38,970
its ultraviolet radiation with its

706
00:27:43,820 --> 00:27:41,280
extreme temperatures and it actually

707
00:27:45,050 --> 00:27:43,830
looks a little bit fragile but when you

708
00:27:46,730 --> 00:27:45,060
look down on the earth you don't see

709
00:27:48,980 --> 00:27:46,740
them there's a couple places where you

710
00:27:52,030 --> 00:27:48,990
can see boundaries of countries but

711
00:27:55,340 --> 00:27:52,040
mostly you just see this one planet and

712
00:27:57,620 --> 00:27:55,350
one one continent you know you look at

713
00:28:00,470 --> 00:27:57,630

continents you don't see countries you

714
00:28:02,630 --> 00:28:00,480
see the green of the tropics the blue of

715
00:28:05,330 --> 00:28:02,640
the oceans you see the deserts are just

716
00:28:08,930 --> 00:28:05,340
you know it's it just the earth is

717
00:28:12,470 --> 00:28:08,940
absolutely beautiful and I think it made

718
00:28:14,930 --> 00:28:12,480
me more aware that hey you know this is

719
00:28:16,799 --> 00:28:14,940
this is spaceship earth we're all on it

720
00:28:19,499 --> 00:28:16,809
right here traveling around

721
00:28:22,230 --> 00:28:19,509
you know our son there's nowhere else to

722
00:28:25,080 --> 00:28:22,240
go we need to take care of it and you

723
00:28:28,379 --> 00:28:25,090
can see the impacts of humans on on our

724
00:28:31,049 --> 00:28:28,389
earth from the space you know the rain

725
00:28:33,149 --> 00:28:31,059
forests in Brazil with the cutting of

726
00:28:35,489 --> 00:28:33,159
the trees and the burning and you know

727
00:28:37,399 --> 00:28:35,499
you see all kinds of things from space

728
00:28:41,399 --> 00:28:37,409
that you get a more global perspective

729
00:28:43,169 --> 00:28:41,409
it's not just us in our one place but we

730
00:28:44,700 --> 00:28:43,179
all have to work together to take care

731
00:28:48,090 --> 00:28:44,710
of this beautiful planet

732
00:28:49,139 --> 00:28:48,100
Ron do you ever find yourself now that

733
00:28:50,730 --> 00:28:49,149
you're back on earth do you ever find

734
00:28:52,139 --> 00:28:50,740
yourself looking at things and asking I

735
00:28:55,799 --> 00:28:52,149
wonder what that would look like from

736
00:28:57,509 --> 00:28:55,809
space yeah I I never have I never

737
00:28:59,700 --> 00:28:57,519
thought of that but I'll tell you any

738
00:29:01,440 --> 00:28:59,710

time I had a spare minute honor of it my

739
00:29:03,749 --> 00:29:01,450
nose was up to the window watching the

740
00:29:05,580 --> 00:29:03,759
earth go by it's just amazing and I have

741
00:29:07,049 --> 00:29:05,590
a have a memory from each one of those

742
00:29:09,529 --> 00:29:07,059
missions that I've tried to plant in my

743
00:29:12,480 --> 00:29:09,539
brain yeah that's the other thing I

744
00:29:14,310 --> 00:29:12,490
pictures just don't do it justice what

745
00:29:16,409 --> 00:29:14,320
you see with the icig I gave you is so

746
00:29:18,269 --> 00:29:16,419
much better I remember after my first

747
00:29:20,700 --> 00:29:18,279
flight I went to I was at there in Space

748
00:29:22,739 --> 00:29:20,710
Museum in Washington DC and the IMAX

749
00:29:25,499 --> 00:29:22,749
movie the blue planet had just come out

750
00:29:27,840 --> 00:29:25,509
and I'm watching this you know on this

751
00:29:29,999 --> 00:29:27,850
IMAX screen and it shows up and I see

752
00:29:34,049 --> 00:29:30,009
the earth and I said that's what it no

753
00:29:35,970 --> 00:29:34,059
it looks better than that getting closer

754
00:29:38,190 --> 00:29:35,980
but never quite there yeah do any more

755
00:29:39,720 --> 00:29:38,200
questions we had one more I heard there

756
00:29:40,830 --> 00:29:39,730
was a special song you took to the

757
00:29:42,899 --> 00:29:40,840
station which reminded you of your

758
00:29:45,810 --> 00:29:42,909
daughter can you share the story and how

759
00:29:47,730 --> 00:29:45,820
important things like songs are to you

760
00:29:50,369 --> 00:29:47,740
when you are in space absolutely

761
00:29:51,960 --> 00:29:50,379
so I'm going to digress mate when you

762
00:29:53,970 --> 00:29:51,970
ask about things we have to deal with I

763
00:29:57,149 --> 00:29:53,980

talked about the physical aspects but

764
00:30:00,060 --> 00:29:57,159
there's also the psychological aspect of

765
00:30:02,909 --> 00:30:00,070
being isolated on long distance

766
00:30:04,619 --> 00:30:02,919
traveling in space and so the things

767
00:30:06,840 --> 00:30:04,629
that we do on earth that help us you

768
00:30:07,499 --> 00:30:06,850
know they apply to space also I love

769
00:30:16,739 --> 00:30:07,509
music

770
00:30:19,350 --> 00:30:16,749
I used to play the trombone when I was

771
00:30:20,669 --> 00:30:19,360
growing up kind of put that aside I've

772
00:30:23,340 --> 00:30:20,679
tried to play the guitar but I'm not

773
00:30:24,749 --> 00:30:23,350
that good I got through book one of

774
00:30:26,159 --> 00:30:24,759
learning how to play the piano I we

775
00:30:27,440 --> 00:30:26,169
owned a piano I said we're gonna have it

776
00:30:29,480 --> 00:30:27,450
in the house I'm gonna learn how to play

777
00:30:30,620 --> 00:30:29,490
but I would like to get better

778
00:30:33,170 --> 00:30:30,630
absolutely

779
00:30:34,580 --> 00:30:33,180
but musics important reading is

780
00:30:37,400 --> 00:30:34,590
important all the things that we do on

781
00:30:38,720 --> 00:30:37,410
earth for entertainment you know we can

782
00:30:40,760 --> 00:30:38,730
do in space and with the advent of

783
00:30:42,200 --> 00:30:40,770
ebooks you know you don't have to worry

784
00:30:43,400 --> 00:30:42,210
about all this paper and weight that

785
00:30:46,580 --> 00:30:43,410
you're taking along you can take along

786
00:30:48,800 --> 00:30:46,590
all kinds of stuff so my daughter and I

787
00:30:52,100 --> 00:30:48,810
are real Wizard of Oz affection autos

788
00:30:53,510 --> 00:30:52,110

you know as she was growing up and right

789
00:30:54,290 --> 00:30:53,520
before my last fight before I went in

790
00:30:56,270 --> 00:30:54,300
quarantine

791
00:30:59,630 --> 00:30:56,280
they had re-released the movie The

792
00:31:01,610 --> 00:30:59,640
Wizard of Oz into the theaters all color

793
00:31:05,480 --> 00:31:01,620
corrected and everything and so she and

794
00:31:07,760 --> 00:31:05,490
I went to see it and it was awesome so

795
00:31:10,040 --> 00:31:07,770
the first night that we went out to

796
00:31:12,110 --> 00:31:10,050
launch the weather was just bad I mean

797
00:31:13,910 --> 00:31:12,120
it was rain and thunderstorms and stuff

798
00:31:17,240 --> 00:31:13,920
and and things just weren't even going

799
00:31:19,850 --> 00:31:17,250
right and we we were gonna launch anyway

800
00:31:21,200 --> 00:31:19,860
we things kind of came together and with

801
00:31:22,520 --> 00:31:21,210
the space station when you're going up

802
00:31:24,140 --> 00:31:22,530
to do a rendezvous with something else

803
00:31:25,550 --> 00:31:24,150
you only have like a five minute launch

804
00:31:28,940 --> 00:31:25,560
window you got to get off or you're not

805
00:31:31,160 --> 00:31:28,950
going right so we had a problem getting

806
00:31:33,920 --> 00:31:31,170
one of the APU started auxilary power

807
00:31:36,350 --> 00:31:33,930
units that provide a hydraulic pressure

808
00:31:40,610 --> 00:31:36,360
to gimbal the engines and move the

809
00:31:45,500 --> 00:31:40,620
flight control surfaces and they we went

810
00:31:47,780 --> 00:31:45,510
into a hold at we counted down to 18

811
00:31:50,330 --> 00:31:47,790
seconds basically and didn't it all

812
00:31:52,880 --> 00:31:50,340
alright so close we had waited so long

813
00:31:55,460 --> 00:31:52,890

before we came out of the five minute

814
00:31:59,000 --> 00:31:55,470
hold to go that when they sorted things

815
00:32:00,380 --> 00:31:59,010
out they they said you don't have

816
00:32:04,460 --> 00:32:00,390
another propellant to rendezvous with

817
00:32:07,220 --> 00:32:04,470
the space station and and it was okay we

818
00:32:10,550 --> 00:32:07,230
went back to the crew quarters and we

819
00:32:12,410 --> 00:32:10,560
tried again in the next day so that next

820
00:32:15,590 --> 00:32:12,420
morning there was this picture in the

821
00:32:18,170 --> 00:32:15,600
paper of Endeavour sitting on the pad

822
00:32:20,180 --> 00:32:18,180
with this rainbow over it right and that

823
00:32:23,060 --> 00:32:20,190
night we went out and it was a smoothest

824
00:32:24,950 --> 00:32:23,070
launch count I've ever seen and we

825
00:32:26,810 --> 00:32:24,960
launched and we got to orbit and

826
00:32:30,170 --> 00:32:26,820
everything was just going perfect so the

827
00:32:32,720 --> 00:32:30,180
wakeup music on on the first day was

828
00:32:35,090 --> 00:32:32,730
Judy Garland singing somewhere over the

829
00:32:36,860 --> 00:32:35,100
rainbow yeah man I had tears going down

830
00:32:38,010 --> 00:32:36,870
my eyes it just it just emotionally

831
00:32:40,290 --> 00:32:38,020
grabbed me

832
00:32:43,020 --> 00:32:40,300
and my daughter had made sure that that

833
00:32:45,630 --> 00:32:43,030
was the music that was played so I

834
00:32:47,550 --> 00:32:45,640
always tell folks somewhere over the

835
00:32:49,440 --> 00:32:47,560
rainbow dreams come true because we

836
00:32:51,480 --> 00:32:49,450
launched over that rainbow and we had an

837
00:32:54,480 --> 00:32:51,490
absolutely dream flight from start to

838
00:32:56,190 --> 00:32:54,490

finish awesome so kind of wrapping up

839
00:32:56,850 --> 00:32:56,200
here so we wanted to kind of pick this

840
00:32:59,700 --> 00:32:56,860
spot

841
00:33:01,440 --> 00:32:59,710
to be here today just because most

842
00:33:02,730 --> 00:33:01,450
people probably don't know about kind of

843
00:33:05,310 --> 00:33:02,740
how roles and responsibilities are

844
00:33:07,530 --> 00:33:05,320
divided amongst the NASA centers mm-hmm

845
00:33:08,880 --> 00:33:07,540
and when it comes to things like Rockets

846
00:33:11,340 --> 00:33:08,890
like we don't really build Rockets here

847
00:33:12,540 --> 00:33:11,350
that's not Casey's thing no but we're

848
00:33:14,790 --> 00:33:12,550
the best in the world at launching

849
00:33:16,770 --> 00:33:14,800
Rockets absolutely and that's what these

850
00:33:18,420 --> 00:33:16,780
firing rooms are about it's obviously

851
00:33:21,270 --> 00:33:18,430
you mentioned earlier getting ready for

852
00:33:22,760 --> 00:33:21,280
that firing firing rockets into space

853
00:33:25,260 --> 00:33:22,770
getting them where they need to be

854
00:33:26,880 --> 00:33:25,270
through lots of our programs absolutely

855
00:33:29,060 --> 00:33:26,890
and remember I talked about simulations

856
00:33:31,530 --> 00:33:29,070
yes right now

857
00:33:33,480 --> 00:33:31,540
Charlie Blackwell Thompson's running

858
00:33:35,880 --> 00:33:33,490
launch simulations over in firing room 1

859
00:33:37,560 --> 00:33:35,890
preparing for that first launch of SLS

860
00:33:39,150 --> 00:33:37,570
and Orion we're gonna be ready when the

861
00:33:41,250 --> 00:33:39,160
time comes that's right so they've got

862
00:33:43,170 --> 00:33:41,260
their team set up in rooms similar to

863
00:33:44,700 --> 00:33:43,180

this much more modern-looking absolutely

864
00:33:45,690 --> 00:33:44,710
running through countdowns working out

865
00:33:46,830 --> 00:33:45,700
the kings because you have to write a

866
00:33:49,410 --> 00:33:46,840
countdown before you can do a count

867
00:33:51,960 --> 00:33:49,420
which is a challenge and you have to

868
00:33:53,520 --> 00:33:51,970
know but all the systems on the vehicle

869
00:33:55,770 --> 00:33:53,530
and have all the procedures and all the

870
00:33:57,540 --> 00:33:55,780
software so a lot of works goes and goes

871
00:34:00,150 --> 00:33:57,550
into a launch and rocket that's right so

872
00:34:02,370 --> 00:34:00,160
thinking about the next year next 12

873
00:34:04,080 --> 00:34:02,380
months yeah what should our viewers be

874
00:34:05,640 --> 00:34:04,090
really looking for what's the what's the

875
00:34:07,920 --> 00:34:05,650
exciting stuff from the Kennedy Space

876
00:34:10,080 --> 00:34:07,930
Center so first off coming up here at

877
00:34:12,330 --> 00:34:10,090
July 2nd we're gonna do an in flight

878
00:34:16,350 --> 00:34:12,340
aboard test of the Orion capsule here at

879
00:34:18,090 --> 00:34:16,360
the Cape and it tests that big solid

880
00:34:21,030 --> 00:34:18,100
rocket motor that's on top that lifts a

881
00:34:22,740 --> 00:34:21,040
capsule off of the rocket in case of a

882
00:34:24,750 --> 00:34:22,750
problem with the rocket to get the crews

883
00:34:28,290 --> 00:34:24,760
safely back down so that's gonna be a

884
00:34:30,120 --> 00:34:28,300
huge test coming up I really want to see

885
00:34:32,460 --> 00:34:30,130
crews fly into the International Space

886
00:34:34,200 --> 00:34:32,470
Station on a u.s. rocket from US soil by

887
00:34:35,880 --> 00:34:34,210
the end of this year yeah so we have

888
00:34:39,020 --> 00:34:35,890

Boeing and SpaceX they're working very

889
00:34:41,639 --> 00:34:39,030
hard to help make that happen

890
00:34:43,620 --> 00:34:41,649
SpaceX has already hit a uncrewed

891
00:34:46,010 --> 00:34:43,630
demonstration flight of their Dragon

892
00:34:48,389 --> 00:34:46,020
capsule docking with the space station

893
00:34:50,490 --> 00:34:48,399
boeing is going to be flying an uncrewed

894
00:34:51,830 --> 00:34:50,500
flight hopefully in the August timeframe

895
00:34:54,800 --> 00:34:51,840
we'll see if they stay on

896
00:34:57,410 --> 00:34:54,810
tract and then hopefully by the end of

897
00:34:58,670 --> 00:34:57,420
the year early next year both of them

898
00:35:00,650 --> 00:34:58,680
will be flying cruise to the

899
00:35:02,270 --> 00:35:00,660
International Space Station on a test

900
00:35:05,240 --> 00:35:02,280
flight so that's going to be very

901
00:35:07,010 --> 00:35:05,250
important and then by the end of this

902
00:35:08,690 --> 00:35:07,020
year we're gonna have all the

903
00:35:11,870 --> 00:35:08,700
construction and testing of all the

904
00:35:13,610 --> 00:35:11,880
facilities necessary to process and

905
00:35:16,520 --> 00:35:13,620
launch the Space Launch System and Orion

906
00:35:18,350 --> 00:35:16,530
complete here at KSC we still have some

907
00:35:20,300 --> 00:35:18,360
software to develop there's a lot of

908
00:35:21,890 --> 00:35:20,310
processes that we're going to be going

909
00:35:23,810 --> 00:35:21,900
through right we're testing with non

910
00:35:25,190 --> 00:35:23,820
flight Hardware stacking things up and

911
00:35:28,190 --> 00:35:25,200
making sure things are right with the

912
00:35:31,550 --> 00:35:28,200
equipment that we've built but come next

913
00:35:34,040 --> 00:35:31,560

year in 2020 and we're gonna have flight

914
00:35:36,200 --> 00:35:34,050
hardware down here processing it and

915
00:35:37,730 --> 00:35:36,210
getting it stacked up to launch into

916
00:35:39,230 --> 00:35:37,740
space on SLS and that's going to be

917
00:35:44,090 --> 00:35:39,240
pretty darn cool that's that's an

918
00:35:44,420 --> 00:35:44,100
amazing rocket it's fun so just real

919
00:35:47,720 --> 00:35:44,430
quick

920
00:35:49,460 --> 00:35:47,730
yeah please this space shuttle had three

921
00:35:51,710 --> 00:35:49,470
main engines and they're liquid hydrogen

922
00:35:53,870 --> 00:35:51,720
and liquid oxygen engines hydrogen's a

923
00:35:55,730 --> 00:35:53,880
fuel oxygen it's the oxidizer the

924
00:35:58,130 --> 00:35:55,740
external tank on the on the Space

925
00:36:00,560 --> 00:35:58,140
Shuttle it's the same diameter as the

926
00:36:02,270 --> 00:36:00,570
Space Launch System okay so that is an

927
00:36:03,890 --> 00:36:02,280
orange tank right that big orange tank

928
00:36:06,290 --> 00:36:03,900
that's just the size of the hydrogen

929
00:36:08,210 --> 00:36:06,300
tank so on top of that there's a liquid

930
00:36:09,650 --> 00:36:08,220
oxygen tank okay there's a second stage

931
00:36:11,270 --> 00:36:09,660
on top of that and then there's a

932
00:36:13,280 --> 00:36:11,280
command and service module on top of

933
00:36:15,350 --> 00:36:13,290
that and then a solid rocket motor sits

934
00:36:19,400 --> 00:36:15,360
the shuttle head right we're using those

935
00:36:21,140 --> 00:36:19,410
on the SLS also but this space shuttle

936
00:36:22,760 --> 00:36:21,150
had four segments stacked up this has

937
00:36:24,440 --> 00:36:22,770
got five segments got another huge

938
00:36:26,270 --> 00:36:24,450

segment of solid rocket motor

939
00:36:29,090 --> 00:36:26,280
propellants stacked up on it and then

940
00:36:30,860 --> 00:36:29,100
the shuttle had three of those shuttle

941
00:36:33,860 --> 00:36:30,870
main engines right we're using those for

942
00:36:35,600 --> 00:36:33,870
SLS also it's called the rs.25 we've got

943
00:36:37,340 --> 00:36:35,610
new engine controllers we've modified

944
00:36:38,990 --> 00:36:37,350
them a little bit it's gonna have four

945
00:36:40,820 --> 00:36:39,000
of those engines down on the bottom so

946
00:36:43,760 --> 00:36:40,830
the space show is pretty darn awesome

947
00:36:45,860 --> 00:36:43,770
when it took off it was loud it was fast

948
00:36:48,140 --> 00:36:45,870
all right so this has got four shuttle

949
00:36:49,910 --> 00:36:48,150
engines bigger solid rocket motors it's

950
00:36:51,770 --> 00:36:49,920
gonna be amazing when it launches yeah

951
00:36:53,060 --> 00:36:51,780
we're all eager for that so final word

952
00:36:54,560 --> 00:36:53,070
from you Bob thinking about our viewers

953
00:36:56,600 --> 00:36:54,570
here thinking about the future of human

954
00:36:58,340 --> 00:36:56,610
space exploration what do you want to

955
00:37:00,860 --> 00:36:58,350
leave our viewer with we have an

956
00:37:02,750 --> 00:37:00,870
absolutely awesome future Josh our

957
00:37:03,460 --> 00:37:02,760
nation is a world leader in space and

958
00:37:06,040 --> 00:37:03,470
we're going to continue

959
00:37:07,900 --> 00:37:06,050
to lead the Artemis program taking us

960
00:37:10,000 --> 00:37:07,910
back to the moon is awesome and that's a

961
00:37:12,880 --> 00:37:10,010
stepping stone to go into Mars

962
00:37:14,920 --> 00:37:12,890
the future is really bright and I would

963
00:37:18,160 --> 00:37:14,930

challenge everybody out there to get

964
00:37:20,349 --> 00:37:18,170
involved if you have a dream you go for

965
00:37:22,359 --> 00:37:20,359
it don't give up be persistent work hard

966
00:37:23,559 --> 00:37:22,369
you know I never dreamed I'd be an

967
00:37:25,329 --> 00:37:23,569
astronaut I talked about that a little

968
00:37:28,150 --> 00:37:25,339
bit but one thing kind of led to another

969
00:37:29,950 --> 00:37:28,160
being a pilot allowed me to become a

970
00:37:33,640 --> 00:37:29,960
test pilot which allowed me to become an

971
00:37:35,859 --> 00:37:33,650
astronaut and I'd say work hard and do

972
00:37:36,520 --> 00:37:35,869
your best at everything you do and don't

973
00:37:38,950 --> 00:37:36,530
ever give up

974
00:37:41,920 --> 00:37:38,960
you know not even the sky is the limit I

975
00:37:43,780 --> 00:37:41,930
learned that absolutely so thank you for

976
00:37:45,339 --> 00:37:43,790
for tuning in thanks Bethany for all

977
00:37:47,380 --> 00:37:45,349
your help and mister Cabana for joining