



# NASA AT HOME

SPACEPORT SERIES



1  
00:00:02,650 --> 00:00:33,130

[Music]

2  
00:00:36,729 --> 00:00:35,229

all right good afternoon everybody and

3  
00:00:38,319 --> 00:00:36,739

welcome to our Artemis week here a

4  
00:00:40,240 --> 00:00:38,329

special edition for you I'm Joshua

5  
00:00:41,170 --> 00:00:40,250

Santora coming to you immediately with

6  
00:00:42,760 --> 00:00:41,180

my special guest

7  
00:00:46,540 --> 00:00:42,770

Regina Spellman Regina thanks for

8  
00:00:48,760 --> 00:00:46,550

joining me today hi I'm happy to be here

9  
00:00:50,770 --> 00:00:48,770

yeah so we are talking all week about

10  
00:00:53,740 --> 00:00:50,780

the Artemis program in Greek mythology

11  
00:00:55,240 --> 00:00:53,750

the twin sister of Apollo because we're

12  
00:00:57,430 --> 00:00:55,250

going back to the moon such a cool nod

13  
00:01:00,579 --> 00:00:57,440

there and Regina obviously your title

14

00:01:03,819 --> 00:01:00,589

their senior project manager for 39b

15

00:01:06,340 --> 00:01:03,829

which is this beauty you see on screen

16

00:01:08,680 --> 00:01:06,350

let's throw up an image here and we can

17

00:01:10,480 --> 00:01:08,690

talk more about this as we go but how

18

00:01:15,249 --> 00:01:10,490

did you get this job and when did you

19

00:01:18,279 --> 00:01:15,259

start kind of managing this effort yes

20

00:01:21,370 --> 00:01:18,289

she is beautiful isn't she she's right

21

00:01:23,380 --> 00:01:21,380

up there with my son I I tell you

22

00:01:24,910 --> 00:01:23,390

growing up in Indiana and you would tell

23

00:01:27,160 --> 00:01:24,920

me that I was going to be working on

24

00:01:29,169 --> 00:01:27,170

this project and you know really looking

25

00:01:31,359 --> 00:01:29,179

towards developing a launchpad to

26

00:01:34,779 --> 00:01:31,369

support the next generation of rockets

27

00:01:37,330 --> 00:01:34,789

for NASA's mission I would would have

28

00:01:38,980 --> 00:01:37,340

been a non-believer but you know I

29

00:01:42,010 --> 00:01:38,990

started out in engineering I went to

30

00:01:43,749 --> 00:01:42,020

Purdue University and I worked with at

31

00:01:45,819 --> 00:01:43,759

NASA Langley actually which is more of a

32

00:01:47,590 --> 00:01:45,829

Research Center and I came down to

33

00:01:49,840 --> 00:01:47,600

Kennedy Space Center at the beginning of

34

00:01:51,490 --> 00:01:49,850

what was constellation program and

35

00:01:53,910 --> 00:01:51,500

started working in systems engineering

36

00:01:55,840 --> 00:01:53,920

and my way up into project management

37

00:01:58,389 --> 00:01:55,850

had some really good people that I

38

00:02:00,520 --> 00:01:58,399

worked with and and lo and behold Here I

39

00:02:02,289 --> 00:02:00,530

am now as a senior project manager and

40

00:02:05,249 --> 00:02:02,299

I'm responsible for all the development

41

00:02:08,830 --> 00:02:05,259

activity out at launch complex 39b

42

00:02:11,259 --> 00:02:08,840

yes so when we talk about that also kind

43

00:02:13,120 --> 00:02:11,269

of recapping to that image that I showed

44

00:02:15,850 --> 00:02:13,130

a minute ago and this video you see on

45

00:02:17,710 --> 00:02:15,860

screen now these lightning towers are

46

00:02:20,020 --> 00:02:17,720

600 feet tall so this is by no means a

47

00:02:22,120 --> 00:02:20,030

small space here so what's the history

48

00:02:26,229 --> 00:02:22,130

of this launch pad because it has a very

49

00:02:29,199 --> 00:02:26,239

long history yeah you're right and and

50

00:02:30,819 --> 00:02:29,209

the launch complex 39b is is about two

51  
00:02:32,140 --> 00:02:30,829  
miles to get all the way around it to

52  
00:02:33,699 --> 00:02:32,150  
give you a little bit of perspective of

53  
00:02:36,640 --> 00:02:33,709  
the scale of that and like you said the

54  
00:02:39,759 --> 00:02:36,650  
towers being 600 feet tall it's it's a

55  
00:02:42,160 --> 00:02:39,769  
big place but it's only a piece of the

56  
00:02:43,660 --> 00:02:42,170  
exploration systems architecture the

57  
00:02:46,000 --> 00:02:43,670  
first image you had had the mobile

58  
00:02:46,750 --> 00:02:46,010  
launcher that's what will actually stack

59  
00:02:49,449 --> 00:02:46,760  
the vehicle

60  
00:02:51,940 --> 00:02:49,459  
and do the connections and that

61  
00:02:53,460 --> 00:02:51,950  
architecture that we have is similar to

62  
00:02:56,920 --> 00:02:53,470  
what they used in the Apollo program

63  
00:02:58,809 --> 00:02:56,930

which is when this pad was actually

64

00:03:02,470 --> 00:02:58,819

built when they started the Apollo

65

00:03:05,380 --> 00:03:02,480

program they built two pads so when we

66

00:03:10,360 --> 00:03:05,390

refer to LC 39 there's a pad a and a pad

67

00:03:12,940 --> 00:03:10,370

B pad a was built first and and pad B

68

00:03:15,940 --> 00:03:12,950

completed construction in 1967 just

69

00:03:17,890 --> 00:03:15,950

behind it right in time to support the

70

00:03:20,770 --> 00:03:17,900

the dry run for Apollo 11 we just had

71

00:03:24,099 --> 00:03:20,780

the anniversary for Apollo 11 landing on

72

00:03:26,259 --> 00:03:24,109

the moon and pad B was used as the for

73

00:03:28,960 --> 00:03:26,269

Apollo 10 which was a dry run for it in

74

00:03:31,360 --> 00:03:28,970

just a few months prior so you know pad

75

00:03:33,640 --> 00:03:31,370

B and pad a both have a long history of

76  
00:03:35,170 --> 00:03:33,650  
supporting the Apollo program and then

77  
00:03:36,819 --> 00:03:35,180  
they were both transitioned to support

78  
00:03:39,729 --> 00:03:36,829  
those the shuttle program and they were

79  
00:03:42,490 --> 00:03:39,739  
used in tandem 53 launches actually of

80  
00:03:45,039 --> 00:03:42,500  
the shuttle program went off of pad B

81  
00:03:48,160 --> 00:03:45,049  
and then towards the end is when the two

82  
00:03:50,619 --> 00:03:48,170  
twin pad started to diverge we started

83  
00:03:52,119 --> 00:03:50,629  
to modify pad B for what was then

84  
00:03:54,400 --> 00:03:52,129  
constellation which has become

85  
00:03:56,979 --> 00:03:54,410  
exploration ground systems with SLS and

86  
00:03:59,349 --> 00:03:56,989  
Orion and then pad a got transitioned

87  
00:04:02,409 --> 00:03:59,359  
over to SpaceX because we're now a

88  
00:04:03,970 --> 00:04:02,419

multi-user spaceport and SpaceX has a

89

00:04:05,409 --> 00:04:03,980

very different architecture than we do

90

00:04:07,750 --> 00:04:05,419

so they have done different things at

91

00:04:09,250 --> 00:04:07,760

pad a so the two twin pads no longer

92

00:04:12,129 --> 00:04:09,260

look alike they are have different

93

00:04:13,750 --> 00:04:12,139

missions now but we have kind of taken

94

00:04:16,539 --> 00:04:13,760

both of those paths to the next

95

00:04:17,740 --> 00:04:16,549

generation yeah and and one of the

96

00:04:19,210 --> 00:04:17,750

biggest things they're kind of thinking

97

00:04:22,029 --> 00:04:19,220

about image I just showed of the shuttle

98

00:04:23,950 --> 00:04:22,039

program people who are really have a

99

00:04:25,510 --> 00:04:23,960

keen eye they'll notice that all those

100

00:04:27,219 --> 00:04:25,520

structures that were there in place are

101  
00:04:30,399 --> 00:04:27,229  
now gone and what we call a clean pad

102  
00:04:32,200 --> 00:04:30,409  
design can you tell us more about why we

103  
00:04:33,760 --> 00:04:32,210  
say clean pad I think you kind of have

104  
00:04:37,540 --> 00:04:33,770  
some specifics there as far as what that

105  
00:04:40,510 --> 00:04:37,550  
means dirty version yeah yeah it's not

106  
00:04:42,430 --> 00:04:40,520  
it's not versus dirty it's clean isn't

107  
00:04:46,420 --> 00:04:42,440  
simple and streamlined that's what we're

108  
00:04:48,070 --> 00:04:46,430  
going for the architecture of our launch

109  
00:04:50,680 --> 00:04:48,080  
vehicles has evolved on our ground

110  
00:04:52,180 --> 00:04:50,690  
systems architecture we're more similar

111  
00:04:54,790 --> 00:04:52,190  
to what they used in Apollo where you

112  
00:04:56,260 --> 00:04:54,800  
have a mobile launcher with a tower and

113  
00:04:58,240 --> 00:04:56,270

you have the vehicle all the connections

114

00:05:00,610 --> 00:04:58,250

to the vehicle are done in the safety of

115

00:05:02,650 --> 00:05:00,620

the Vehicle Assembly Building and that's

116

00:05:04,420 --> 00:05:02,660

out to the launch pad and that way you

117

00:05:06,610 --> 00:05:04,430

don't have those large structures at the

118

00:05:08,320 --> 00:05:06,620

pad they tried something different in

119

00:05:09,879 --> 00:05:08,330

the space shuttle program and had the

120

00:05:12,189 --> 00:05:09,889

fixed service structure the rotating

121

00:05:14,860 --> 00:05:12,199

service structure but we've found out

122

00:05:17,050 --> 00:05:14,870

over you know 20-some years that even

123

00:05:18,790 --> 00:05:17,060

though the ocean is beautiful it's also

124

00:05:21,280 --> 00:05:18,800

the salt air which is very corrosive

125

00:05:22,840 --> 00:05:21,290

which is a maintenance nightmare so we

126  
00:05:24,820 --> 00:05:22,850  
had a lot of maintenance that we had to

127  
00:05:26,469 --> 00:05:24,830  
do a lot of costs so we went back to

128  
00:05:28,810 --> 00:05:26,479  
something similar to the Apollo

129  
00:05:31,330 --> 00:05:28,820  
architecture where we bring all of that

130  
00:05:33,460 --> 00:05:31,340  
with us and we keep all of that inside

131  
00:05:35,710 --> 00:05:33,470  
the Vehicle Assembly Building and the

132  
00:05:37,629 --> 00:05:35,720  
other added benefit of that is then what

133  
00:05:41,320 --> 00:05:37,639  
you actually see on the pad surface is

134  
00:05:43,240 --> 00:05:41,330  
very neutral so that also enables other

135  
00:05:45,939 --> 00:05:43,250  
launch companies to come out there and

136  
00:05:47,560 --> 00:05:45,949  
use that same pad and they can have

137  
00:05:50,770 --> 00:05:47,570  
their own custom connections to the

138  
00:05:52,810 --> 00:05:50,780

vehicle on their mobile launcher so as

139

00:05:54,850 --> 00:05:52,820

we think about that clean pad design and

140

00:05:57,340 --> 00:05:54,860

going from all those giant structures

141

00:06:00,010 --> 00:05:57,350

that were fixed in place to a simple

142

00:06:02,050 --> 00:06:00,020

design what's that process been like

143

00:06:03,370 --> 00:06:02,060

because obviously I mean you you kind of

144

00:06:05,500 --> 00:06:03,380

think of it as being almost just a

145

00:06:07,980 --> 00:06:05,510

demolition process is it that simple of

146

00:06:11,529 --> 00:06:07,990

just hey rip it all out and we're done I

147

00:06:13,060 --> 00:06:11,539

want to say I wish but it to get to

148

00:06:14,830 --> 00:06:13,070

something simple actually takes a lot of

149

00:06:16,360 --> 00:06:14,840

work so you're right one of the first

150

00:06:17,680 --> 00:06:16,370

things we did have to do was to go in

151  
00:06:19,690 --> 00:06:17,690  
there and demolition it but when you

152  
00:06:21,909 --> 00:06:19,700  
have you know two different generations

153  
00:06:23,469 --> 00:06:21,919  
of programs out there some of that

154  
00:06:25,600 --> 00:06:23,479  
structure and some of those systems are

155  
00:06:27,879 --> 00:06:25,610  
still useful and we didn't want to start

156  
00:06:30,400 --> 00:06:27,889  
with a you know blank piece of paper so

157  
00:06:32,290 --> 00:06:30,410  
you know the pad surface and a lot of

158  
00:06:34,000 --> 00:06:32,300  
those structures that are there the

159  
00:06:35,260 --> 00:06:34,010  
large spheres that you see on the

160  
00:06:38,020 --> 00:06:35,270  
perimeter the liquid hydrogen liquid

161  
00:06:40,000 --> 00:06:38,030  
oxygen spheres those are original and so

162  
00:06:42,040 --> 00:06:40,010  
you know we basically kept what was

163  
00:06:45,100 --> 00:06:42,050

could be used and did a lot of

164

00:06:47,710 --> 00:06:45,110

refurbishment to it or we updated it and

165

00:06:48,159 --> 00:06:47,720

where we didn't have something existing

166

00:06:50,110 --> 00:06:48,169

already

167

00:06:52,600 --> 00:06:50,120

we actually have gone in and put in new

168

00:06:55,029 --> 00:06:52,610

systems so when you're out there at the

169

00:06:57,430 --> 00:06:55,039

pad today you will see all three

170

00:06:59,260 --> 00:06:57,440

generations of programs working in

171

00:07:01,659 --> 00:06:59,270

concert together to meet our SLS and

172

00:07:03,159 --> 00:07:01,669

Orion objectives yeah that's awesome so

173

00:07:04,570 --> 00:07:03,169

can you talk about some of the specifics

174

00:07:07,000 --> 00:07:04,580

what are things what are the highlights

175

00:07:08,950 --> 00:07:07,010

of this process I'm thinking about the

176

00:07:10,959 --> 00:07:08,960

things that are new maybe not

177

00:07:12,110 --> 00:07:10,969

necessarily shiny but definitely new and

178

00:07:15,260 --> 00:07:12,120

ready for the next enter

179

00:07:17,689 --> 00:07:15,270

rockets yeah we jump it nothing shiny at

180

00:07:18,770 --> 00:07:17,699

the pad it's definitely a working

181

00:07:20,810 --> 00:07:18,780

environment but some of the really

182

00:07:22,189 --> 00:07:20,820

visible ones obviously the demolition of

183

00:07:23,600 --> 00:07:22,199

the fixed service structure and rotating

184

00:07:26,150 --> 00:07:23,610

service structure I mean those were

185

00:07:28,159 --> 00:07:26,160

sentimental as well those were visual

186

00:07:30,620 --> 00:07:28,169

images of the shuttle program so it was

187

00:07:32,210 --> 00:07:30,630

difficult to see that come down but

188

00:07:33,500 --> 00:07:32,220

understanding what the future hold is

189

00:07:35,870 --> 00:07:33,510

you know really what kind of drove us

190

00:07:38,270 --> 00:07:35,880

through that we also you know in gearing

191

00:07:40,550 --> 00:07:38,280

up towards you know SLS is going to be

192

00:07:43,460 --> 00:07:40,560

the most powerful rocket ever so we had

193

00:07:45,020 --> 00:07:43,470

to upsize some of it so with the flame

194

00:07:47,360 --> 00:07:45,030

trench the flame deflector have been

195

00:07:49,490 --> 00:07:47,370

completely redone the bricks were

196

00:07:51,560 --> 00:07:49,500

original apollo-era bricks we replace

197

00:07:53,180 --> 00:07:51,570

all of those we put in a new flame

198

00:07:56,000 --> 00:07:53,190

deflector that could take the massive

199

00:07:57,920 --> 00:07:56,010

thrust from the SLS and actually

200

00:07:59,659 --> 00:07:57,930

designed it to be able to support any

201  
00:08:02,300 --> 00:07:59,669  
American rocket that's launching today

202  
00:08:03,950 --> 00:08:02,310  
that we knew of so you know we're trying

203  
00:08:05,240 --> 00:08:03,960  
to not only up size but we're also

204  
00:08:08,480 --> 00:08:05,250  
trying to keep that multi-user spaceport

205  
00:08:09,830 --> 00:08:08,490  
in mind we've we've built three they

206  
00:08:11,900 --> 00:08:09,840  
mentioned the lightning towers those

207  
00:08:13,610 --> 00:08:11,910  
that lightning protection system was one

208  
00:08:15,439 --> 00:08:13,620  
of the first things we did that decides

209  
00:08:17,360 --> 00:08:15,449  
to support any rocket that could leave

210  
00:08:19,040 --> 00:08:17,370  
the Vehicle Assembly Building that's why

211  
00:08:21,560 --> 00:08:19,050  
they're so big so not knowing what would

212  
00:08:22,580 --> 00:08:21,570  
come we built as big as we could what we

213  
00:08:24,680 --> 00:08:22,590

would need to for the Vehicle Assembly

214

00:08:26,960 --> 00:08:24,690

Building but that provides us protection

215

00:08:29,450 --> 00:08:26,970

at the pad that we've never had before

216

00:08:30,890 --> 00:08:29,460

and the whole idea is trying to enable

217

00:08:33,409 --> 00:08:30,900

our launch director to have every

218

00:08:34,670 --> 00:08:33,419

opportunity possible to get that vehicle

219

00:08:38,089 --> 00:08:34,680

on the off the ground at the first

220

00:08:40,490 --> 00:08:38,099

opportunity yeah we have this video view

221

00:08:42,110 --> 00:08:40,500

those highlights for you and just

222

00:08:44,240 --> 00:08:42,120

wondering what you can tell us about

223

00:08:46,670 --> 00:08:44,250

this obviously 96,000 that's no small

224

00:08:48,350 --> 00:08:46,680

number of bricks yeah so yeah in this

225

00:08:50,780 --> 00:08:48,360

video here you see that well as the

226

00:08:52,310 --> 00:08:50,790

time-lapse of them erecting that that

227

00:08:53,990 --> 00:08:52,320

flame deflector and the ignition

228

00:08:55,910 --> 00:08:54,000

overpressure sound suppression system

229

00:08:57,470 --> 00:08:55,920

we're doing a water flow test of that

230

00:08:59,600 --> 00:08:57,480

and then in the front there you can see

231

00:09:01,600 --> 00:08:59,610

the new bricks when the mobile launcher

232

00:09:04,010 --> 00:09:01,610

was out there we tested that same system

233

00:09:05,360 --> 00:09:04,020

but really she's had a complete makeover

234

00:09:07,310 --> 00:09:05,370

there's not a system out there that

235

00:09:10,699 --> 00:09:07,320

hasn't been touched refurbished or

236

00:09:12,470 --> 00:09:10,709

replaced you know 450 years old she's

237

00:09:14,810 --> 00:09:12,480

looking fantastic she's had a complete

238

00:09:16,910 --> 00:09:14,820

makeover has been really upgraded and

239

00:09:18,949 --> 00:09:16,920

she's ready to go to get that first

240

00:09:21,800 --> 00:09:18,959

launch party this one off in 2021

241

00:09:24,170 --> 00:09:21,810

yeah awesome again important there to

242

00:09:25,929 --> 00:09:24,180

list that day 2021 for the first flight

243

00:09:28,509 --> 00:09:25,939

and obviously we know that weird

244

00:09:30,639 --> 00:09:28,519

clared ready for artemis one so is your

245

00:09:32,229 --> 00:09:30,649

job done is it just like we're good here

246

00:09:36,819 --> 00:09:32,239

or what's next

247

00:09:38,529 --> 00:09:36,829

and and some of these projects you know

248

00:09:39,999 --> 00:09:38,539

we've been renovating this pad for over

249

00:09:42,039 --> 00:09:40,009

ten years now

250

00:09:44,169 --> 00:09:42,049

and we really had to focus on artemis

251  
00:09:46,449 --> 00:09:44,179  
one there are a few projects that were

252  
00:09:47,529 --> 00:09:46,459  
needed for the flight crew because we

253  
00:09:48,999 --> 00:09:47,539  
weren't going to need those for the

254  
00:09:51,039 --> 00:09:49,009  
first launch we've deferred them and

255  
00:09:54,849 --> 00:09:51,049  
we're doing them now so we're actually

256  
00:09:56,529 --> 00:09:54,859  
in new construction i we showed the the

257  
00:09:58,539 --> 00:09:56,539  
big sphere that's eight hundred thousand

258  
00:09:59,710 --> 00:09:58,549  
gallons of liquid hydrogen but again

259  
00:10:01,509 --> 00:09:59,720  
trying to get our launch sir director

260  
00:10:03,399 --> 00:10:01,519  
every attempt in order to get her three

261  
00:10:05,889 --> 00:10:03,409  
attempts twenty four hours apart when we

262  
00:10:07,719 --> 00:10:05,899  
have crew we're building a new liquid

263  
00:10:09,759 --> 00:10:07,729

hydrogen sphere that's going to be 1.4

264

00:10:11,469 --> 00:10:09,769

million gallons and we need both of

265

00:10:13,539 --> 00:10:11,479

those together to get those three

266

00:10:15,849 --> 00:10:13,549

attempts we're also building the

267

00:10:17,469 --> 00:10:15,859

emergency egress system which if

268

00:10:19,210 --> 00:10:17,479

something would happen on launch day

269

00:10:21,489 --> 00:10:19,220

that enables our flight crew to get out

270

00:10:23,919 --> 00:10:21,499

to safety quickly and that's a system

271

00:10:25,329 --> 00:10:23,929

that we're currently designing so you

272

00:10:27,579 --> 00:10:25,339

know we've done everything we needed to

273

00:10:30,519 --> 00:10:27,589

do for Artemus one but we are in the

274

00:10:32,589 --> 00:10:30,529

thick of the new development projects

275

00:10:34,269 --> 00:10:32,599

for Artemus two and it's really trying

276

00:10:36,699 --> 00:10:34,279

to get you know to that end goal of

277

00:10:39,399 --> 00:10:36,709

getting that first woman a man on the

278

00:10:40,599 --> 00:10:39,409

moon in 2024 awesome good Regina

279

00:10:41,739 --> 00:10:40,609

appreciate you and all the hard work

280

00:10:44,710 --> 00:10:41,749

that you and your teams are putting in

281

00:10:46,799 --> 00:10:44,720

we are excited to see this thing fly and

282

00:10:49,749 --> 00:10:46,809

certainly I'm sure element for you

283

00:10:51,549 --> 00:10:49,759

absolutely all right for everybody out

284

00:10:52,449 --> 00:10:51,559

there watching please be sure to tune in

285

00:10:54,099 --> 00:10:52,459

to the rest of our episodes this week

286

00:10:55,899 --> 00:10:54,109

we're touching on our rocket the Space

287

00:10:57,879 --> 00:10:55,909

Launch System the Kennedy Space Center

288

00:11:00,699 --> 00:10:57,889

at large and what we've done to be be

289

00:11:02,379 --> 00:11:00,709

ready the Orion space capsule and then

290

00:11:04,569 --> 00:11:02,389

some of the work to be done on the moon

291

00:11:06,069 --> 00:11:04,579

as we as we go there with the sustained

292

00:11:09,099 --> 00:11:06,079

presence with our eyes on Mars

293

00:11:10,239 --> 00:11:09,109

thanks for Gina appreciate you thanks

294

00:11:12,039 --> 00:11:10,249

Josh was good to be here