



1  
00:00:02,869 --> 00:00:01,589  
i'm nasa public affairs specialist

2  
00:00:05,110 --> 00:00:02,879  
brandie dean

3  
00:00:06,630 --> 00:00:05,120  
on november 2nd 2000 the very first

4  
00:00:08,390 --> 00:00:06,640  
expedition crew arrived at the

5  
00:00:10,629 --> 00:00:08,400  
international space station and since

6  
00:00:14,150 --> 00:00:10,639  
then there have been an unbroken string

7  
00:00:15,910 --> 00:00:14,160  
of 241 astronauts from 19 countries on

8  
00:00:17,830 --> 00:00:15,920  
board supporting science experiments

9  
00:00:19,830 --> 00:00:17,840  
performing space walks and teaching us

10  
00:00:21,269 --> 00:00:19,840  
how to live long term in space but

11  
00:00:23,189 --> 00:00:21,279  
although the crew members in space might

12  
00:00:24,870 --> 00:00:23,199  
be the most visible piece of that puzzle

13  
00:00:26,230 --> 00:00:24,880

they are only a tiny percentage of the

14

00:00:28,470 --> 00:00:26,240

many many people who have to work

15

00:00:30,470 --> 00:00:28,480

together to make sure missions are safe

16

00:00:31,830 --> 00:00:30,480

and successful we're here today with

17

00:00:33,590 --> 00:00:31,840

some of the people that work on the

18

00:00:35,830 --> 00:00:33,600

ground and in particular through our

19

00:00:37,030 --> 00:00:35,840

flat operations directorate and we have

20

00:00:39,350 --> 00:00:37,040

a few international space station

21

00:00:40,790 --> 00:00:39,360

program stowaways here with us as well

22

00:00:42,229 --> 00:00:40,800

i'm going to let each of them introduce

23

00:00:43,990 --> 00:00:42,239

themselves and

24

00:00:45,430 --> 00:00:44,000

tell a little bit about what they do and

25

00:00:46,869 --> 00:00:45,440

then in honor of the anniversary we're

26

00:00:49,270 --> 00:00:46,879

celebrating i'd love for each of you to

27

00:00:51,750 --> 00:00:49,280

also tell us where you were 20 years ago

28

00:00:53,990 --> 00:00:51,760

when expedition 2 expedition 1 was just

29

00:00:57,270 --> 00:00:54,000

beginning and we are going to start

30

00:00:59,189 --> 00:00:57,280

first with norm knight

31

00:01:01,349 --> 00:00:59,199

well let's see brandi uh it's really an

32

00:01:02,709 --> 00:01:01,359

exciting day and uh it's great to be on

33

00:01:06,550 --> 00:01:02,719

this panel

34

00:01:08,390 --> 00:01:06,560

uh a little bit of my background uh

35

00:01:10,870 --> 00:01:08,400

i've worked in in flight ops for many

36

00:01:13,670 --> 00:01:10,880

years i i'm currently the deputy

37

00:01:15,590 --> 00:01:13,680

director of flight operations

38

00:01:17,670 --> 00:01:15,600

you know thinking back 20 years ago

39

00:01:20,230 --> 00:01:17,680

which some days it seems like yesterday

40

00:01:21,830 --> 00:01:20,240

and some days it seems like a long long

41

00:01:24,469 --> 00:01:21,840

time ago

42

00:01:26,550 --> 00:01:24,479

i had been a group lead for one of the

43

00:01:28,469 --> 00:01:26,560

shuttle uh groups

44

00:01:30,550 --> 00:01:28,479

that uh that managed the main engines

45

00:01:31,510 --> 00:01:30,560

solid rocket boosters and external tank

46

00:01:33,109 --> 00:01:31,520

and

47

00:01:35,429 --> 00:01:33,119

was recently selected as a flight

48

00:01:36,310 --> 00:01:35,439

director so i was really transitioning

49

00:01:38,950 --> 00:01:36,320

from

50

00:01:41,830 --> 00:01:38,960

uh shuttle to station so

51  
00:01:43,109 --> 00:01:41,840  
exciting times exciting memories and uh

52  
00:01:45,350 --> 00:01:43,119  
look forward to

53  
00:01:45,740 --> 00:01:45,360  
to the rest of uh the panel discussion

54  
00:01:47,670 --> 00:01:45,750  
today

55  
00:01:50,069 --> 00:01:47,680  
[Music]

56  
00:01:52,710 --> 00:01:50,079  
definitely thank you norm um now we're

57  
00:01:54,469 --> 00:01:52,720  
going to go to kenny todd

58  
00:01:56,870 --> 00:01:54,479  
hey good morning brandi and uh good

59  
00:01:58,389 --> 00:01:56,880  
morning to the rest of uh my esteemed

60  
00:02:00,389 --> 00:01:58,399  
colleagues on the panel it's good to see

61  
00:02:02,789 --> 00:02:00,399  
all of you um

62  
00:02:04,870 --> 00:02:02,799  
i am i'm the deputy program manager for

63  
00:02:06,950 --> 00:02:04,880

the international space station um have

64

00:02:09,350 --> 00:02:06,960

been for a number of years here

65

00:02:11,190 --> 00:02:09,360

but uh worked very closely with uh with

66

00:02:13,190 --> 00:02:11,200

the entire flight operations community

67

00:02:15,510 --> 00:02:13,200

and and have done so for

68

00:02:17,830 --> 00:02:15,520

for for close to the last uh 20 years

69

00:02:19,190 --> 00:02:17,840

now um when i think back

70

00:02:21,510 --> 00:02:19,200

to where we were

71

00:02:23,670 --> 00:02:21,520

where i was 20 years ago obviously i

72

00:02:25,589 --> 00:02:23,680

wasn't in this position but at the time

73

00:02:26,630 --> 00:02:25,599

my focus was over in avionics and

74

00:02:28,630 --> 00:02:26,640

software

75

00:02:30,390 --> 00:02:28,640

and one of the biggest challenges for a

76  
00:02:31,350 --> 00:02:30,400  
program such as this one where you have

77  
00:02:32,790 --> 00:02:31,360  
hardware

78  
00:02:35,110 --> 00:02:32,800  
you know literally being built all over

79  
00:02:38,070 --> 00:02:35,120  
the united states and in other parts of

80  
00:02:39,509 --> 00:02:38,080  
the world um by by different countries

81  
00:02:40,790 --> 00:02:39,519  
uh one of the challenges was trying to

82  
00:02:42,150 --> 00:02:40,800  
figure out how to integrate all that

83  
00:02:44,869 --> 00:02:42,160  
hardware and software and there was a

84  
00:02:45,670 --> 00:02:44,879  
big big effort in that that time frame

85  
00:02:49,589 --> 00:02:45,680  
back

86  
00:02:52,070 --> 00:02:49,599  
were really starting to to get this

87  
00:02:53,509 --> 00:02:52,080  
program off the ground and in orbit and

88  
00:02:56,470 --> 00:02:53,519

so at that time

89

00:02:58,710 --> 00:02:56,480

i had one camp working working real time

90

00:02:59,589 --> 00:02:58,720

operations on the avionics and software

91

00:03:01,270 --> 00:02:59,599

side and

92

00:03:03,430 --> 00:03:01,280

making sure everything was going okay on

93

00:03:05,509 --> 00:03:03,440

orbit as we as we started to bring up

94

00:03:06,309 --> 00:03:05,519

these different systems and at the same

95

00:03:08,229 --> 00:03:06,319

time

96

00:03:09,750 --> 00:03:08,239

i was off trying to figure out the next

97

00:03:12,309 --> 00:03:09,760

flights in the queue and how to make

98

00:03:13,910 --> 00:03:12,319

sure that uh that uh that we were all

99

00:03:15,190 --> 00:03:13,920

gonna be good to go and trying to find

100

00:03:17,190 --> 00:03:15,200

problems on the ground so we didn't have

101  
00:03:19,670 --> 00:03:17,200  
to find them and and give them to these

102  
00:03:23,030 --> 00:03:19,680  
uh to these flight directors later on uh

103  
00:03:26,390 --> 00:03:23,040  
when they have to to deal with them

104  
00:03:32,869 --> 00:03:28,630  
i'm sure they appreciate that early work

105  
00:03:34,309 --> 00:03:32,879  
uh next up is holly writings

106  
00:03:37,910 --> 00:03:34,319  
all right well good morning everybody

107  
00:03:39,830 --> 00:03:37,920  
i'm holly writings uh today i am the

108  
00:03:42,229 --> 00:03:39,840  
chief flight director and the flight

109  
00:03:45,110 --> 00:03:42,239  
operations directorate and it's it is

110  
00:03:47,270 --> 00:03:45,120  
pretty exciting uh to sit here today you

111  
00:03:48,869 --> 00:03:47,280  
know after 20 years and look back you

112  
00:03:50,949 --> 00:03:48,879  
know see some of the same

113  
00:03:52,869 --> 00:03:50,959

faces on this panel and and really have

114

00:03:54,949 --> 00:03:52,879

an opportunity to to celebrate

115

00:03:56,229 --> 00:03:54,959

everything that we've done and and so

116

00:03:58,390 --> 00:03:56,239

today i'm the chief flight director but

117

00:03:59,830 --> 00:03:58,400

if you go back 20 years i was just

118

00:04:03,190 --> 00:03:59,840

starting out

119

00:04:06,470 --> 00:04:03,200

at nasa as a flight controller just you

120

00:04:09,429 --> 00:04:06,480

know newly minted and was able to sit uh

121

00:04:11,830 --> 00:04:09,439

sit console for the very very beginning

122

00:04:13,190 --> 00:04:11,840

of space station and so for a while i

123

00:04:15,270 --> 00:04:13,200

would tell everyone i had the entire

124

00:04:16,710 --> 00:04:15,280

history of space station in my head and

125

00:04:19,030 --> 00:04:16,720

now it's gotten so complicated i don't

126

00:04:21,430 --> 00:04:19,040

think i can remember it all but uh but

127

00:04:23,430 --> 00:04:21,440

for a while i could i could go flight by

128

00:04:25,270 --> 00:04:23,440

flight by flight and that was how i

129

00:04:27,909 --> 00:04:25,280

organized my whole life not birthdays

130

00:04:29,830 --> 00:04:27,919

not holidays space station uh flights

131

00:04:31,670 --> 00:04:29,840

were the milestones and and really still

132

00:04:34,230 --> 00:04:31,680

are actually uh that's kind of how we

133

00:04:36,950 --> 00:04:34,240

mark time in our world so i'm super

134

00:04:40,550 --> 00:04:36,960

excited to be here and uh hope you enjoy

135

00:04:40,560 --> 00:04:47,350

thank you next let's go to emily nelson

136

00:04:52,469 --> 00:04:50,230

good morning and hey to everybody

137

00:04:54,070 --> 00:04:52,479

so let's see right now i'm the deputy

138

00:04:56,710 --> 00:04:54,080

chief flight director in the flight

139

00:04:59,030 --> 00:04:56,720

operations directorate and um we're

140

00:05:01,909 --> 00:04:59,040

still also active flight directors

141

00:05:04,230 --> 00:05:01,919

um 20 years ago i

142

00:05:05,590 --> 00:05:04,240

was also starting out as a junior flight

143

00:05:08,070 --> 00:05:05,600

controller

144

00:05:10,710 --> 00:05:08,080

the expedition one launch

145

00:05:13,189 --> 00:05:10,720

marked a transition where um

146

00:05:15,590 --> 00:05:13,199

one role that we had early on was going

147

00:05:17,029 --> 00:05:15,600

to retire because the the the space

148

00:05:19,350 --> 00:05:17,039

station which had actually been in orbit

149

00:05:21,029 --> 00:05:19,360

for a while was gonna have people on it

150

00:05:23,990 --> 00:05:21,039

and so we were gonna retire one position

151  
00:05:26,469 --> 00:05:24,000  
and move into a full team so um i was

152  
00:05:27,670 --> 00:05:26,479  
excited to be transitioning into

153  
00:05:30,710 --> 00:05:27,680  
additional

154  
00:05:32,070 --> 00:05:30,720  
uh responsibility and getting maybe to

155  
00:05:34,070 --> 00:05:32,080  
become a little bit more senior as a

156  
00:05:35,749 --> 00:05:34,080  
flight controller someday but i was a

157  
00:05:40,870 --> 00:05:35,759  
pretty baby flight controller back in at

158  
00:05:40,880 --> 00:05:46,150  
um how about we go to david korth next

159  
00:05:50,469 --> 00:05:48,230  
hey good morning it's good to be back

160  
00:05:53,990 --> 00:05:50,479  
among friends uh i hung up my flight

161  
00:05:56,230 --> 00:05:54,000  
director spurs several years ago

162  
00:05:58,230 --> 00:05:56,240  
so now i'm the deputy manager of the

163  
00:06:00,950 --> 00:05:58,240

isis avionics software

164

00:06:02,629 --> 00:06:00,960

division what kenny was doing 20 years

165

00:06:06,870 --> 00:06:02,639

ago

166

00:06:08,150 --> 00:06:06,880

sitting console and what we call the

167

00:06:09,909 --> 00:06:08,160

blue ficker

168

00:06:11,430 --> 00:06:09,919

a much smaller version of what's behind

169

00:06:12,790 --> 00:06:11,440

emily right now

170

00:06:14,550 --> 00:06:12,800

and i was the lead planner for

171

00:06:16,950 --> 00:06:14,560

expedition one and so

172

00:06:19,029 --> 00:06:16,960

the you know i i look back and i was

173

00:06:20,870 --> 00:06:19,039

reflecting uh this last couple of days

174

00:06:22,469 --> 00:06:20,880

on what we've accomplished since then

175

00:06:25,670 --> 00:06:22,479

and thinking you know how much

176  
00:06:28,629 --> 00:06:25,680  
preparation went into expedition one and

177  
00:06:31,029 --> 00:06:28,639  
as emily mentioned uh the un uncrewed

178  
00:06:31,830 --> 00:06:31,039  
station that existed for a year and a

179  
00:06:33,510 --> 00:06:31,840  
half

180  
00:06:35,110 --> 00:06:33,520  
two years before

181  
00:06:36,150 --> 00:06:35,120  
the exhibition one crew showed up and

182  
00:06:38,070 --> 00:06:36,160  
how much

183  
00:06:39,990 --> 00:06:38,080  
work effort we all put into working with

184  
00:06:41,430 --> 00:06:40,000  
the russians trying to come up with

185  
00:06:43,430 --> 00:06:41,440  
what the plans were going to be how

186  
00:06:45,990 --> 00:06:43,440  
we're going to integrate things together

187  
00:06:48,469 --> 00:06:46,000  
and when we finally cut our first plan

188  
00:06:50,629 --> 00:06:48,479

and uplink that's when it you know you

189

00:06:51,670 --> 00:06:50,639

know this is real this is actually

190

00:06:52,870 --> 00:06:51,680

happening

191

00:06:54,790 --> 00:06:52,880

um

192

00:06:56,070 --> 00:06:54,800

so i and and clearly a lot has

193

00:06:59,029 --> 00:06:56,080

transpired

194

00:07:01,430 --> 00:06:59,039

uh both with all of our partners and uh

195

00:07:03,589 --> 00:07:01,440

the vehicle itself and and the evolution

196

00:07:06,550 --> 00:07:03,599

of operations so i'm glad to be part of

197

00:07:12,390 --> 00:07:08,710

it must have been such an exciting time

198

00:07:13,589 --> 00:07:12,400

uh finally we're going to go to pujac

199

00:07:15,830 --> 00:07:13,599

all right good morning everyone i'm

200

00:07:17,749 --> 00:07:15,840

happy to be here with all of you

201  
00:07:20,710 --> 00:07:17,759  
like brandi mentioned uh my name is pujo

202  
00:07:23,350 --> 00:07:20,720  
jesfani and i am a flight director um

203  
00:07:25,749 --> 00:07:23,360  
i was selected in 2018 so i'm one of the

204  
00:07:27,909 --> 00:07:25,759  
newer flight directors in our office i

205  
00:07:30,710 --> 00:07:27,919  
was selected with five others making a

206  
00:07:32,390 --> 00:07:30,720  
class of six and so i am the you know

207  
00:07:34,070 --> 00:07:32,400  
one of the baby flight directors you

208  
00:07:35,830 --> 00:07:34,080  
would say but have had a lot of

209  
00:07:40,790 --> 00:07:35,840  
experience now at nasa

210  
00:07:42,469 --> 00:07:40,800  
in 2011 sorry i should say in 2000 i was

211  
00:07:47,029 --> 00:07:42,479  
in 11th grade

212  
00:07:49,510 --> 00:07:47,039  
space posters in my room and it's you

213  
00:07:52,390 --> 00:07:49,520

know it was very inspired by space and

214

00:07:56,150 --> 00:07:52,400

wanted to be um where i am today so

215

00:08:00,150 --> 00:07:56,160

um very excited to be here thank you

216

00:08:04,230 --> 00:08:02,469

yes this is already so much fun

217

00:08:05,909 --> 00:08:04,240

um so now we're gonna back up a little

218

00:08:07,510 --> 00:08:05,919

bit uh although a lot of this group

219

00:08:09,029 --> 00:08:07,520

supports flat operations and mission

220

00:08:11,589 --> 00:08:09,039

control that's not everything that

221

00:08:13,270 --> 00:08:11,599

flight operations does uh by a long shot

222

00:08:15,029 --> 00:08:13,280

so norm says you're the deputy director

223

00:08:17,430 --> 00:08:15,039

of flight uh operations why don't you

224

00:08:20,070 --> 00:08:17,440

give us an overview of what flight

225

00:08:22,950 --> 00:08:20,080

operations directorate is

226

00:08:26,150 --> 00:08:22,960

okay brandi and eleventh grade goodness

227

00:08:27,749 --> 00:08:26,160

that's a shocker um so flight operations

228

00:08:29,909 --> 00:08:27,759

we live in a lot of acronyms so you hear

229

00:08:31,589 --> 00:08:29,919

fod it's synonymous with flight

230

00:08:34,310 --> 00:08:31,599

operations it's flight operations

231

00:08:36,070 --> 00:08:34,320

director and really what we are is a

232

00:08:38,709 --> 00:08:36,080

service organization

233

00:08:41,670 --> 00:08:38,719

uh for all the major programs for uh

234

00:08:43,029 --> 00:08:41,680

development and mission execution and so

235

00:08:45,030 --> 00:08:43,039

what i'll talk a little bit about and

236

00:08:47,990 --> 00:08:45,040

give you an overview today is really for

237

00:08:50,630 --> 00:08:48,000

station but uh but it does support uh

238

00:08:53,509 --> 00:08:50,640

all programs and you know the program is

239

00:08:56,310 --> 00:08:53,519

our customer we're an org of about 2500

240

00:08:59,190 --> 00:08:56,320

people and we have three major functions

241

00:09:01,430 --> 00:08:59,200

within uh flight ops you could think of

242

00:09:03,509 --> 00:09:01,440

us as kind of like a tripod

243

00:09:06,949 --> 00:09:03,519

one leg of that is our astronauts we

244

00:09:09,670 --> 00:09:06,959

have about 47 active astronauts today

245

00:09:13,110 --> 00:09:09,680

the other leg is uh aircraft operations

246

00:09:15,910 --> 00:09:13,120

we call it aod and we have about 60 of

247

00:09:18,470 --> 00:09:15,920

the aviation assets for the agency

248

00:09:20,389 --> 00:09:18,480

within flight ops we have 19 t-38s that

249

00:09:22,550 --> 00:09:20,399

are used for uh space flight readiness

250

00:09:24,070 --> 00:09:22,560

training we have a cargo transport the

251  
00:09:27,269 --> 00:09:24,080  
big guppy you've probably seen flying

252  
00:09:30,310 --> 00:09:27,279  
around we have some high research

253  
00:09:32,150 --> 00:09:30,320  
aircraft used for science and training

254  
00:09:34,710 --> 00:09:32,160  
and then we have a gulf stream three and

255  
00:09:36,870 --> 00:09:34,720  
a gulfstream five which are used to uh

256  
00:09:39,350 --> 00:09:36,880  
to transport the crews home after

257  
00:09:40,630 --> 00:09:39,360  
landing and get them back reunited with

258  
00:09:43,509 --> 00:09:40,640  
their family

259  
00:09:45,350 --> 00:09:43,519  
and then we have the uh the plan train

260  
00:09:48,470 --> 00:09:45,360  
fly part of the organization which is

261  
00:09:50,550 --> 00:09:48,480  
really the biggest part of fod although

262  
00:09:52,230 --> 00:09:50,560  
it all works together but really that

263  
00:09:54,630 --> 00:09:52,240

plan train fly is what we do for the

264

00:09:57,030 --> 00:09:54,640

program we really start planning and

265

00:09:59,670 --> 00:09:57,040

training each of these iss increments

266

00:10:01,430 --> 00:09:59,680

which are about six months long

267

00:10:03,509 --> 00:10:01,440

about a year and a half out and the

268

00:10:05,190 --> 00:10:03,519

teams very work very hard to take the

269

00:10:08,069 --> 00:10:05,200

program requirements

270

00:10:10,230 --> 00:10:08,079

metabolize those into a plan a very

271

00:10:12,470 --> 00:10:10,240

detailed plan of how to how to

272

00:10:14,470 --> 00:10:12,480

accomplish this we train the astronauts

273

00:10:16,470 --> 00:10:14,480

we train the flight controllers

274

00:10:19,430 --> 00:10:16,480

we integrate the teams

275

00:10:21,269 --> 00:10:19,440

and we get ready uh to go in and and

276

00:10:23,430 --> 00:10:21,279

execute that in the real-time

277

00:10:25,269 --> 00:10:23,440

environment and that plan really starts

278

00:10:27,350 --> 00:10:25,279

from when the astronauts leave their

279

00:10:29,990 --> 00:10:27,360

families to go to launch

280

00:10:32,550 --> 00:10:30,000

uh all through uh all activities on

281

00:10:35,430 --> 00:10:32,560

orbit to the time that they uh they come

282

00:10:37,110 --> 00:10:35,440

back to earth and are reunited again

283

00:10:39,030 --> 00:10:37,120

with their families

284

00:10:41,269 --> 00:10:39,040

where you see a lot of this really

285

00:10:43,110 --> 00:10:41,279

culminate is in the mission control

286

00:10:45,190 --> 00:10:43,120

center many of you have probably seen

287

00:10:47,430 --> 00:10:45,200

mission control whether you've seen it

288

00:10:49,269 --> 00:10:47,440

in person or in photos

289

00:10:52,230 --> 00:10:49,279

that's the command and control center

290

00:10:54,069 --> 00:10:52,240

for the international space station

291

00:10:57,990 --> 00:10:54,079

these teams

292

00:10:59,430 --> 00:10:58,000

work 24 7 365 days a year

293

00:11:00,470 --> 00:10:59,440

the flight director is really the

294

00:11:03,509 --> 00:11:00,480

conductor

295

00:11:06,150 --> 00:11:03,519

in these real-time teams managing uh all

296

00:11:08,310 --> 00:11:06,160

the systems uh on board and and the

297

00:11:10,389 --> 00:11:08,320

purpose of the teams in there

298

00:11:12,790 --> 00:11:10,399

is to manage the systems and also

299

00:11:14,710 --> 00:11:12,800

provide uh crew safety

300

00:11:17,269 --> 00:11:14,720

for this orbiting laboratory

301  
00:11:19,829 --> 00:11:17,279  
uh in real time the teams typically send

302  
00:11:22,230 --> 00:11:19,839  
about 30 000 remote control commands

303  
00:11:23,110 --> 00:11:22,240  
from the ground to the space station a

304  
00:11:25,430 --> 00:11:23,120  
month

305  
00:11:27,350 --> 00:11:25,440  
to manage this platform so it's uh it's

306  
00:11:30,310 --> 00:11:27,360  
very interactive it's hands-on it's

307  
00:11:32,550 --> 00:11:30,320  
tactile and it's uh and it's very uh

308  
00:11:33,910 --> 00:11:32,560  
it's very rewarding

309  
00:11:35,430 --> 00:11:33,920  
um

310  
00:11:37,430 --> 00:11:35,440  
you know flight operations we're very

311  
00:11:39,590 --> 00:11:37,440  
rich in tradition

312  
00:11:41,350 --> 00:11:39,600  
we have our foundations of

313  
00:11:43,590 --> 00:11:41,360

what we call foundations of mission

314

00:11:46,550 --> 00:11:43,600

operations they're leadership tenants

315

00:11:49,110 --> 00:11:46,560

not unique to fod as we say

316

00:11:50,870 --> 00:11:49,120

but really for uh for any

317

00:11:53,110 --> 00:11:50,880

effort that requires leadership it's

318

00:11:55,269 --> 00:11:53,120

discipline confidence competence

319

00:11:57,030 --> 00:11:55,279

toughness teamwork vigilance and

320

00:11:59,430 --> 00:11:57,040

responsibility and these leadership

321

00:12:01,430 --> 00:11:59,440

attributes that define our culture

322

00:12:04,230 --> 00:12:01,440

and this culture in addition to the

323

00:12:06,310 --> 00:12:04,240

flight rules and procedures is really

324

00:12:08,949 --> 00:12:06,320

what provides the framework for the

325

00:12:11,509 --> 00:12:08,959

critical decisions and the operations

326

00:12:13,030 --> 00:12:11,519

that are dry boring voices you know

327

00:12:15,190 --> 00:12:13,040

because that's what we do on console

328

00:12:18,470 --> 00:12:15,200

when things go wrong and i'm not sure it

329

00:12:21,509 --> 00:12:18,480

quite it quite conveys uh you know the

330

00:12:23,590 --> 00:12:21,519

the situation to to folks out there uh

331

00:12:25,990 --> 00:12:23,600

but you know i decided i'd try a little

332

00:12:27,829 --> 00:12:26,000

bit so hopefully people understand that

333

00:12:30,150 --> 00:12:27,839

you know that's our equivalent of heart

334

00:12:33,829 --> 00:12:30,160

pounding where we have these very calm

335

00:12:35,030 --> 00:12:33,839

faces and sort of monotone

336

00:12:36,310 --> 00:12:35,040

because that's that's what we're trained

337

00:12:37,590 --> 00:12:36,320

to do

338

00:12:39,430 --> 00:12:37,600

yeah and just to add some color

339

00:12:41,590 --> 00:12:39,440

commentary to that one

340

00:12:43,030 --> 00:12:41,600

um i remember that day because i was

341

00:12:44,470 --> 00:12:43,040

with a team that was doing a training

342

00:12:46,870 --> 00:12:44,480

run upstairs

343

00:12:47,590 --> 00:12:46,880

and word spread that

344

00:12:49,430 --> 00:12:47,600

because

345

00:12:51,269 --> 00:12:49,440

it was pretty unusual for progress to

346

00:12:53,110 --> 00:12:51,279

not dock totally normally and so word

347

00:12:54,949 --> 00:12:53,120

had spread upstairs into this and we

348

00:12:56,710 --> 00:12:54,959

pretty much just like everybody took a

349

00:12:58,629 --> 00:12:56,720

pause and we moved our data from our

350

00:13:00,310 --> 00:12:58,639

simulation training data to the

351

00:13:02,870 --> 00:13:00,320

real-time data to just kind of follow

352

00:13:04,870 --> 00:13:02,880

along you know with baited breath from

353

00:13:06,150 --> 00:13:04,880

upstairs to see what are they gonna do

354

00:13:07,430 --> 00:13:06,160

how are they gonna solve the problem you

355

00:13:10,790 --> 00:13:07,440

know we had a whole team that was

356

00:13:12,949 --> 00:13:10,800

following along that really it was it

357

00:13:15,269 --> 00:13:12,959

yes when you describe it technically and

358

00:13:17,030 --> 00:13:15,279

in the moment you can't get all

359

00:13:18,790 --> 00:13:17,040

you know we don't make it a big exciting

360

00:13:20,389 --> 00:13:18,800

event but i will tell you that from

361

00:13:22,150 --> 00:13:20,399

another room in the building having

362

00:13:24,310 --> 00:13:22,160

nothing whatsoever to do with the op we

363

00:13:26,040 --> 00:13:24,320

were all watching because it was a a

364

00:13:27,990 --> 00:13:26,050

kind of a really scary event

365

00:13:29,269 --> 00:13:28,000

[Music]

366

00:13:30,949 --> 00:13:29,279

and i'll uh

367

00:13:33,030 --> 00:13:30,959

let's see brandy i'll i'll jump in kind

368

00:13:34,790 --> 00:13:33,040

of from a program perspective i don't i

369

00:13:37,430 --> 00:13:34,800

don't sit and do the

370

00:13:39,269 --> 00:13:37,440

the actual console work but um you know

371

00:13:41,269 --> 00:13:39,279

i look at from a programmatic

372

00:13:43,269 --> 00:13:41,279

perspective we've asked the flight ops

373

00:13:45,269 --> 00:13:43,279

team you know take care of the crew take

374

00:13:47,189 --> 00:13:45,279

care of the iss

375

00:13:49,509 --> 00:13:47,199

and if something goes wrong you know my

376

00:13:50,870 --> 00:13:49,519

perspective is get us through the shift

377

00:13:51,829 --> 00:13:50,880

get a stable

378

00:13:53,829 --> 00:13:51,839

and then

379

00:13:55,509 --> 00:13:53,839

we'll step back as an integrated group

380

00:13:57,430 --> 00:13:55,519

and take a look and see what our options

381

00:13:58,629 --> 00:13:57,440

are try to figure out how to go how to

382

00:13:59,509 --> 00:13:58,639

go forward

383

00:14:00,949 --> 00:13:59,519

and

384

00:14:02,629 --> 00:14:00,959

at least one of the examples that i can

385

00:14:04,389 --> 00:14:02,639

think of and maybe maybe one of y'all

386

00:14:06,710 --> 00:14:04,399

can help me remember for some reason it

387

00:14:09,350 --> 00:14:06,720

was i think it was 12 8 or 13 a we had a

388

00:14:11,269 --> 00:14:09,360

shuttle shuttle dock to station

389

00:14:13,030 --> 00:14:11,279

and

390

00:14:14,629 --> 00:14:13,040

for whatever reason the russians had a

391

00:14:16,949 --> 00:14:14,639

computer failure

392

00:14:19,189 --> 00:14:16,959

and we thought oh no big deal and then

393

00:14:21,110 --> 00:14:19,199

they had another computer failure and

394

00:14:23,350 --> 00:14:21,120

you're like well that's

395

00:14:25,269 --> 00:14:23,360

you know unfortunate for those guys and

396

00:14:27,750 --> 00:14:25,279

then you realize well that's really

397

00:14:29,990 --> 00:14:27,760

unfortunate for all of us because uh

398

00:14:30,949 --> 00:14:30,000

because we need them in order to be able

399

00:14:33,110 --> 00:14:30,959

to

400

00:14:34,470 --> 00:14:33,120

stabilize the stations so the shuttle

401  
00:14:37,990 --> 00:14:34,480  
can leave

402  
00:14:40,470 --> 00:14:38,000  
and we had absolutely no clue as to what

403  
00:14:41,990 --> 00:14:40,480  
happened with the russian computers the

404  
00:14:43,269 --> 00:14:42,000  
russians didn't really have a good

405  
00:14:45,509 --> 00:14:43,279  
understanding

406  
00:14:48,870 --> 00:14:45,519  
there was

407  
00:14:50,629 --> 00:14:48,880  
concern i'll put it that way because we

408  
00:14:52,790 --> 00:14:50,639  
were really in a situation where we

409  
00:14:54,870 --> 00:14:52,800  
couldn't keep shuttle forever trying to

410  
00:14:57,030 --> 00:14:54,880  
figure out what to do

411  
00:14:59,509 --> 00:14:57,040  
we were concerned about overall

412  
00:15:01,590 --> 00:14:59,519  
maintaining attitude control

413  
00:15:03,189 --> 00:15:01,600

should we try to undock and not have

414

00:15:05,189 --> 00:15:03,199

these computers that could control the

415

00:15:07,189 --> 00:15:05,199

propulsive systems you probably remember

416

00:15:08,069 --> 00:15:07,199

this but anyway um

417

00:15:10,870 --> 00:15:08,079

so

418

00:15:12,629 --> 00:15:10,880

anyway i just remember that was a

419

00:15:14,629 --> 00:15:12,639

very concerning time for us at the

420

00:15:16,550 --> 00:15:14,639

program level because we were still

421

00:15:19,110 --> 00:15:16,560

building station you know we were still

422

00:15:20,949 --> 00:15:19,120

quite a ways from being done and to have

423

00:15:22,710 --> 00:15:20,959

a problem like this where you're really

424

00:15:24,550 --> 00:15:22,720

looking at each other going how are we

425

00:15:27,829 --> 00:15:24,560

going to get out of this i mean this

426

00:15:30,790 --> 00:15:27,839

this could uh you know be a step in a

427

00:15:33,189 --> 00:15:30,800

very bad direction if if we try to let a

428

00:15:34,870 --> 00:15:33,199

shuttle go and not have a good

429

00:15:36,870 --> 00:15:34,880

way of ensuring that we can clear it

430

00:15:40,629 --> 00:15:36,880

from the station without any kind of a

431

00:15:42,629 --> 00:15:40,639

contact so it was uh at least um

432

00:15:44,389 --> 00:15:42,639

over a period of days it was it was

433

00:15:46,230 --> 00:15:44,399

something i think a lot of us lost sleep

434

00:15:47,350 --> 00:15:46,240

over working with the entire team

435

00:15:48,870 --> 00:15:47,360

engineering

436

00:15:50,230 --> 00:15:48,880

our operations team our safety

437

00:15:52,230 --> 00:15:50,240

communities

438

00:15:54,150 --> 00:15:52,240

our partners our russian partners trying

439

00:15:56,949 --> 00:15:54,160

to figure out because it wasn't just as

440

00:15:59,269 --> 00:15:56,959

simple as rebooting that computer and

441

00:16:01,990 --> 00:15:59,279

bringing it back up that it was a much

442

00:16:03,670 --> 00:16:02,000

more involved technical issue that

443

00:16:05,430 --> 00:16:03,680

again kind of felt like it brought us to

444

00:16:07,269 --> 00:16:05,440

our knees there for a period of days and

445

00:16:10,870 --> 00:16:07,279

i assume some of you might might have

446

00:16:13,670 --> 00:16:12,629

yeah so i'll pick up for just a few

447

00:16:16,150 --> 00:16:13,680

minutes because i was actually on

448

00:16:17,910 --> 00:16:16,160

console i worked that i worked that

449

00:16:20,389 --> 00:16:17,920

mission from the flight director console

450

00:16:23,189 --> 00:16:20,399

it was actually my very first

451  
00:16:24,790 --> 00:16:23,199  
joint you know joint mission so i've

452  
00:16:26,470 --> 00:16:24,800  
been certified before that and had

453  
00:16:28,870 --> 00:16:26,480  
worked space station shifts but that was

454  
00:16:30,949 --> 00:16:28,880  
my first first joint mission on the on

455  
00:16:32,230 --> 00:16:30,959  
the iss flight director team so i came

456  
00:16:33,910 --> 00:16:32,240  
in i was the

457  
00:16:37,749 --> 00:16:33,920  
crew overnight shift we put the crew to

458  
00:16:39,910 --> 00:16:37,759  
bed and i came in and and the lead of of

459  
00:16:42,150 --> 00:16:39,920  
our team said well we're

460  
00:16:45,670 --> 00:16:42,160  
in free drift and we can't figure out

461  
00:16:47,509 --> 00:16:45,680  
how to get out of it um we needed the

462  
00:16:49,350 --> 00:16:47,519  
computers on the space station to work

463  
00:16:51,670 --> 00:16:49,360

and then be able to hand back and forth

464

00:16:54,069 --> 00:16:51,680

in terms of the shuttle taking overall

465

00:16:56,230 --> 00:16:54,079

control of the of the combined space

466

00:16:58,150 --> 00:16:56,240

station shuttle um but we were trying to

467

00:17:00,230 --> 00:16:58,160

get back to where the space station you

468

00:17:01,350 --> 00:17:00,240

know took control of that like kenny

469

00:17:03,430 --> 00:17:01,360

said we couldn't couldn't have the

470

00:17:07,029 --> 00:17:03,440

shuttle do that forever

471

00:17:08,630 --> 00:17:07,039

and so i came in and we're free drift

472

00:17:10,230 --> 00:17:08,640

and and we don't know how to get out of

473

00:17:12,390 --> 00:17:10,240

it but here's here's the lesson i

474

00:17:14,630 --> 00:17:12,400

learned right so one of the more senior

475

00:17:15,429 --> 00:17:14,640

uh flight directors was the lead

476

00:17:18,630 --> 00:17:15,439

and

477

00:17:20,390 --> 00:17:18,640

we're figuring out how to get out of

478

00:17:22,230 --> 00:17:20,400

free drift you know what what else can

479

00:17:24,870 --> 00:17:22,240

you do we actually needed to move the

480

00:17:26,549 --> 00:17:24,880

mobile transporter which is um a piece

481

00:17:28,470 --> 00:17:26,559

of equipment where the robotic arm can

482

00:17:30,630 --> 00:17:28,480

ride up and down the length of the space

483

00:17:32,710 --> 00:17:30,640

station to set up for an operation the

484

00:17:34,230 --> 00:17:32,720

next day so you know as a new flight

485

00:17:36,390 --> 00:17:34,240

director you're just you're kind of like

486

00:17:39,270 --> 00:17:36,400

okay here's our problem you know she was

487

00:17:42,150 --> 00:17:39,280

looking up and out like hey let's keep

488

00:17:44,230 --> 00:17:42,160

moving forward safely while we're still

489

00:17:46,310 --> 00:17:44,240

solving this really bad problem over

490

00:17:48,310 --> 00:17:46,320

here you know it was in my early flight

491

00:17:49,909 --> 00:17:48,320

director career one of the the most

492

00:17:52,390 --> 00:17:49,919

important lessons that i've learned what

493

00:17:54,390 --> 00:17:52,400

can you do to move forward even when

494

00:17:56,150 --> 00:17:54,400

faced with a problem that right now you

495

00:17:58,549 --> 00:17:56,160

don't know how to solve how do you move

496

00:18:00,070 --> 00:17:58,559

forward you know safely of course and so

497

00:18:01,430 --> 00:18:00,080

we move the mobile transporter because

498

00:18:03,350 --> 00:18:01,440

we had to be free drift to do that

499

00:18:05,350 --> 00:18:03,360

anyway we happen to already be free

500

00:18:06,950 --> 00:18:05,360

drift while we're over here trying to

501  
00:18:08,950 --> 00:18:06,960  
figure out how to solve the problem the

502  
00:18:10,470 --> 00:18:08,960  
other piece of that is when you have a

503  
00:18:13,590 --> 00:18:10,480  
problem that big

504  
00:18:15,669 --> 00:18:13,600  
everyone just shows up like it's amazing

505  
00:18:17,669 --> 00:18:15,679  
you don't have to make phone calls

506  
00:18:19,110 --> 00:18:17,679  
people just know like emily was saying

507  
00:18:20,630 --> 00:18:19,120  
earlier the team in the other room's

508  
00:18:23,110 --> 00:18:20,640  
looking at the data everybody's at home

509  
00:18:24,870 --> 00:18:23,120  
watching nasa tv you know people are

510  
00:18:26,310 --> 00:18:24,880  
getting things on their phones now more

511  
00:18:29,110 --> 00:18:26,320  
than they used to because phones are a

512  
00:18:31,510 --> 00:18:29,120  
little more more uh prevalent now but

513  
00:18:33,990 --> 00:18:31,520

but the data just gets out and people

514

00:18:35,590 --> 00:18:34,000

just show up what can i do to help and

515

00:18:37,510 --> 00:18:35,600

and we formulate what's called a team

516

00:18:39,669 --> 00:18:37,520

four where you have a another set of

517

00:18:41,909 --> 00:18:39,679

folks go really really focus on that

518

00:18:44,150 --> 00:18:41,919

problem leaving us in the control room

519

00:18:46,390 --> 00:18:44,160

again to continue flying the mission as

520

00:18:48,150 --> 00:18:46,400

much progress as we could make safely so

521

00:18:49,110 --> 00:18:48,160

you know those are like two of my

522

00:18:51,430 --> 00:18:49,120

biggest

523

00:18:54,070 --> 00:18:51,440

flight director lessons that that i

524

00:18:55,430 --> 00:18:54,080

carry with me from from that specific

525

00:19:00,070 --> 00:18:55,440

incident that

526

00:19:02,870 --> 00:19:01,110

now

527

00:19:04,950 --> 00:19:02,880

i'll just add one quick thing so i

528

00:19:07,190 --> 00:19:04,960

actually started at nasa about two weeks

529

00:19:09,270 --> 00:19:07,200

after that shuttle flight and it was the

530

00:19:11,510 --> 00:19:09,280

biggest buzz in town i mean the amount

531

00:19:12,870 --> 00:19:11,520

of conversations that happened after

532

00:19:15,029 --> 00:19:12,880

that shuttle flight and all the things

533

00:19:17,590 --> 00:19:15,039

that the team had done to recover i mean

534

00:19:19,830 --> 00:19:17,600

that was sort of my getting my feet wet

535

00:19:23,190 --> 00:19:19,840

and really learning all about what fod

536

00:19:27,430 --> 00:19:23,200

does it was a great experience to start

537

00:19:30,230 --> 00:19:28,549

yeah that

538

00:19:32,390 --> 00:19:30,240

that's so that's so cool i feel like we

539

00:19:35,350 --> 00:19:32,400

could listen to your battle stories

540

00:19:37,110 --> 00:19:35,360

for a long time but um i know you've got

541

00:19:39,510 --> 00:19:37,120

other things to get to today but i did

542

00:19:42,390 --> 00:19:39,520

want to wrap up a little bit by talking

543

00:19:44,470 --> 00:19:42,400

kind of um about how

544

00:19:47,110 --> 00:19:44,480

uh flight direct flight operations

545

00:19:49,190 --> 00:19:47,120

directorate is is still evolving as we

546

00:19:50,150 --> 00:19:49,200

have new programs coming online i know

547

00:19:53,270 --> 00:19:50,160

um

548

00:19:55,830 --> 00:19:53,280

holly you supported the the first uh

549

00:19:57,909 --> 00:19:55,840

spacex cargo mission and puja i think is

550

00:20:00,150 --> 00:19:57,919

getting ready to support the first

551  
00:20:02,390 --> 00:20:00,160  
boeing commercial crew mission as well

552  
00:20:05,350 --> 00:20:02,400  
so um maybe you guys could talk a little

553  
00:20:06,950 --> 00:20:05,360  
bit about um about how things are how

554  
00:20:09,270 --> 00:20:06,960  
we're adapting to those those new

555  
00:20:11,190 --> 00:20:09,280  
demands

556  
00:20:13,990 --> 00:20:11,200  
yeah so you could probably do an entire

557  
00:20:16,470 --> 00:20:14,000  
panel on just that topic right um kenny

558  
00:20:18,230 --> 00:20:16,480  
kenny was there as well norm was sitting

559  
00:20:19,909 --> 00:20:18,240  
behind me so i was the

560  
00:20:21,990 --> 00:20:19,919  
uh the flight director the nasa flight

561  
00:20:23,669 --> 00:20:22,000  
character sitting in the iss you know

562  
00:20:25,190 --> 00:20:23,679  
flight control room responsible for the

563  
00:20:28,390 --> 00:20:25,200

very first dragon that came to the space

564

00:20:31,990 --> 00:20:28,400

station so this is 2012. um to put that

565

00:20:34,789 --> 00:20:32,000

in perspective we've now done over 20 of

566

00:20:37,990 --> 00:20:34,799

those if you count that demonstration

567

00:20:40,549 --> 00:20:38,000

headed into uh the 21st under under the

568

00:20:43,430 --> 00:20:40,559

the space station cargo contract so i

569

00:20:46,470 --> 00:20:43,440

mean two ish a year for the last you

570

00:20:48,789 --> 00:20:46,480

know almost almost 10 years now so

571

00:20:49,990 --> 00:20:48,799

um amazing to see how far we've come you

572

00:20:51,029 --> 00:20:50,000

know when you sit there the first time

573

00:20:53,190 --> 00:20:51,039

we talked about this when we talked

574

00:20:55,750 --> 00:20:53,200

about expedition one right you've put

575

00:20:57,190 --> 00:20:55,760

all this blood sweat and tears planning

576

00:20:59,270 --> 00:20:57,200

trying to figure out how to do this

577

00:21:01,350 --> 00:20:59,280

again kenny remembers all of this and

578

00:21:03,750 --> 00:21:01,360

then and then you go live and it doesn't

579

00:21:05,029 --> 00:21:03,760

it doesn't work exactly like you planned

580

00:21:06,549 --> 00:21:05,039

and that's where we really get to do our

581

00:21:07,990 --> 00:21:06,559

jobs that's right that's what they pay

582

00:21:11,270 --> 00:21:08,000

us for right is to figure those things

583

00:21:13,029 --> 00:21:11,280

out and so um we got about you know 120

584

00:21:15,190 --> 00:21:13,039

meters from the space station and our

585

00:21:18,549 --> 00:21:15,200

navigation sensors that communicated

586

00:21:20,230 --> 00:21:18,559

with the spacex dragon um didn't didn't

587

00:21:21,830 --> 00:21:20,240

look quite right so we got to sit there

588

00:21:24,070 --> 00:21:21,840

for a little while and and figure out

589

00:21:26,710 --> 00:21:24,080

how we were gonna get a manage that in

590

00:21:29,190 --> 00:21:26,720

order to get uh the two vehicles to

591

00:21:30,390 --> 00:21:29,200

communicate and navigate and navigate in

592

00:21:32,070 --> 00:21:30,400

safely

593

00:21:33,669 --> 00:21:32,080

and ultimately we did figure it out it's

594

00:21:35,510 --> 00:21:33,679

another one of those stories where like

595

00:21:37,669 --> 00:21:35,520

literally heart pounding

596

00:21:39,190 --> 00:21:37,679

but you know when you tell it afterwards

597

00:21:40,950 --> 00:21:39,200

it's like okay well we sat there and

598

00:21:43,110 --> 00:21:40,960

calmly worked through it you know we had

599

00:21:44,710 --> 00:21:43,120

our engineering support we had the

600

00:21:47,190 --> 00:21:44,720

program folks you know kenny was in the

601  
00:21:49,590 --> 00:21:47,200  
other room norm sitting behind me and

602  
00:21:51,110 --> 00:21:49,600  
and we figured out what to do and and do

603  
00:21:53,190 --> 00:21:51,120  
it safely and we're able to bring the

604  
00:21:56,070 --> 00:21:53,200  
vehicle in we did have to sit you know

605  
00:21:57,990 --> 00:21:56,080  
120 meters from the space station for

606  
00:21:59,510 --> 00:21:58,000  
for a while uh making sure our

607  
00:22:01,350 --> 00:21:59,520  
navigation sensors were working

608  
00:22:04,070 --> 00:22:01,360  
correctly between the two vehicles and

609  
00:22:06,070 --> 00:22:04,080  
so you know from my standpoint you look

610  
00:22:09,190 --> 00:22:06,080  
back and now where we are with

611  
00:22:11,510 --> 00:22:09,200  
commercial um is really amazing you know

612  
00:22:13,830 --> 00:22:11,520  
a tipping point in in human space flight

613  
00:22:15,750 --> 00:22:13,840

for us to be able to incorporate a

614

00:22:18,630 --> 00:22:15,760

commercial partner and and bring them

615

00:22:21,270 --> 00:22:18,640

safely into the space station um but to

616

00:22:23,669 --> 00:22:21,280

us right who started you know at the

617

00:22:27,190 --> 00:22:23,679

beginning of the space station it was

618

00:22:29,110 --> 00:22:27,200

just another opportunity right we we had

619

00:22:31,029 --> 00:22:29,120

done expedition one we had figured out

620

00:22:32,710 --> 00:22:31,039

how to incorporate you know over time

621

00:22:34,710 --> 00:22:32,720

all of our international partners add

622

00:22:36,950 --> 00:22:34,720

their modules and their vehicles to the

623

00:22:40,070 --> 00:22:36,960

space station and this was just one more

624

00:22:42,710 --> 00:22:40,080

in a in a continuum and and so we look

625

00:22:45,029 --> 00:22:42,720

forward now with all of the the pieces

626  
00:22:47,909 --> 00:22:45,039  
that we continue to do on space station

627  
00:22:49,990 --> 00:22:47,919  
and you know on into artemis and and for

628  
00:22:51,990 --> 00:22:50,000  
us that's you know

629  
00:22:53,350 --> 00:22:52,000  
continuing to build on the skills and

630  
00:22:55,510 --> 00:22:53,360  
and the culture you know at the end of

631  
00:22:58,070 --> 00:22:55,520  
the day it's about relationships and

632  
00:22:59,430 --> 00:22:58,080  
teamwork and trust and and you go and

633  
00:23:02,149 --> 00:22:59,440  
you figure out

634  
00:23:04,230 --> 00:23:02,159  
that that combination with with every

635  
00:23:06,310 --> 00:23:04,240  
partner with every provider with every

636  
00:23:08,230 --> 00:23:06,320  
team that we interact with and you know

637  
00:23:09,830 --> 00:23:08,240  
that's really the amazing thing to me

638  
00:23:11,990 --> 00:23:09,840

about the international space station

639

00:23:13,510 --> 00:23:12,000

one of the most amazing things and so

640

00:23:15,190 --> 00:23:13,520

again i could talk forever but you know

641

00:23:18,230 --> 00:23:15,200

kenny and norm were there as well so

642

00:23:20,230 --> 00:23:18,240

i'll all hand to them

643

00:23:22,549 --> 00:23:20,240

well i'll provide just one aspect of it

644

00:23:24,549 --> 00:23:22,559

that holly hit on and it's the teamwork

645

00:23:26,710 --> 00:23:24,559

in its relationships and

646

00:23:28,549 --> 00:23:26,720

and you know it was a fantastic day to

647

00:23:30,789 --> 00:23:28,559

get dragon birth but if you look at the

648

00:23:32,470 --> 00:23:30,799

journey to get there um

649

00:23:35,110 --> 00:23:32,480

that that was

650

00:23:37,510 --> 00:23:35,120

really what made it special because

651  
00:23:39,270 --> 00:23:37,520  
you know the the commercial cargo came

652  
00:23:41,430 --> 00:23:39,280  
on the heels of the constellation

653  
00:23:42,870 --> 00:23:41,440  
program being cancelled nasa deferring

654  
00:23:45,909 --> 00:23:42,880  
funds from

655  
00:23:47,830 --> 00:23:45,919  
um government type work into to more of

656  
00:23:50,470 --> 00:23:47,840  
the private and commercial industries to

657  
00:23:52,549 --> 00:23:50,480  
where nasa buys a service instead of

658  
00:23:53,909 --> 00:23:52,559  
actually building a vehicle so that was

659  
00:23:54,630 --> 00:23:53,919  
the forefront of that and i'll tell you

660  
00:23:55,350 --> 00:23:54,640  
that

661  
00:23:57,350 --> 00:23:55,360  
the

662  
00:23:59,669 --> 00:23:57,360  
dynamics between

663  
00:24:02,149 --> 00:23:59,679

commercial and nasa and government at

664

00:24:03,990 --> 00:24:02,159

that point was pretty toxic it was you

665

00:24:06,630 --> 00:24:04,000

know nasa funding has gone down it was

666

00:24:08,630 --> 00:24:06,640

given to commercial it was just

667

00:24:11,909 --> 00:24:08,640

the timing was bad and the environment

668

00:24:14,230 --> 00:24:11,919

was was not great and it really took

669

00:24:15,750 --> 00:24:14,240

you know holly and her team and kenny

670

00:24:18,390 --> 00:24:15,760

and the programs

671

00:24:21,190 --> 00:24:18,400

to to really start helping

672

00:24:23,029 --> 00:24:21,200

um build trust as holly said because we

673

00:24:25,750 --> 00:24:23,039

were doing a lot of finger pointing back

674

00:24:27,750 --> 00:24:25,760

and forth and it was getting us nowhere

675

00:24:29,669 --> 00:24:27,760

uh and until you know those

676

00:24:31,269 --> 00:24:29,679

relationships started to be built the

677

00:24:33,590 --> 00:24:31,279

trust started to be

678

00:24:35,990 --> 00:24:33,600

uh instilled in that you need us and

679

00:24:37,750 --> 00:24:36,000

nasa recognizes that we needed them as

680

00:24:39,510 --> 00:24:37,760

well we're not the enemy we're the

681

00:24:41,830 --> 00:24:39,520

solution so are they and we have to work

682

00:24:43,190 --> 00:24:41,840

together so we started focusing instead

683

00:24:45,750 --> 00:24:43,200

of pointing at each other we're pointing

684

00:24:49,029 --> 00:24:45,760

now at a common goal that common goal of

685

00:24:50,710 --> 00:24:49,039

successful commercial cargo and that is

686

00:24:52,310 --> 00:24:50,720

the foundation and the success of that

687

00:24:53,909 --> 00:24:52,320

is a foundation we're resting on today

688

00:24:56,390 --> 00:24:53,919

with commercial crew it's what we're

689

00:24:59,430 --> 00:24:56,400

going into with the uh gateway and human

690

00:25:01,350 --> 00:24:59,440

landing system and and it all goes back

691

00:25:03,909 --> 00:25:01,360

to that so leadership matters

692

00:25:06,710 --> 00:25:03,919

relationships matter and people and

693

00:25:07,150 --> 00:25:06,720

trust matter so uh just a great success

694

00:25:09,430 --> 00:25:07,160

story

695

00:25:11,669 --> 00:25:09,440

[Music]

696

00:25:12,870 --> 00:25:11,679

let's see and and norm f absolutely i

697

00:25:15,190 --> 00:25:12,880

agree with

698

00:25:17,750 --> 00:25:15,200

you and holly both i mean

699

00:25:19,669 --> 00:25:17,760

if we look back at when station started

700

00:25:22,310 --> 00:25:19,679

did we know that we were going to end up

701  
00:25:24,070 --> 00:25:22,320  
in this model uh not not necessarily i

702  
00:25:25,510 --> 00:25:24,080  
mean we sort of had to adapt the mission

703  
00:25:27,510 --> 00:25:25,520  
along the way

704  
00:25:29,590 --> 00:25:27,520  
based on on the guidance and direction

705  
00:25:31,269 --> 00:25:29,600  
that we've been given and

706  
00:25:33,750 --> 00:25:31,279  
and again that brought some new people

707  
00:25:35,350 --> 00:25:33,760  
into our our circle that we didn't

708  
00:25:37,430 --> 00:25:35,360  
didn't know about when we started this

709  
00:25:39,350 --> 00:25:37,440  
but but um

710  
00:25:41,990 --> 00:25:39,360  
one thing i talk to people about

711  
00:25:44,549 --> 00:25:42,000  
up and out a lot is is the fact that

712  
00:25:46,950 --> 00:25:44,559  
that we have a space station culture

713  
00:25:48,310 --> 00:25:46,960

there's not you know every partner every

714

00:25:50,390 --> 00:25:48,320

whether it's commercial or whether it's

715

00:25:52,549 --> 00:25:50,400

international everybody brings

716

00:25:54,310 --> 00:25:52,559

their aspect of how to do things and how

717

00:25:56,710 --> 00:25:54,320

to look at problems and how to look at

718

00:25:58,549 --> 00:25:56,720

challenges and and how to accomplish

719

00:26:00,870 --> 00:25:58,559

things in their own way but at the end

720

00:26:02,789 --> 00:26:00,880

of the day you have to figure out how to

721

00:26:04,549 --> 00:26:02,799

to make that work with everybody else

722

00:26:06,950 --> 00:26:04,559

and and what ultimately comes out of

723

00:26:09,510 --> 00:26:06,960

that mix mixer if you will is a is a

724

00:26:11,830 --> 00:26:09,520

space station culture and and we

725

00:26:13,190 --> 00:26:11,840

understand each other um i like to tell

726

00:26:14,630 --> 00:26:13,200

people you know the technical problems

727

00:26:16,230 --> 00:26:14,640

don't really know international

728

00:26:18,390 --> 00:26:16,240

boundaries they don't know contractual

729

00:26:20,230 --> 00:26:18,400

boundaries they are problems uh you know

730

00:26:22,070 --> 00:26:20,240

you solve them the same way the physics

731

00:26:24,630 --> 00:26:22,080

doesn't change just because you talk a

732

00:26:25,990 --> 00:26:24,640

different language and so you have to

733

00:26:28,310 --> 00:26:26,000

get together you have to figure out how

734

00:26:30,549 --> 00:26:28,320

to work together to do that and and i

735

00:26:32,470 --> 00:26:30,559

and we did it early on with the partners

736

00:26:33,909 --> 00:26:32,480

our international partners and i think

737

00:26:36,070 --> 00:26:33,919

with our commercial friends we're

738

00:26:38,310 --> 00:26:36,080

starting to see that same thing as as

739

00:26:40,789 --> 00:26:38,320

both holly and norm talked about uh you

740

00:26:42,470 --> 00:26:40,799

know the the early part that storming

741

00:26:44,149 --> 00:26:42,480

forming norming thing that there was a

742

00:26:46,630 --> 00:26:44,159

little bit of storming early on and it

743

00:26:49,029 --> 00:26:46,640

took us a little bit but uh i think uh

744

00:26:50,070 --> 00:26:49,039

in the end you know we had arrived at a

745

00:26:51,830 --> 00:26:50,080

kind of a

746

00:26:53,590 --> 00:26:51,840

cultural understanding of how to get

747

00:26:56,549 --> 00:26:53,600

things done and it's been extremely

748

00:26:57,909 --> 00:26:56,559

successful and and um uh you know i

749

00:26:59,909 --> 00:26:57,919

think it's gonna carry us forward as

750

00:27:01,190 --> 00:26:59,919

norm said as we as we start to not just

751

00:27:03,350 --> 00:27:01,200

work with international partners but

752

00:27:05,669 --> 00:27:03,360

also commercial partners and and trying

753

00:27:09,510 --> 00:27:05,679

to uh to go live around the moon and and

754

00:27:13,110 --> 00:27:11,110

yeah

755

00:27:14,789 --> 00:27:13,120

i was just going to mention that i think

756

00:27:16,230 --> 00:27:14,799

this is also just a very exciting time

757

00:27:18,470 --> 00:27:16,240

for younger generations you know the

758

00:27:20,789 --> 00:27:18,480

last time we flew off of u.s soil was in

759

00:27:22,070 --> 00:27:20,799

2011 for our last shuttle flight and so

760

00:27:25,510 --> 00:27:22,080

to get to see

761

00:27:27,110 --> 00:27:25,520

uh dm2 the summer fly i mean it was the

762

00:27:28,470 --> 00:27:27,120

buzz around town it was the buzz around

763

00:27:30,149 --> 00:27:28,480

the world you know to get to see these

764

00:27:32,870 --> 00:27:30,159

astronauts go to the international space

765

00:27:34,230 --> 00:27:32,880

station and fly off of us soil and i

766

00:27:35,750 --> 00:27:34,240

think the spacex team is doing an

767

00:27:37,909 --> 00:27:35,760

outstanding job and we have a you know

768

00:27:40,230 --> 00:27:37,919

flight coming up in the next few weeks

769

00:27:41,909 --> 00:27:40,240

as well as boeing working really hard um

770

00:27:43,269 --> 00:27:41,919

to do the same thing so i think you know

771

00:27:46,389 --> 00:27:43,279

the next few years are going to be super

772

00:27:49,669 --> 00:27:47,990

definitely a lot of excitement these

773

00:27:50,470 --> 00:27:49,679

past 20 years a lot more excitement to

774

00:27:52,470 --> 00:27:50,480

come

775

00:27:53,750 --> 00:27:52,480

i think we are just about pretty pretty

776

00:27:55,510 --> 00:27:53,760

much out of time so but i do want to

777

00:27:56,950 --> 00:27:55,520

give um norm a chance to just kind of

778

00:27:58,700 --> 00:27:56,960

wrap up for us a little bit what we've

779

00:28:00,389 --> 00:27:58,710

talked about today

780

00:28:03,110 --> 00:28:00,399

[Music]

781

00:28:05,830 --> 00:28:03,120

well randy great discussion great panel

782

00:28:07,830 --> 00:28:05,840

and you know i don't know how many folks

783

00:28:09,909 --> 00:28:07,840

have had the opportunity to uh go out

784

00:28:11,750 --> 00:28:09,919

and see an iss viewing where you go out

785

00:28:12,950 --> 00:28:11,760

and look in the night sky early morning

786

00:28:16,149 --> 00:28:12,960

sky

787

00:28:18,149 --> 00:28:16,159

and see a station fly over but if if

788

00:28:19,830 --> 00:28:18,159

you've not had that opportunity

789

00:28:21,590 --> 00:28:19,840

go do so because

790

00:28:24,789 --> 00:28:21,600

you know the station didn't happen on

791

00:28:27,669 --> 00:28:24,799

its own uh it was you know one vote in

792

00:28:29,750 --> 00:28:27,679

congress it took a lot of uh

793

00:28:31,669 --> 00:28:29,760

teams to put this orbiting

794

00:28:34,310 --> 00:28:31,679

outpost in orbit

795

00:28:36,149 --> 00:28:34,320

and so when you look up at this um

796

00:28:38,149 --> 00:28:36,159

this magnificent laboratory that's the

797

00:28:41,029 --> 00:28:38,159

size of a football field it's nearly a

798

00:28:42,070 --> 00:28:41,039

million pounds of mass

799

00:28:43,590 --> 00:28:42,080

in orbit

800

00:28:44,710 --> 00:28:43,600

orbiting the earth about every 90

801  
00:28:46,389 --> 00:28:44,720  
minutes

802  
00:28:47,909 --> 00:28:46,399  
you realize it's real there's human

803  
00:28:50,389 --> 00:28:47,919  
presence on board there's been human

804  
00:28:51,190 --> 00:28:50,399  
presence for the last 20 years

805  
00:28:52,230 --> 00:28:51,200  
and

806  
00:28:54,310 --> 00:28:52,240  
you know

807  
00:28:57,269 --> 00:28:54,320  
it really is an engineering marvel and

808  
00:28:59,350 --> 00:28:57,279  
and to me miracles

809  
00:29:01,029 --> 00:28:59,360  
you know miracles do happen when you

810  
00:29:02,630 --> 00:29:01,039  
have a vision

811  
00:29:05,430 --> 00:29:02,640  
uh you provide the leadership the

812  
00:29:08,149 --> 00:29:05,440  
perseverance the political support

813  
00:29:10,870 --> 00:29:08,159

and and teams that manage this thing day

814

00:29:13,190 --> 00:29:10,880

in and day out and have been doing that

815

00:29:14,870 --> 00:29:13,200

for the past 20 years it's it's

816

00:29:16,310 --> 00:29:14,880

incredible and

817

00:29:19,110 --> 00:29:16,320

you know it's a great orbiting uh

818

00:29:22,789 --> 00:29:19,120

laboratory for science and research

819

00:29:24,950 --> 00:29:22,799

and it's also being used as a great um

820

00:29:28,470 --> 00:29:24,960

platform for developing hardware that's

821

00:29:31,990 --> 00:29:28,480

going to evolve us to the moon in mars

822

00:29:34,549 --> 00:29:32,000

and beyond so this is amazing 20 years

823

00:29:36,630 --> 00:29:34,559

has gone by in a blink of an eye

824

00:29:39,190 --> 00:29:36,640

but the relationships and the teams that

825

00:29:40,789 --> 00:29:39,200

have made this all happen or what's

826

00:29:42,950 --> 00:29:40,799

going to evolve us

827

00:29:45,430 --> 00:29:42,960

to getting on the moon by 2024 and

828

00:29:47,830 --> 00:29:45,440

making that a reality as well so

829

00:29:49,750 --> 00:29:47,840

i think i can speak for all of us that

830

00:29:51,190 --> 00:29:49,760

you know being part of this is just

831

00:29:52,630 --> 00:29:51,200

really special

832

00:29:54,630 --> 00:29:52,640

and

833

00:29:56,070 --> 00:29:54,640

just really glad to be here today with

834

00:29:58,470 --> 00:29:56,080

our friends and see

835

00:30:01,029 --> 00:29:58,480

uh just what this has become and how

836

00:30:03,669 --> 00:30:01,039

it's evolving even into the future so

837

00:30:05,190 --> 00:30:03,679

i'll leave you with that

838

00:30:07,110 --> 00:30:05,200

thank you so much norm that's a great

839

00:30:08,950 --> 00:30:07,120

idea definitely go out in a way that

840

00:30:10,950 --> 00:30:08,960

kate sergey and sergey as they are

841

00:30:12,310 --> 00:30:10,960

flying over and then later this month

842

00:30:14,310 --> 00:30:12,320

you'll get a chance to cheer on the crew

843

00:30:16,789 --> 00:30:14,320

one crew as they launch to the space

844

00:30:19,190 --> 00:30:16,799

station on our spacex dragon as well

845

00:30:21,430 --> 00:30:19,200

um this is just the second in a series

846

00:30:23,990 --> 00:30:21,440

of six panels so you're going to want to

847

00:30:25,909 --> 00:30:24,000

watch out for the rest of this series

848

00:30:27,430 --> 00:30:25,919

coming up is going to be all about

849

00:30:29,750 --> 00:30:27,440

science that's the next one that we'll

850

00:30:31,750 --> 00:30:29,760

be holding so you can watch out for that

851  
00:30:33,190 --> 00:30:31,760  
thank you so much for joining us today

852  
00:30:49,010 --> 00:30:33,200  
and uh

853  
00:30:49,020 --> 00:31:13,509  
[Music]

854  
00:31:19,110 --> 00:31:15,750  
throughout my career at the european

855  
00:31:21,110 --> 00:31:19,120  
space agency

856  
00:31:23,669 --> 00:31:21,120  
i passed many significant events in

857  
00:31:24,950 --> 00:31:23,679  
iza's history

858  
00:31:26,310 --> 00:31:24,960  
milestones