



Google+



Tom Miller

NASA Dryden, Global Hawk Project Pilot



1  
00:00:10,230 --> 00:00:07,990  
hi good afternoon i'm rob gutrow from

2  
00:00:11,830 --> 00:00:10,240  
nasa's goddard space flight center

3  
00:00:13,669 --> 00:00:11,840  
in the office of communications also

4  
00:00:16,790 --> 00:00:13,679  
manager of the nasa hurricane page we're

5  
00:00:19,590 --> 00:00:16,800  
here today for uh an hs3 google hangout

6  
00:00:21,029 --> 00:00:19,600  
hs3 means hurricane and severe storm

7  
00:00:23,029 --> 00:00:21,039  
sentinel

8  
00:00:25,429 --> 00:00:23,039  
google hangout

9  
00:00:27,589 --> 00:00:25,439  
the hs3 mission is a five year mission

10  
00:00:29,269 --> 00:00:27,599  
this is the second year of the mission

11  
00:00:30,390 --> 00:00:29,279  
and we'll be finding out what's brand

12  
00:00:32,709 --> 00:00:30,400  
new for this year

13  
00:00:35,910 --> 00:00:32,719

with our four panelists

14

00:00:37,670 --> 00:00:35,920

just a little bit about the hs3 mission

15

00:00:39,350 --> 00:00:37,680

the hs3 mission

16

00:00:41,430 --> 00:00:39,360

purpose is to

17

00:00:43,590 --> 00:00:41,440

investigate the processes that underlie

18

00:00:45,430 --> 00:00:43,600

hurricane formation and the intensity

19

00:00:48,069 --> 00:00:45,440

changes of tropical cyclones in the

20

00:00:50,790 --> 00:00:48,079

atlantic ocean among those factors hs3

21

00:00:54,310 --> 00:00:50,800

will address the controversial

22

00:00:56,830 --> 00:00:54,320

hot dry and dusty saharan air layer

23

00:00:58,630 --> 00:00:56,840

in tropical storm formation and

24

00:01:01,510 --> 00:00:58,640

intensification and the extent to which

25

00:01:03,510 --> 00:01:01,520

the deep convection of the inner core of

26

00:01:06,149 --> 00:01:03,520

those storms

27

00:01:08,789 --> 00:01:06,159

is the key driver of intensity change

28

00:01:11,350 --> 00:01:08,799

the hs3 mentioned will run between

29

00:01:13,510 --> 00:01:11,360

august 20th and september 23rd based at

30

00:01:15,670 --> 00:01:13,520

wallops flight facility in wallops

31

00:01:19,190 --> 00:01:15,680

island virginia

32

00:01:20,710 --> 00:01:19,200

the hs3 mission page is [nasa.gov](http://nasa.gov)

33

00:01:22,149 --> 00:01:20,720

hs3

34

00:01:24,390 --> 00:01:22,159

we will be taking questions at the end

35

00:01:26,710 --> 00:01:24,400

of the hangout and you can make some

36

00:01:28,070 --> 00:01:26,720

comments and questions in the youtube

37

00:01:33,030 --> 00:01:28,080

comments section

38

00:01:35,670 --> 00:01:33,040

on twitter at hashtag nasahs3

39

00:01:38,069 --> 00:01:35,680

and also on the google plus page

40

00:01:40,950 --> 00:01:38,079

our participants today include dr scott

41

00:01:44,550 --> 00:01:40,960

brown he is the principal investigator

42

00:01:47,350 --> 00:01:44,560

tom miller a nasa global hawk pilot

43

00:01:49,190 --> 00:01:47,360

uh live from the airplane hangar at

44

00:01:51,590 --> 00:01:49,200

dryden so you'll be able to see the

45

00:01:54,630 --> 00:01:51,600

global hawk behind him

46

00:01:55,670 --> 00:01:54,640

marilyn vasquez the hs3 project manager

47

00:01:58,469 --> 00:01:55,680

and

48

00:02:00,230 --> 00:01:58,479

our guest brian mcnulty

49

00:02:02,950 --> 00:02:00,240

a senior research associate at the

50

00:02:05,670 --> 00:02:02,960

university of miami's rosenstiel school

51  
00:02:08,309 --> 00:02:05,680  
of marine and atmospheric sciences and a

52  
00:02:09,910 --> 00:02:08,319  
capital weather gang columnist so we're

53  
00:02:12,550 --> 00:02:09,920  
going to start the google hangout by

54  
00:02:14,229 --> 00:02:12,560  
going over to dr scott brown he's a

55  
00:02:15,910 --> 00:02:14,239  
research meteorologist here at nasa's

56  
00:02:17,350 --> 00:02:15,920  
goddard space flight center in greenbelt

57  
00:02:19,110 --> 00:02:17,360  
and he studies hurricanes from the

58  
00:02:20,470 --> 00:02:19,120  
inside and out

59  
00:02:23,270 --> 00:02:20,480  
he was

60  
00:02:25,589 --> 00:02:23,280  
the hs3 principal mission investigator

61  
00:02:28,309 --> 00:02:25,599  
last year and again this year um he

62  
00:02:29,830 --> 00:02:28,319  
leads a diverse team of scientists and

63  
00:02:31,110 --> 00:02:29,840

instrument uh

64

00:02:33,430 --> 00:02:31,120

specialists

65

00:02:35,910 --> 00:02:33,440

to investigate hurricanes and conduct

66

00:02:38,470 --> 00:02:35,920

experiments using unmanned aircraft to

67

00:02:40,309 --> 00:02:38,480

better understand the conditions that

68

00:02:43,350 --> 00:02:40,319

favor the storm formation and the

69

00:02:45,670 --> 00:02:43,360

development of major hurricanes and

70

00:02:47,350 --> 00:02:45,680

here's dr scott brown to talk about

71

00:02:50,150 --> 00:02:47,360

what's new with the hs3 mission this

72

00:02:52,710 --> 00:02:50,160

year and the science behind it scott

73

00:02:55,350 --> 00:02:52,720

okay thanks rob well as rob

74

00:02:57,430 --> 00:02:55,360

said we're uh studying the processes

75

00:02:59,509 --> 00:02:57,440

that affect storm formation and

76  
00:03:01,430 --> 00:02:59,519  
intensity change and we're particularly

77  
00:03:03,830 --> 00:03:01,440  
interested in the relative roles of the

78  
00:03:06,710 --> 00:03:03,840  
large scale environment and inner core

79  
00:03:09,589 --> 00:03:08,630  
and that in terms of the environment one

80  
00:03:12,070 --> 00:03:09,599  
of the things we're particularly

81  
00:03:14,070 --> 00:03:12,080  
interested in is the saharan air layer

82  
00:03:15,589 --> 00:03:14,080  
which has been controversial late

83  
00:03:17,430 --> 00:03:15,599  
there's been a number of studies early

84  
00:03:19,990 --> 00:03:17,440  
on that suggests that it can have a

85  
00:03:21,830 --> 00:03:20,000  
positive influence on storm growth

86  
00:03:23,990 --> 00:03:21,840  
and that it aids storm formation and

87  
00:03:25,830 --> 00:03:24,000  
intensification and a number of studies

88  
00:03:27,430 --> 00:03:25,840

that suggest that it actually has an

89

00:03:29,030 --> 00:03:27,440

inhibiting effect on storm

90

00:03:31,350 --> 00:03:29,040

intensification

91

00:03:32,789 --> 00:03:31,360

in addition we're very interested in

92

00:03:35,350 --> 00:03:32,799

what happens in the inner core in

93

00:03:37,430 --> 00:03:35,360

particular with very deep thunderstorms

94

00:03:40,309 --> 00:03:37,440

also called hot towers

95

00:03:42,229 --> 00:03:40,319

um and some studies have suggested that

96

00:03:44,470 --> 00:03:42,239

when these hot towers are seen within

97

00:03:46,550 --> 00:03:44,480

the eye wall of a hurricane the storm is

98

00:03:48,630 --> 00:03:46,560

more likely to undergo intensification

99

00:03:50,710 --> 00:03:48,640

in the day that follows whereas if a

100

00:03:53,350 --> 00:03:50,720

tower is not seen

101  
00:03:55,670 --> 00:03:53,360  
they tend either not to intensify or to

102  
00:03:58,470 --> 00:03:55,680  
weaken but it's still not clear whether

103  
00:04:00,550 --> 00:03:58,480  
these hot towers are playing an active

104  
00:04:02,229 --> 00:04:00,560  
key role in the development or if

105  
00:04:04,149 --> 00:04:02,239  
they're maybe more of a passive

106  
00:04:06,470 --> 00:04:04,159  
indicator of other processes that are

107  
00:04:08,710 --> 00:04:06,480  
leading to the intensification and so

108  
00:04:10,390 --> 00:04:08,720  
hs3 was really designed to try and look

109  
00:04:11,509 --> 00:04:10,400  
at both the environmental aspect of the

110  
00:04:15,509 --> 00:04:11,519  
problem

111  
00:04:19,189 --> 00:04:15,519  
and to do that we're using two of the

112  
00:04:21,189 --> 00:04:19,199  
nasa unmanned aircraft uh one uh one

113  
00:04:23,189 --> 00:04:21,199

equipped specifically to look at the

114

00:04:26,070 --> 00:04:23,199

environment and i'll describe a little

115

00:04:27,590 --> 00:04:26,080

later the payload that's on there

116

00:04:29,830 --> 00:04:27,600

and the other is equipped with the

117

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

payload to really look at the inner core

118

00:04:33,430 --> 00:04:31,680

in particular the precipitation and

119

00:04:35,909 --> 00:04:33,440

winds within the eye wall and the rain

120

00:04:38,150 --> 00:04:35,919

bands uh last year was our first

121

00:04:40,070 --> 00:04:38,160

deployment uh and

122

00:04:43,510 --> 00:04:40,080

in that deployment out of walls we only

123

00:04:44,629 --> 00:04:43,520

had the environmental aircraft

124

00:04:46,469 --> 00:04:44,639

and

125

00:04:48,070 --> 00:04:46,479

that was probably due to some logistical

126  
00:04:51,110 --> 00:04:48,080  
and technical uh

127  
00:04:54,150 --> 00:04:51,120  
issues with the other aircraft excuse me

128  
00:04:56,070 --> 00:04:54,160  
your blood just fell out

129  
00:04:57,990 --> 00:04:56,080  
but it proved extremely useful having

130  
00:05:00,230 --> 00:04:58,000  
that one aircraft to work out a number

131  
00:05:02,870 --> 00:05:00,240  
of the issues involved in a very complex

132  
00:05:05,110 --> 00:05:02,880  
operation uh operating out of walls for

133  
00:05:07,830 --> 00:05:05,120  
the very first time um

134  
00:05:09,830 --> 00:05:07,840  
with a global hawk uh with a science

135  
00:05:13,189 --> 00:05:09,840  
team that had never

136  
00:05:14,870 --> 00:05:13,199  
done this type of campaign

137  
00:05:16,710 --> 00:05:14,880  
in just this sort of way so it was

138  
00:05:18,310 --> 00:05:16,720

really a challenge

139

00:05:21,029 --> 00:05:18,320

we had

140

00:05:22,870 --> 00:05:21,039

six flights that were done last year

141

00:05:25,270 --> 00:05:22,880

the first one was actually our transit

142

00:05:27,270 --> 00:05:25,280

flight from dryden out to wallops uh

143

00:05:29,189 --> 00:05:27,280

hurricane leslie was out in the western

144

00:05:32,150 --> 00:05:29,199

atlantic at the time and we decided to

145

00:05:34,070 --> 00:05:32,160

fly around uh the outskirts of leslie to

146

00:05:35,670 --> 00:05:34,080

look at its outflow layer and that was

147

00:05:37,990 --> 00:05:35,680

our very first flight we got some very

148

00:05:40,310 --> 00:05:38,000

unique observations in the outflow layer

149

00:05:42,230 --> 00:05:40,320

uh from the probably for the first time

150

00:05:44,710 --> 00:05:42,240

from above the storm all the way through

151  
00:05:47,110 --> 00:05:44,720  
the alpha layer and down to the surface

152  
00:05:50,950 --> 00:05:47,120  
our next five flights were into a very

153  
00:05:52,790 --> 00:05:50,960  
long-lived hurricane nadine uh which uh

154  
00:05:54,550 --> 00:05:52,800  
the first flight being when it first

155  
00:05:56,629 --> 00:05:54,560  
became a tropical storm the second

156  
00:05:58,150 --> 00:05:56,639  
flight when it first became a hurricane

157  
00:05:59,749 --> 00:05:58,160  
and then if you remember hurricane

158  
00:06:02,390 --> 00:05:59,759  
nadine moved out into the eastern

159  
00:06:04,070 --> 00:06:02,400  
atlantic around the azores and just sort

160  
00:06:06,469 --> 00:06:04,080  
of meandered out there for almost two

161  
00:06:08,070 --> 00:06:06,479  
weeks or about two weeks and we were

162  
00:06:09,830 --> 00:06:08,080  
able to do three flights during that

163  
00:06:11,430 --> 00:06:09,840

time something that you really wouldn't

164

00:06:13,110 --> 00:06:11,440

be able to do with the manned aircraft

165

00:06:15,110 --> 00:06:13,120

because of the range and duration of the

166

00:06:16,469 --> 00:06:15,120

global hawk

167

00:06:18,070 --> 00:06:16,479

and during that time we saw the

168

00:06:19,909 --> 00:06:18,080

weakening of the storm when it went

169

00:06:21,990 --> 00:06:19,919

post-tropical and then we saw its

170

00:06:24,469 --> 00:06:22,000

redevelopment including

171

00:06:26,629 --> 00:06:24,479

the onset of its re-intensification back

172

00:06:28,469 --> 00:06:26,639

into a hurricane and it subsequently

173

00:06:30,309 --> 00:06:28,479

reached its maximum intensity over its

174

00:06:32,230 --> 00:06:30,319

entire life cycle

175

00:06:33,749 --> 00:06:32,240

so we got some very unique measurements

176  
00:06:35,590 --> 00:06:33,759  
last year

177  
00:06:38,390 --> 00:06:35,600  
now this year we're adding in the second

178  
00:06:40,230 --> 00:06:38,400  
aircraft which will have uh the suite of

179  
00:06:41,350 --> 00:06:40,240  
instruments designed to look at the

180  
00:06:43,110 --> 00:06:41,360  
inner core

181  
00:06:45,830 --> 00:06:43,120  
uh and and by

182  
00:06:48,230 --> 00:06:45,840  
taking using the the two planes uh

183  
00:06:50,230 --> 00:06:48,240  
potentially one right after the other

184  
00:06:52,469 --> 00:06:50,240  
will be able to get snapshots of the

185  
00:06:54,230 --> 00:06:52,479  
environment i shouldn't say snapshot

186  
00:06:56,150 --> 00:06:54,240  
shots but continuous looks at the

187  
00:06:57,830 --> 00:06:56,160  
environment and then the inner core and

188  
00:07:00,710 --> 00:06:57,840

then potentially going back and forth

189

00:07:02,309 --> 00:07:00,720

between the two with time in between uh

190

00:07:04,309 --> 00:07:02,319

for crew rest given the the long

191

00:07:05,589 --> 00:07:04,319

duration of these flights

192

00:07:07,270 --> 00:07:05,599

um

193

00:07:09,830 --> 00:07:07,280

rob if you guys want to show the

194

00:07:11,189 --> 00:07:09,840

interactive on the uh the instruments i

195

00:07:13,670 --> 00:07:11,199

can talk a little bit about the payload

196

00:07:20,550 --> 00:07:13,680

or we can pause a moment and discuss

197

00:07:23,909 --> 00:07:22,309

okay let's uh let's pull up the

198

00:07:30,950 --> 00:07:23,919

interactive um

199

00:07:34,309 --> 00:07:32,309

all right as we wait for the uh the

200

00:07:36,629 --> 00:07:34,319

interactive um

201  
00:07:38,950 --> 00:07:36,639  
the the uh the unmanned aircraft will

202  
00:07:41,029 --> 00:07:38,960  
actually be able to to go for twice as

203  
00:07:42,710 --> 00:07:41,039  
long as a hurricane hunter aircraft is

204  
00:07:44,150 --> 00:07:42,720  
that is that correct scott

205  
00:07:46,870 --> 00:07:44,160  
uh a lot of it

206  
00:07:49,189 --> 00:07:46,880  
its total flight duration is uh two to

207  
00:07:51,830 --> 00:07:49,199  
three times as long as a typical manned

208  
00:07:53,830 --> 00:07:51,840  
aircraft uh depending on where the storm

209  
00:07:55,670 --> 00:07:53,840  
is in the atlantic will either be if

210  
00:07:58,070 --> 00:07:55,680  
it's close to the u.s we'll be able to

211  
00:07:59,670 --> 00:07:58,080  
spend maybe two to three times as much

212  
00:08:01,670 --> 00:07:59,680  
time over the storm as you would with

213  
00:08:03,350 --> 00:08:01,680

the manned aircraft but if it's out in

214

00:08:05,350 --> 00:08:03,360

the central atlantic we can actually get

215

00:08:07,270 --> 00:08:05,360

the storms that we wouldn't normally get

216

00:08:09,510 --> 00:08:07,280

to with manned aircraft because of the

217

00:08:10,950 --> 00:08:09,520

long range and nadine was a good example

218

00:08:12,710 --> 00:08:10,960

that where it was in the northeastern

219

00:08:15,110 --> 00:08:12,720

atlantic and we were able to spend 10 to

220

00:08:16,390 --> 00:08:15,120

12 hours over the storm whereas a manned

221

00:08:18,469 --> 00:08:16,400

aircraft really would not have been able

222

00:08:19,350 --> 00:08:18,479

to get to it and spend any time at all

223

00:08:21,990 --> 00:08:19,360

in it

224

00:08:24,629 --> 00:08:22,000

so that is a real advantage of the

225

00:08:27,589 --> 00:08:26,070

and and this year we'll we're actually

226

00:08:30,390 --> 00:08:27,599

going to be double teaming with the two

227

00:08:31,830 --> 00:08:30,400

global hawks uh one to get the data from

228

00:08:33,589 --> 00:08:31,840

the guts of the storm and the other

229

00:08:34,870 --> 00:08:33,599

basically to look at the the whole

230

00:08:37,350 --> 00:08:34,880

environment

231

00:08:40,709 --> 00:08:37,360

um of the storm so that's something we

232

00:08:42,870 --> 00:08:40,719

weren't able to do last year right

233

00:08:44,710 --> 00:08:42,880

is that interactive ready

234

00:08:47,990 --> 00:08:44,720

i can kind of

235

00:08:48,000 --> 00:08:58,389

we are bringing the uh

236

00:09:03,590 --> 00:09:00,790

let's um let's take

237

00:09:05,670 --> 00:09:03,600

let's turn to uh to some of the the uh

238

00:09:07,030 --> 00:09:05,680

instruments on the on the global hawks

239

00:09:09,030 --> 00:09:07,040

as we wait for the interactive to come

240

00:09:11,670 --> 00:09:09,040

up well that's what i was hoping for the

241

00:09:14,230 --> 00:09:11,680

interactive for but uh

242

00:09:16,470 --> 00:09:14,240

one thing we can say is uh as we're

243

00:09:18,150 --> 00:09:16,480

doing these flights we're interacting uh

244

00:09:20,470 --> 00:09:18,160

quite a bit with noah

245

00:09:22,070 --> 00:09:20,480

noah is one of our

246

00:09:25,030 --> 00:09:22,080

team members they provide one of the

247

00:09:27,030 --> 00:09:25,040

instruments uh and the the the sort of

248

00:09:29,269 --> 00:09:27,040

the manpower behind operating the

249

00:09:30,630 --> 00:09:29,279

instrument and processing the data uh in

250

00:09:32,389 --> 00:09:30,640

addition they're providing a few of the

251

00:09:35,269 --> 00:09:32,399

pilots and some of the ground crews

252

00:09:37,030 --> 00:09:35,279

they're a significant partner for us um

253

00:09:38,470 --> 00:09:37,040

in addition to that

254

00:09:40,389 --> 00:09:38,480

the noaa

255

00:09:45,190 --> 00:09:40,399

hurricane hunter aircraft

256

00:09:46,790 --> 00:09:45,200

will be out there at the same time and

257

00:09:48,389 --> 00:09:46,800

we are planning to

258

00:09:50,550 --> 00:09:48,399

collaborate with them as much as

259

00:09:51,910 --> 00:09:50,560

possible to try to time our flight so

260

00:09:54,070 --> 00:09:51,920

that we're either flying together to

261

00:09:57,990 --> 00:09:54,080

maximize the data being collected at any

262

00:10:01,910 --> 00:10:00,550

in series with each other so that we

263

00:10:03,990 --> 00:10:01,920

maintain

264

00:10:07,750 --> 00:10:04,000

as continuous coverage of the storm as

265

00:10:09,829 --> 00:10:08,550

so

266

00:10:11,110 --> 00:10:09,839

if the interactive it's not going to be

267

00:10:12,550 --> 00:10:11,120

off i can just

268

00:10:14,230 --> 00:10:12,560

it's alright it's up and running you

269

00:10:19,750 --> 00:10:14,240

just just look on the bottom of your

270

00:10:24,230 --> 00:10:21,750

all right so um this is our

271

00:10:27,030 --> 00:10:24,240

environmental aircraft it has uh three

272

00:10:29,350 --> 00:10:27,040

instruments on it for 2013.

273

00:10:31,750 --> 00:10:29,360

the first is the cloud physics lidar

274

00:10:35,590 --> 00:10:31,760

which is up in the nose of the aircraft

275

00:10:37,910 --> 00:10:35,600

it's specifically designed to look at

276

00:10:39,110 --> 00:10:37,920

profiles of saharan dust which is one of

277

00:10:40,870 --> 00:10:39,120

the things that we're trying to track

278

00:10:42,790 --> 00:10:40,880

and how it interacts with the storm so

279

00:10:44,389 --> 00:10:42,800

this gives us a way to identify where

280

00:10:46,550 --> 00:10:44,399

the saharan air

281

00:10:49,829 --> 00:10:46,560

air layer air mass is

282

00:10:51,110 --> 00:10:49,839

um a second instrument uh in the belly

283

00:10:52,949 --> 00:10:51,120

of the aircraft although it lifts

284

00:10:54,310 --> 00:10:52,959

twilight there uh that's one that we're

285

00:10:55,509 --> 00:10:54,320

not actually flying this year but

286

00:10:57,829 --> 00:10:55,519

there's another instrument that's going

287

00:11:00,069 --> 00:10:57,839

to be there called scanning his or the

288

00:11:02,150 --> 00:11:00,079

interferometer sounder that'll give us

289

00:11:04,470 --> 00:11:02,160

vertical profiles of temperature and

290

00:11:06,550 --> 00:11:04,480

humidity in the clear air environment

291

00:11:09,350 --> 00:11:06,560

and then when we're overflying clouds it

292

00:11:11,509 --> 00:11:09,360

gives us information uh on the

293

00:11:13,430 --> 00:11:11,519

properties of the cloud tops

294

00:11:15,670 --> 00:11:13,440

and then at the back of the aircraft

295

00:11:17,350 --> 00:11:15,680

there's an instrument known as avaps

296

00:11:19,910 --> 00:11:17,360

which is a drop sonde system so it

297

00:11:22,069 --> 00:11:19,920

releases a small tube from the aircraft

298

00:11:24,150 --> 00:11:22,079

that floats down to the surface on a

299

00:11:25,990 --> 00:11:24,160

parachute and as it's going down it

300

00:11:28,230 --> 00:11:26,000

collects information on temperature

301  
00:11:30,230 --> 00:11:28,240  
humidity pressure wind speed and

302  
00:11:32,150 --> 00:11:30,240  
direction with very high vertical

303  
00:11:33,509 --> 00:11:32,160  
resolution so we get very detailed

304  
00:11:36,230 --> 00:11:33,519  
measurements of some of the vertical

305  
00:11:38,069 --> 00:11:36,240  
structures uh and that's one one of the

306  
00:11:40,389 --> 00:11:38,079  
instruments that we also then can feed

307  
00:11:41,750 --> 00:11:40,399  
in to some of the operational centers

308  
00:11:43,350 --> 00:11:41,760  
and potentially into some of the

309  
00:11:45,269 --> 00:11:43,360  
forecast models

310  
00:11:46,550 --> 00:11:45,279  
now we had also planned to fly a wind

311  
00:11:48,230 --> 00:11:46,560  
lighter that would have been in the

312  
00:11:51,110 --> 00:11:48,240  
belly of the aircraft that would provide

313  
00:11:53,829 --> 00:11:51,120

continuous wind uh speed and direction

314

00:11:55,269 --> 00:11:53,839

uh measurements in the clear air

315

00:11:58,389 --> 00:11:55,279

but there's been some issues with that

316

00:12:00,550 --> 00:11:58,399

that we haven't been able to fly yet

317

00:12:03,670 --> 00:12:00,560

i guess i won't get into that part uh if

318

00:12:06,150 --> 00:12:03,680

you can go to the other aircraft um

319

00:12:08,790 --> 00:12:06,160

our overstorm aircraft is carrying

320

00:12:13,030 --> 00:12:08,800

um the plan three instruments which are

321

00:12:15,350 --> 00:12:13,040

uh hamster in the nose of the aircraft

322

00:12:18,470 --> 00:12:15,360

it's a microwave sounder

323

00:12:20,870 --> 00:12:18,480

that's capable of giving us uh sort of

324

00:12:23,030 --> 00:12:20,880

low resolution vertical profiles of

325

00:12:25,269 --> 00:12:23,040

temperature and humidity in both clear

326

00:12:26,790 --> 00:12:25,279

and cloudy air and then when we're in

327

00:12:28,150 --> 00:12:26,800

precipitating areas it gives us

328

00:12:30,310 --> 00:12:28,160

information on the vertical

329

00:12:33,430 --> 00:12:30,320

precipitation profiles

330

00:12:35,590 --> 00:12:33,440

in the belly of the aircraft is a dual

331

00:12:37,509 --> 00:12:35,600

frequency conically scanning doppler

332

00:12:40,389 --> 00:12:37,519

radar so this provides

333

00:12:43,030 --> 00:12:40,399

information on both winds wind speed and

334

00:12:44,870 --> 00:12:43,040

direction and precipitation profiles

335

00:12:46,629 --> 00:12:44,880

within the storm and then when we're

336

00:12:48,870 --> 00:12:46,639

outside of precipitation areas it can

337

00:12:51,110 --> 00:12:48,880

give us wind speed and direction

338

00:12:52,629 --> 00:12:51,120

at the surface to look at the overall

339

00:12:55,030 --> 00:12:52,639

surface flow

340

00:12:56,710 --> 00:12:55,040

and then in the tail the aircraft is an

341

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

instrument it's a

342

00:13:01,269 --> 00:12:58,639

microwave radiometer

343

00:13:03,990 --> 00:13:01,279

that gives us a broad swath of surface

344

00:13:05,910 --> 00:13:04,000

wind speed and precipitation information

345

00:13:07,670 --> 00:13:05,920

so in one pass of the storm we'll be

346

00:13:10,949 --> 00:13:07,680

able to map out the surface wind speed

347

00:13:12,629 --> 00:13:10,959

field and look at the the structure of

348

00:13:14,949 --> 00:13:12,639

the of the wind maximum

349

00:13:16,310 --> 00:13:14,959

how broad the wind speed maximum is and

350

00:13:17,430 --> 00:13:16,320

things of that sort

351

00:13:19,110 --> 00:13:17,440

now this year it's not on the

352

00:13:20,550 --> 00:13:19,120

interactive diagram but we're also

353

00:13:22,790 --> 00:13:20,560

flying what we call a piggyback

354

00:13:25,670 --> 00:13:22,800

instrument something that

355

00:13:28,150 --> 00:13:25,680

got itself funded to ride along with us

356

00:13:30,710 --> 00:13:28,160

and it's a gamma-ray detector looking at

357

00:13:32,949 --> 00:13:30,720

gamma rays emitted from lightning

358

00:13:34,470 --> 00:13:32,959

within the storm so those those are the

359

00:13:39,509 --> 00:13:34,480

instruments that we have for for this

360

00:13:44,710 --> 00:13:42,310

come back to your rob thank you scott

361

00:13:47,590 --> 00:13:44,720

um just a reminder we are taking

362

00:13:50,150 --> 00:13:47,600

questions um and you can make comments

363

00:13:52,310 --> 00:13:50,160

or or questions on youtube uh you can

364

00:13:53,509 --> 00:13:52,320

make them on twitter using

365

00:13:56,870 --> 00:13:53,519

nasa

366

00:13:57,990 --> 00:13:56,880

hs3 and also uh comments will be taken

367

00:13:59,910 --> 00:13:58,000

on the google

368

00:14:01,189 --> 00:13:59,920

google plus page and we will get to your

369

00:14:02,470 --> 00:14:01,199

questions and answers at the end of the

370

00:14:04,710 --> 00:14:02,480

session

371

00:14:07,829 --> 00:14:04,720

now i'd like to move on to nasa dryden

372

00:14:09,430 --> 00:14:07,839

and uh to tom miller a project pilot for

373

00:14:11,430 --> 00:14:09,440

the global hawk who is sitting in the

374

00:14:13,910 --> 00:14:11,440

hangar with the global hawk uh behind

375

00:14:16,949 --> 00:14:13,920

him uh tom miller is a project pilot for

376

00:14:19,750 --> 00:14:16,959

the uh the unmanned spacecraft

377

00:14:22,230 --> 00:14:19,760

at edwards california and he determines

378

00:14:24,790 --> 00:14:22,240

training objectives and standards

379

00:14:26,069 --> 00:14:24,800

he evaluates air crew performance and he

380

00:14:27,990 --> 00:14:26,079

is a subject matter expert for

381

00:14:30,790 --> 00:14:28,000

development on the ground station and

382

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

command and control communication system

383

00:14:35,189 --> 00:14:33,440

that's used to fly the aircraft so tom

384

00:14:36,870 --> 00:14:35,199

uh tell us about the aircraft

385

00:14:39,030 --> 00:14:36,880

operational

386

00:14:40,629 --> 00:14:39,040

okay well uh just uh i'll begin with a

387

00:14:42,069 --> 00:14:40,639

description of the airplane itself and

388

00:14:43,350 --> 00:14:42,079

let everybody get a look at the whole

389

00:14:46,150 --> 00:14:43,360

thing here

390

00:14:48,550 --> 00:14:46,160

this is actually uh air vehicle one this

391

00:14:50,550 --> 00:14:48,560

was the aircraft that

392

00:14:53,910 --> 00:14:50,560

ryan first flew the first global hawk to

393

00:14:56,069 --> 00:14:53,920

fly back in 1998. so we resurrected it

394

00:14:58,870 --> 00:14:56,079

for a nasa science mission and it's

395

00:15:00,310 --> 00:14:58,880

still going strong

396

00:15:02,550 --> 00:15:00,320

we um

397

00:15:04,949 --> 00:15:02,560

as uh scott talked about there we

398

00:15:06,629 --> 00:15:04,959

develop our mission plans in conjunction

399

00:15:08,470 --> 00:15:06,639

with the scientists typically a couple

400

00:15:10,389 --> 00:15:08,480

days prior to the flight

401  
00:15:12,389 --> 00:15:10,399  
we'll go ahead and start working with

402  
00:15:13,670 --> 00:15:12,399  
the science team and up up to about the

403  
00:15:15,509 --> 00:15:13,680  
day prior

404  
00:15:16,710 --> 00:15:15,519  
we'll finalize this and turn it into a

405  
00:15:18,389 --> 00:15:16,720  
flight plan

406  
00:15:19,990 --> 00:15:18,399  
then we'll also on that day we'll also

407  
00:15:22,069 --> 00:15:20,000  
be coordinating with the air traffic

408  
00:15:23,590 --> 00:15:22,079  
authorities and lining up everything to

409  
00:15:27,110 --> 00:15:23,600  
conduct the mission

410  
00:15:29,590 --> 00:15:27,120  
the day of flight uh will show up about

411  
00:15:31,269 --> 00:15:29,600  
three hours prior to flight time to our

412  
00:15:33,829 --> 00:15:31,279  
briefing to our pre-flights and prepare

413  
00:15:35,350 --> 00:15:33,839

the aircraft uh during all the time this

414

00:15:37,269 --> 00:15:35,360

is going on the ground crew has been

415

00:15:40,310 --> 00:15:37,279

working really hard uh getting the

416

00:15:42,310 --> 00:15:40,320

aircraft ready ready to go

417

00:15:44,150 --> 00:15:42,320

so we'll conduct the pre-flight

418

00:15:46,790 --> 00:15:44,160

and then we go ahead and launch the

419

00:15:48,230 --> 00:15:46,800

aircraft using local command and control

420

00:15:50,790 --> 00:15:48,240

links

421

00:15:52,550 --> 00:15:50,800

about three hours after the launch we'll

422

00:15:54,870 --> 00:15:52,560

be driving out to the

423

00:15:57,430 --> 00:15:54,880

mission area we'll go ahead and hand off

424

00:15:58,710 --> 00:15:57,440

the aircraft back to a crew here at

425

00:16:00,470 --> 00:15:58,720

dryden

426

00:16:02,629 --> 00:16:00,480

that's in our global hawk operations

427

00:16:05,350 --> 00:16:02,639

center and they will take over the

428

00:16:07,509 --> 00:16:05,360

aircraft and either continue enroute to

429

00:16:09,829 --> 00:16:07,519

the mission area depending on how close

430

00:16:11,670 --> 00:16:09,839

the missionary is or or go ahead and

431

00:16:13,110 --> 00:16:11,680

start right into the into the science

432

00:16:15,350 --> 00:16:13,120

bush

433

00:16:17,910 --> 00:16:15,360

this crew will do a shift of about uh

434

00:16:19,430 --> 00:16:17,920

nine to ten hours they'll hand it off to

435

00:16:21,350 --> 00:16:19,440

another crew

436

00:16:22,949 --> 00:16:21,360

who again does another nine or ten hours

437

00:16:25,990 --> 00:16:22,959

of doing the scientists

438

00:16:27,910 --> 00:16:26,000

and again we'll either continue that or

439

00:16:30,069 --> 00:16:27,920

depending on where the storm is we'll

440

00:16:33,189 --> 00:16:30,079

start to drive home

441

00:16:34,230 --> 00:16:33,199

approximately four hours prior to uh

442

00:16:35,990 --> 00:16:34,240

landing

443

00:16:38,949 --> 00:16:36,000

they'll hand the aircraft back off to

444

00:16:40,790 --> 00:16:38,959

the crew at wallops the recovery crew

445

00:16:43,749 --> 00:16:40,800

and that crew will then uh effectively

446

00:16:46,629 --> 00:16:43,759

join up with the chase aircraft and

447

00:16:49,110 --> 00:16:46,639

go ahead and land

448

00:16:50,710 --> 00:16:49,120

so as far as how the airplane flies it's

449

00:16:52,550 --> 00:16:50,720

very similar to flying any other

450

00:16:55,430 --> 00:16:52,560

airplane though just kind of a full-time

451  
00:16:57,990 --> 00:16:55,440  
autopilot we drive the airplane around

452  
00:17:00,310 --> 00:16:58,000  
and work at work scientists to achieve

453  
00:17:03,430 --> 00:17:00,320  
whatever objectives they need to

454  
00:17:07,590 --> 00:17:05,110  
and again the mission depends on whether

455  
00:17:09,990 --> 00:17:07,600  
we're flying the overstorm aircraft or

456  
00:17:12,710 --> 00:17:10,000  
the environmental aircraft as to how

457  
00:17:15,189 --> 00:17:12,720  
complicated it is

458  
00:17:18,630 --> 00:17:16,309  
let's see

459  
00:17:20,870 --> 00:17:18,640  
uh what else can i talk about here about

460  
00:17:24,870 --> 00:17:23,189  
airplane uh some of the challenges that

461  
00:17:27,350 --> 00:17:24,880  
we talked about and the advantages

462  
00:17:29,270 --> 00:17:27,360  
obviously one of the advantages of using

463  
00:17:30,789 --> 00:17:29,280

an unmanned aircraft is that we do have

464

00:17:33,430 --> 00:17:30,799

the endurance you don't have to carry a

465

00:17:36,310 --> 00:17:33,440

full crew

466

00:17:38,230 --> 00:17:36,320

we swap out during uh during the flight

467

00:17:40,470 --> 00:17:38,240

so that's uh that's a big advantage that

468

00:17:42,710 --> 00:17:40,480

this aircraft offers whereas a manned

469

00:17:44,870 --> 00:17:42,720

aircraft is typically limited to

470

00:17:46,789 --> 00:17:44,880

through the endurance of the aircrew we

471

00:17:47,990 --> 00:17:46,799

can change ours out right in the middle

472

00:17:49,830 --> 00:17:48,000

to mission

473

00:17:51,510 --> 00:17:49,840

but this also brings some challenges in

474

00:17:53,830 --> 00:17:51,520

that it is an unmanned aircraft and

475

00:17:55,909 --> 00:17:53,840

we're still trying to fully integrate uh

476

00:17:58,150 --> 00:17:55,919

in the airspace with the other manned

477

00:17:59,430 --> 00:17:58,160

aircraft so that's proved to be a

478

00:18:02,549 --> 00:17:59,440

challenge but we've got a really good

479

00:18:04,549 --> 00:18:02,559

relationship with the faa and the oceana

480

00:18:06,150 --> 00:18:04,559

control authorities and

481

00:18:10,870 --> 00:18:06,160

they've really helped us out a lot we've

482

00:18:10,880 --> 00:18:15,430

to continue doing that

483

00:18:20,549 --> 00:18:17,750

thank you tom so i have a question for

484

00:18:23,430 --> 00:18:20,559

you the uh in terms of the duration of

485

00:18:25,270 --> 00:18:23,440

global hawks uh how long can they stay

486

00:18:26,950 --> 00:18:25,280

in the air

487

00:18:28,950 --> 00:18:26,960

well of course

488

00:18:31,110 --> 00:18:28,960

yeah this depends on how the aircraft is

489

00:18:34,150 --> 00:18:31,120

loaded but uh general uh flight time is

490

00:18:36,470 --> 00:18:34,160

about 28 hours

491

00:18:39,669 --> 00:18:36,480

and what altitude did they fly at we'll

492

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

go uh well above 60 000 feet

493

00:18:44,310 --> 00:18:41,919

we get to a cruise climb altitude based

494

00:18:46,950 --> 00:18:44,320

on weight and at that point we have to

495

00:18:47,750 --> 00:18:46,960

burn off more fuel to continue climbing

496

00:18:50,549 --> 00:18:47,760

so

497

00:18:52,870 --> 00:18:50,559

it achieves an initial altitude and then

498

00:18:56,070 --> 00:18:52,880

just does this kind of slow climb up to

499

00:18:58,230 --> 00:18:56,080

the ultimate ceiling

500

00:19:01,590 --> 00:18:58,240

so what is it like piloting the global

501  
00:19:03,510 --> 00:19:01,600  
hawk from where you are

502  
00:19:04,950 --> 00:19:03,520  
well it's a little strange you in in

503  
00:19:07,750 --> 00:19:04,960  
some cases you're you're a little

504  
00:19:10,310 --> 00:19:07,760  
disconnected um from the aircraft you

505  
00:19:12,630 --> 00:19:10,320  
don't have the same sensations that uh

506  
00:19:14,150 --> 00:19:12,640  
you would in a manned aircraft uh you

507  
00:19:15,990 --> 00:19:14,160  
don't have uh

508  
00:19:17,510 --> 00:19:16,000  
you know

509  
00:19:19,430 --> 00:19:17,520  
sound uh

510  
00:19:21,430 --> 00:19:19,440  
the sound of the aircraft the sound of

511  
00:19:24,230 --> 00:19:21,440  
the engines the seat of the pants

512  
00:19:25,590 --> 00:19:24,240  
sensations the g-forces that uh come on

513  
00:19:27,830 --> 00:19:25,600

an airplane when you're flying you know

514

00:19:29,590 --> 00:19:27,840

if uh if something were to go wrong for

515

00:19:31,909 --> 00:19:29,600

example and the engine were to roll back

516

00:19:33,590 --> 00:19:31,919

you don't hear that as you would in a

517

00:19:36,630 --> 00:19:33,600

manned aircraft so that brings its own

518

00:19:38,310 --> 00:19:36,640

challenges basically we all we have this

519

00:19:39,510 --> 00:19:38,320

site let's project on the computer

520

00:19:41,750 --> 00:19:39,520

screen so

521

00:19:44,150 --> 00:19:41,760

it's a bit like flying uh any other

522

00:19:46,310 --> 00:19:44,160

aircraft put on a full-time auto pilot

523

00:19:48,150 --> 00:19:46,320

we don't have direct uh control over the

524

00:19:51,430 --> 00:19:48,160

flight controls but we give the aircraft

525

00:19:53,830 --> 00:19:51,440

altitude headings and air speeds and the

526

00:19:55,430 --> 00:19:53,840

mission management computers decide how

527

00:19:57,510 --> 00:19:55,440

to hit the airplane

528

00:19:59,669 --> 00:19:57,520

where we asked it to go

529

00:20:00,630 --> 00:19:59,679

and it's 60 000 feet you're well over

530

00:20:02,070 --> 00:20:00,640

the top of

531

00:20:04,870 --> 00:20:02,080

a tropical storm

532

00:20:07,350 --> 00:20:04,880

uh generally we are yes

533

00:20:10,070 --> 00:20:07,360

so last year i understand that uh during

534

00:20:12,150 --> 00:20:10,080

hurricane nadine we dropped somewhere in

535

00:20:13,909 --> 00:20:12,160

the vicinity of 300 drop songs is that

536

00:20:15,510 --> 00:20:13,919

correct

537

00:20:17,430 --> 00:20:15,520

so that they provided a lot of

538

00:20:18,950 --> 00:20:17,440

information that we otherwise couldn't

539

00:20:21,350 --> 00:20:18,960

get

540

00:20:23,350 --> 00:20:21,360

uh yeah it sure did i i think scott you

541

00:20:26,070 --> 00:20:23,360

know probably speak more to the data

542

00:20:28,230 --> 00:20:26,080

that was collected than i could

543

00:20:32,630 --> 00:20:28,240

yeah i think overall we collected about

544

00:20:34,470 --> 00:20:32,640

350 uh drops on uh profiles

545

00:20:36,549 --> 00:20:34,480

the drop sign instruments capable of

546

00:20:38,470 --> 00:20:36,559

carrying up to 88 suns in a single

547

00:20:40,870 --> 00:20:38,480

flight i think the most that we did was

548

00:20:43,270 --> 00:20:40,880

around 75 77 last year in a single

549

00:20:47,669 --> 00:20:45,510

scott can you explain uh for the viewers

550

00:20:49,590 --> 00:20:47,679

what a drop sonde is and what what it

551  
00:20:50,390 --> 00:20:49,600  
tells us

552  
00:20:52,630 --> 00:20:50,400  
uh

553  
00:20:55,029 --> 00:20:52,640  
yeah i thought i did earlier but

554  
00:20:57,029 --> 00:20:55,039  
so basically again it's a small tube uh

555  
00:20:59,350 --> 00:20:57,039  
that has a parachute at one end and a

556  
00:21:01,270 --> 00:20:59,360  
sensor at the other end and it's ejected

557  
00:21:03,510 --> 00:21:01,280  
from the aircraft craft it's a fairly

558  
00:21:04,630 --> 00:21:03,520  
lightweight tube

559  
00:21:06,070 --> 00:21:04,640  
about the

560  
00:21:09,909 --> 00:21:06,080  
you know maybe an inch and a half in

561  
00:21:11,669 --> 00:21:09,919  
diameter and uh maybe 15 inches long

562  
00:21:13,909 --> 00:21:11,679  
and as it falls to the surface on this

563  
00:21:16,149 --> 00:21:13,919

small with the small parachute

564

00:21:18,310 --> 00:21:16,159

it's collecting temperature pressure uh

565

00:21:19,270 --> 00:21:18,320

wind speed relative humidity and wind

566

00:21:20,870 --> 00:21:19,280

direction

567

00:21:23,190 --> 00:21:20,880

uh and then when it hits the surface

568

00:21:25,110 --> 00:21:23,200

it's it stops collecting data

569

00:21:28,549 --> 00:21:25,120

but it basically gives us a very high

570

00:21:33,590 --> 00:21:28,559

resolution profile of those parameters

571

00:21:37,190 --> 00:21:34,789

thank you scott

572

00:21:39,029 --> 00:21:37,200

um back to you tom anything you want to

573

00:21:41,029 --> 00:21:39,039

add

574

00:21:43,669 --> 00:21:41,039

i don't think so maybe i'll uh save it

575

00:21:45,350 --> 00:21:43,679

for uh some questions and answers later

576  
00:21:46,789 --> 00:21:45,360  
okay

577  
00:21:49,029 --> 00:21:46,799  
very good thank you and that's a

578  
00:21:50,710 --> 00:21:49,039  
beautiful aircraft behind you

579  
00:21:53,270 --> 00:21:50,720  
again just a reminder for those who are

580  
00:21:55,750 --> 00:21:53,280  
are watching us on youtube or

581  
00:21:57,590 --> 00:21:55,760  
on google plus you can comment on both

582  
00:21:58,870 --> 00:21:57,600  
of those and also on twitter with

583  
00:22:01,909 --> 00:21:58,880  
hashtag

584  
00:22:03,750 --> 00:22:01,919  
nasa hs3

585  
00:22:06,549 --> 00:22:03,760  
next we're going to take you to marilyn

586  
00:22:09,270 --> 00:22:06,559  
vasquez she's the hs3 project manager

587  
00:22:11,190 --> 00:22:09,280  
and she has been leading more than 200

588  
00:22:13,350 --> 00:22:11,200

people will be involved in preparing and

589

00:22:15,430 --> 00:22:13,360

supporting the aircraft so she's going

590

00:22:18,149 --> 00:22:15,440

to tell us what it takes to get the

591

00:22:19,430 --> 00:22:18,159

flight off the ground

592

00:22:22,390 --> 00:22:19,440

marilyn does flight planning and

593

00:22:25,110 --> 00:22:22,400

aircraft coordination and she conducts

594

00:22:27,830 --> 00:22:25,120

the science data collection which is a

595

00:22:30,230 --> 00:22:27,840

big job all in itself um all this work

596

00:22:31,909 --> 00:22:30,240

is done to support the hs3 mission

597

00:22:34,310 --> 00:22:31,919

which has the two global hawks as we've

598

00:22:35,990 --> 00:22:34,320

been talking about and uh carry these

599

00:22:38,230 --> 00:22:36,000

these science instruments over

600

00:22:39,830 --> 00:22:38,240

hurricanes and tropical cyclones so

601  
00:22:41,270 --> 00:22:39,840  
marilyn tell us about flight planning

602  
00:22:43,270 --> 00:22:41,280  
and what it takes to get a flight off

603  
00:22:44,870 --> 00:22:43,280  
the ground

604  
00:22:47,110 --> 00:22:44,880  
all right um

605  
00:22:49,110 --> 00:22:47,120  
getting some echo here um anyway i

606  
00:22:51,029 --> 00:22:49,120  
wanted to let you know that uh this

607  
00:22:52,630 --> 00:22:51,039  
whole project is a

608  
00:22:54,470 --> 00:22:52,640  
great amount of coordination

609  
00:22:57,190 --> 00:22:54,480  
communication and planning that's how we

610  
00:22:59,270 --> 00:22:57,200  
do this we have i worked the project

611  
00:23:01,590 --> 00:22:59,280  
development with scott

612  
00:23:03,110 --> 00:23:01,600  
and then with the global hawk team at

613  
00:23:06,310 --> 00:23:03,120

dryden for all of

614

00:23:08,630 --> 00:23:06,320

the operations and then also with our

615

00:23:11,430 --> 00:23:08,640

hosts here at wallops for the logistics

616

00:23:13,510 --> 00:23:11,440

and operations for flying the plane

617

00:23:14,630 --> 00:23:13,520

so do you have that um yes i see you've

618

00:23:18,630 --> 00:23:14,640

got the

619

00:23:22,950 --> 00:23:21,029

so what i'm showing you here if it comes

620

00:23:25,510 --> 00:23:22,960

up

621

00:23:27,190 --> 00:23:25,520

are you guys seeing it

622

00:23:29,750 --> 00:23:27,200

anyway it's going it's the integration

623

00:23:32,789 --> 00:23:29,760

of the environmental aircraft you're

624

00:23:35,669 --> 00:23:32,799

going to see them uh load scanning his

625

00:23:37,110 --> 00:23:35,679

into the belly of the plane then cpl

626  
00:23:39,190 --> 00:23:37,120  
into the nose

627  
00:23:40,549 --> 00:23:39,200  
and avaps which that was the drop sun

628  
00:23:41,510 --> 00:23:40,559  
system they'll be loading that into the

629  
00:23:42,950 --> 00:23:41,520  
tail

630  
00:23:45,270 --> 00:23:42,960  
so you can watch that while i tell you a

631  
00:23:47,029 --> 00:23:45,280  
little bit about how we do a mission so

632  
00:23:48,710 --> 00:23:47,039  
for example when the instruments first

633  
00:23:49,669 --> 00:23:48,720  
arrive the first thing we do is we weigh

634  
00:23:53,350 --> 00:23:49,679  
them

635  
00:23:54,470 --> 00:23:53,360  
computer that's going to communicate and

636  
00:23:55,830 --> 00:23:54,480  
find out

637  
00:23:57,110 --> 00:23:55,840  
if the instrument is properly

638  
00:23:58,630 --> 00:23:57,120

communicating because we want to have

639

00:23:59,830 --> 00:23:58,640

the status of the of the instruments

640

00:24:01,990 --> 00:23:59,840

while they're flying we want it to be

641

00:24:04,070 --> 00:24:02,000

able to talk to us on the ground

642

00:24:05,270 --> 00:24:04,080

we also want to plug it in and see what

643

00:24:06,870 --> 00:24:05,280

kind of power

644

00:24:08,549 --> 00:24:06,880

uh it's going to draw so we want to have

645

00:24:10,870 --> 00:24:08,559

a very good characterization

646

00:24:12,149 --> 00:24:10,880

characterization of the plane of the

647

00:24:14,549 --> 00:24:12,159

instruments before we put them on the

648

00:24:16,230 --> 00:24:14,559

plane so once we've done that with all

649

00:24:19,990 --> 00:24:16,240

the instruments we put them all on the

650

00:24:21,830 --> 00:24:20,000

plane we attach all the fairings

651  
00:24:24,549 --> 00:24:21,840  
get the whole plane ready as if it's

652  
00:24:27,510 --> 00:24:24,559  
going to fly then we weigh it

653  
00:24:28,630 --> 00:24:27,520  
that gives us the center of gravity

654  
00:24:33,909 --> 00:24:28,640  
for

655  
00:24:35,350 --> 00:24:33,919  
fuel load after that we um

656  
00:24:37,350 --> 00:24:35,360  
we're getting ready for communication

657  
00:24:39,750 --> 00:24:37,360  
testing so what we want to do at that

658  
00:24:42,230 --> 00:24:39,760  
point is make sure that the scientists

659  
00:24:44,470 --> 00:24:42,240  
who will be at the facility the

660  
00:24:45,909 --> 00:24:44,480  
operations facility at wallops

661  
00:24:47,350 --> 00:24:45,919  
they'll be able to talk to their

662  
00:24:50,070 --> 00:24:47,360  
instruments and the instruments at that

663  
00:24:52,070 --> 00:24:50,080

time are on the plane on the ground at

664

00:24:53,350 --> 00:24:52,080

dryden so that's our first test

665

00:24:54,870 --> 00:24:53,360

then we do a series of other

666

00:24:56,630 --> 00:24:54,880

communication tests to make sure

667

00:24:58,149 --> 00:24:56,640

everything's going to run when we're

668

00:24:59,909 --> 00:24:58,159

very confident that everything is

669

00:25:01,909 --> 00:24:59,919

communicating whether it be a science

670

00:25:04,230 --> 00:25:01,919

instrument or a facility instrument

671

00:25:05,909 --> 00:25:04,240

which would be things like a camera or

672

00:25:07,269 --> 00:25:05,919

the basic communication system for the

673

00:25:09,110 --> 00:25:07,279

plane

674

00:25:11,430 --> 00:25:09,120

no once all that is working

675

00:25:14,390 --> 00:25:11,440

then we're ready for a test flight so at

676

00:25:17,269 --> 00:25:14,400

that point we fly the plane in the area

677

00:25:18,549 --> 00:25:17,279

right around dryden to make sure that

678

00:25:21,110 --> 00:25:18,559

all the instruments are working well

679

00:25:22,470 --> 00:25:21,120

communicate well they fly for about five

680

00:25:25,830 --> 00:25:22,480

hours

681

00:25:28,950 --> 00:25:25,840

and at that point they um

682

00:25:32,630 --> 00:25:28,960

were ready for a transit flight so

683

00:25:34,710 --> 00:25:32,640

we are at that at that point um

684

00:25:37,510 --> 00:25:34,720

we're not quite at that point yet we're

685

00:25:39,830 --> 00:25:37,520

right now for hs3 2013

686

00:25:42,310 --> 00:25:39,840

we have

687

00:25:43,990 --> 00:25:42,320

sorry i keep seeing rob so i'm i'm

688

00:25:45,990 --> 00:25:44,000

distracted i'm not seeing the video

689

00:25:48,950 --> 00:25:46,000

sorry rob

690

00:25:51,350 --> 00:25:48,960

so that's better um anyway no offense

691

00:25:52,870 --> 00:25:51,360

rob but anyway the uh so when we transit

692

00:25:54,149 --> 00:25:52,880

the airplane

693

00:25:56,310 --> 00:25:54,159

and we'll do that the week of august

694

00:25:58,390 --> 00:25:56,320

second we'll transit both the airplanes

695

00:25:59,830 --> 00:25:58,400

right now in the process of that what i

696

00:26:01,190 --> 00:25:59,840

described to you we are at the point

697

00:26:02,870 --> 00:26:01,200

where the instruments have all been

698

00:26:04,630 --> 00:26:02,880

loaded on the plane

699

00:26:06,390 --> 00:26:04,640

we've done weight and balance and we've

700

00:26:08,390 --> 00:26:06,400

done the beginning of the communications

701  
00:26:10,070 --> 00:26:08,400  
test so soon we'll be ready for the

702  
00:26:11,590 --> 00:26:10,080  
range test and then we'll start planning

703  
00:26:13,269 --> 00:26:11,600  
our transit

704  
00:26:15,029 --> 00:26:13,279  
so this whole operation is very

705  
00:26:16,950 --> 00:26:15,039  
complicated there's a very large

706  
00:26:18,789 --> 00:26:16,960  
infrastructure at dryden for supporting

707  
00:26:20,950 --> 00:26:18,799  
the airplane but as you can imagine we

708  
00:26:23,510 --> 00:26:20,960  
have to do the same thing at wallops so

709  
00:26:25,669 --> 00:26:23,520  
we work with our colleagues here to be

710  
00:26:27,669 --> 00:26:25,679  
sure we have a hangar we have the proper

711  
00:26:29,750 --> 00:26:27,679  
fuel we have the proper ground support

712  
00:26:31,669 --> 00:26:29,760  
equipment tom was talking about in the

713  
00:26:34,549 --> 00:26:31,679

plane taking off on the runway we have

714

00:26:35,909 --> 00:26:34,559

to realize since there isn't a pilot the

715

00:26:38,149 --> 00:26:35,919

pilot can't see if there is an

716

00:26:40,630 --> 00:26:38,159

obstruction on the runway for any reason

717

00:26:42,470 --> 00:26:40,640

so we have a a truck that goes alongside

718

00:26:44,230 --> 00:26:42,480

the plane when it's on the runway to be

719

00:26:46,149 --> 00:26:44,240

sure that there's no obstructions before

720

00:26:49,190 --> 00:26:46,159

it takes off so all those things have to

721

00:26:52,710 --> 00:26:49,200

be coordinated we have um space for the

722

00:26:54,310 --> 00:26:52,720

scientists space for the

723

00:26:56,310 --> 00:26:54,320

all the different instruments we have

724

00:26:58,310 --> 00:26:56,320

labs for them

725

00:27:00,230 --> 00:26:58,320

we have so many people involved it is

726

00:27:01,669 --> 00:27:00,240

very complex to set it all up we need to

727

00:27:02,630 --> 00:27:01,679

get them badged we need to make sure

728

00:27:04,070 --> 00:27:02,640

they all

729

00:27:07,430 --> 00:27:04,080

know how to work safely around the

730

00:27:10,070 --> 00:27:07,440

airplane we lay out an evacuation plan

731

00:27:11,669 --> 00:27:10,080

way in advance so that we're in case a

732

00:27:14,870 --> 00:27:11,679

storm comes our way we know how to get

733

00:27:16,230 --> 00:27:14,880

the planes and the people out safely

734

00:27:17,190 --> 00:27:16,240

all that is involved in the initial

735

00:27:18,549 --> 00:27:17,200

planning

736

00:27:20,470 --> 00:27:18,559

then we get ready to actually plan a

737

00:27:23,269 --> 00:27:20,480

particular flight

738

00:27:24,950 --> 00:27:23,279

so scott's told you about our goals well

739

00:27:26,870 --> 00:27:24,960

we have the goals then we have what the

740

00:27:29,269 --> 00:27:26,880

nature has put out as our targets do we

741

00:27:31,350 --> 00:27:29,279

have a storm out there that's going to

742

00:27:32,870 --> 00:27:31,360

it looks like it's developing do we have

743

00:27:35,110 --> 00:27:32,880

one that looks like it's going to

744

00:27:36,710 --> 00:27:35,120

intensify which one's closer which one

745

00:27:40,870 --> 00:27:36,720

should we choose

746

00:27:42,549 --> 00:27:40,880

and we have to do this 48 hours in

747

00:27:44,310 --> 00:27:42,559

advance we have to have a flight plan so

748

00:27:46,789 --> 00:27:44,320

we have to think about what we want to

749

00:27:49,190 --> 00:27:46,799

do and do we want to fly with those

750

00:27:51,510 --> 00:27:49,200

other groups the the noaa and air force

751  
00:27:54,389 --> 00:27:51,520  
aircraft that scott mentioned do we want

752  
00:27:55,909 --> 00:27:54,399  
to have them in the storm while we're

753  
00:27:58,389 --> 00:27:55,919  
going back and getting another plane how

754  
00:27:59,830 --> 00:27:58,399  
do we want to do it and we talk to them

755  
00:28:02,149 --> 00:27:59,840  
to the whole group once a week every

756  
00:28:05,110 --> 00:28:02,159  
once in once a day to look at our

757  
00:28:07,029 --> 00:28:05,120  
planning to see what we want to do

758  
00:28:23,110 --> 00:28:07,039  
all those things have to come together

759  
00:28:31,029 --> 00:28:24,789  
hey rob i think we lost her feed from

760  
00:28:35,350 --> 00:28:32,710  
okay it uh it looks like we may have

761  
00:28:37,990 --> 00:28:35,360  
lost uh maryland um we're getting a lot

762  
00:28:40,149 --> 00:28:38,000  
of great questions um which we will

763  
00:28:43,110 --> 00:28:40,159

begin to address uh first i would like

764

00:28:45,190 --> 00:28:43,120

to go over to our guest

765

00:28:47,110 --> 00:28:45,200

uh brian mcnulty he's a senior research

766

00:28:48,789 --> 00:28:47,120

associate at the university of miami's

767

00:28:51,110 --> 00:28:48,799

rosenstein school of marine and

768

00:28:53,190 --> 00:28:51,120

atmospheric sciences in miami he's a

769

00:28:55,269 --> 00:28:53,200

tropical weather expert too for the

770

00:28:56,789 --> 00:28:55,279

washington post's capital weather gang

771

00:28:58,630 --> 00:28:56,799

blog

772

00:29:00,230 --> 00:28:58,640

some cool things about brian is that he

773

00:29:02,230 --> 00:29:00,240

actually spent a summer here at nasa

774

00:29:05,430 --> 00:29:02,240

goddard in 1997 so he gets to see the

775

00:29:08,149 --> 00:29:05,440

trim spacecraft and meet one of his um

776

00:29:09,510 --> 00:29:08,159

his his role models joanne simpson who

777

00:29:11,990 --> 00:29:09,520

he calls the mother of tropical

778

00:29:13,669 --> 00:29:12,000

meteorology

779

00:29:16,389 --> 00:29:13,679

he's most of his current research is on

780

00:29:19,510 --> 00:29:16,399

vortex initialization in models

781

00:29:22,149 --> 00:29:19,520

and it's about an analyzing a model and

782

00:29:24,789 --> 00:29:22,159

creating a new vortex that hopefully

783

00:29:26,470 --> 00:29:24,799

more closely resembles nature so brian

784

00:29:28,310 --> 00:29:26,480

why don't we just jump over to you and

785

00:29:29,510 --> 00:29:28,320

see if you have any questions for the

786

00:29:30,870 --> 00:29:29,520

panel

787

00:29:32,710 --> 00:29:30,880

and go from there

788

00:29:35,669 --> 00:29:32,720

all right thanks rob i appreciate the

789

00:29:37,110 --> 00:29:35,679

invitation to be on here with with uh

790

00:29:38,830 --> 00:29:37,120

the experts

791

00:29:41,669 --> 00:29:38,840

from hs 3

792

00:29:44,310 --> 00:29:41,679

program um

793

00:29:46,389 --> 00:29:44,320

yeah uh the the work being done by this

794

00:29:48,389 --> 00:29:46,399

is incredible um

795

00:29:51,190 --> 00:29:48,399

being able to

796

00:29:53,430 --> 00:29:51,200

to go out to the far eastern atlantic

797

00:29:55,990 --> 00:29:53,440

and look at storms is certainly a unique

798

00:29:58,230 --> 00:29:56,000

opportunity uh the manda aircraft at

799

00:30:00,710 --> 00:29:58,240

best can get out to

800

00:30:02,549 --> 00:30:00,720

um about the mid-atlantic and and that's

801  
00:30:04,710 --> 00:30:02,559  
a that's a stretch

802  
00:30:06,070 --> 00:30:04,720  
so this is this is really an incredible

803  
00:30:07,190 --> 00:30:06,080  
opportunity

804  
00:30:09,590 --> 00:30:07,200  
and uh

805  
00:30:11,350 --> 00:30:09,600  
it's it's really great to see

806  
00:30:12,470 --> 00:30:11,360  
that we have you know year after year of

807  
00:30:13,269 --> 00:30:12,480  
this so

808  
00:30:16,389 --> 00:30:13,279  
um

809  
00:30:18,310 --> 00:30:16,399  
so we'll see what sort of storms we can

810  
00:30:19,190 --> 00:30:18,320  
get this year

811  
00:30:20,789 --> 00:30:19,200  
um

812  
00:30:23,830 --> 00:30:20,799  
as far as

813  
00:30:26,789 --> 00:30:23,840

questions go i guess maybe my first one

814

00:30:29,590 --> 00:30:26,799

would be uh for

815

00:30:33,110 --> 00:30:29,600

tom um

816

00:30:34,230 --> 00:30:33,120

now you've mentioned we can fly

817

00:30:42,710 --> 00:30:34,240

we can fly

818

00:30:44,230 --> 00:30:42,720

a time and

819

00:30:48,230 --> 00:30:44,240

those can be

820

00:30:49,990 --> 00:30:48,240

in coordination with either a noaa or a

821

00:30:51,430 --> 00:30:50,000

an air force plane so they could be

822

00:30:53,830 --> 00:30:51,440

flying through the same

823

00:30:55,750 --> 00:30:53,840

storm or on top of the same storm at the

824

00:30:58,149 --> 00:30:55,760

same time

825

00:30:59,750 --> 00:30:58,159

yeah that's true uh however uh remember

826

00:31:01,990 --> 00:30:59,760

these aircraft are typically going to be

827

00:31:05,510 --> 00:31:02,000

at different altitudes obviously we're

828

00:31:07,190 --> 00:31:05,520

the high flyers out there and then

829

00:31:09,590 --> 00:31:07,200

the other aircraft will be in there but

830

00:31:11,269 --> 00:31:09,600

we do have a pretty um

831

00:31:13,029 --> 00:31:11,279

good communications plan this is

832

00:31:14,549 --> 00:31:13,039

something we've been working on for a

833

00:31:16,789 --> 00:31:14,559

long time in fact it's been years in

834

00:31:18,789 --> 00:31:16,799

development

835

00:31:21,430 --> 00:31:18,799

nasa and noaa have been doing hurricane

836

00:31:23,430 --> 00:31:21,440

research for a long time so uh that's

837

00:31:25,830 --> 00:31:23,440

key as marilyn said is the coordination

838

00:31:28,870 --> 00:31:25,840

between all the external agencies

839

00:31:47,430 --> 00:31:28,880

so we have this plan that we use and

840

00:31:51,669 --> 00:31:49,110

network kicked me off there for a second

841

00:31:54,710 --> 00:31:51,679

so okay no problem

842

00:31:56,149 --> 00:31:54,720

so we uh uh follow this plan pretty uh

843

00:31:58,149 --> 00:31:56,159

pretty closely to make sure that

844

00:31:59,990 --> 00:31:58,159

everybody is uh um

845

00:32:02,310 --> 00:32:00,000

not in the same airspace at the same

846

00:32:04,389 --> 00:32:02,320

time and we're not dropping things

847

00:32:07,350 --> 00:32:04,399

in a place where we won't want to draw

848

00:32:09,029 --> 00:32:07,360

so right that that's the key here and uh

849

00:32:11,269 --> 00:32:09,039

you know maryland does a really good job

850

00:32:17,110 --> 00:32:11,279

of corralling everybody together and

851  
00:32:20,630 --> 00:32:19,269  
terrific so yeah i guess i mean one

852  
00:32:22,710 --> 00:32:20,640  
thing that just

853  
00:32:25,269 --> 00:32:22,720  
if anyone

854  
00:32:26,830 --> 00:32:25,279  
is curious if these these planes don't

855  
00:32:29,269 --> 00:32:26,840  
replace what we have now in terms of

856  
00:32:31,509 --> 00:32:29,279  
demand missions that fly right into the

857  
00:32:34,149 --> 00:32:31,519  
eye of a hurricane and measure the

858  
00:32:36,070 --> 00:32:34,159  
maximum winds and all that so these are

859  
00:32:37,590 --> 00:32:36,080  
just kind of a really great extra

860  
00:32:39,350 --> 00:32:37,600  
resource

861  
00:32:41,190 --> 00:32:39,360  
um to

862  
00:32:42,549 --> 00:32:41,200  
go ahead yeah that's that's true brian

863  
00:32:45,509 --> 00:32:42,559

and that's really the same for any

864

00:32:47,990 --> 00:32:45,519

aircraft all aircraft are uh are good at

865

00:32:49,750 --> 00:32:48,000

doing certain things and really the key

866

00:32:52,710 --> 00:32:49,760

is combining all of these aircraft

867

00:32:53,990 --> 00:32:52,720

together and uh using the advantages of

868

00:32:57,029 --> 00:32:54,000

each of them it provides a lot of

869

00:32:58,870 --> 00:32:57,039

synergy for the whole project as a whole

870

00:33:00,789 --> 00:32:58,880

absolutely yeah it's wonderful and being

871

00:33:03,509 --> 00:33:00,799

able to go out and get the

872

00:33:04,789 --> 00:33:03,519

wind fields from storms in the far east

873

00:33:07,029 --> 00:33:04,799

eastern atlantic is something we've

874

00:33:08,389 --> 00:33:07,039

never been able to do

875

00:33:12,389 --> 00:33:08,399

um

876

00:33:15,669 --> 00:33:12,399

and then again the the big push on

877

00:33:16,789 --> 00:33:15,679

being able to to understand the uh dry

878

00:33:19,350 --> 00:33:16,799

air

879

00:33:21,830 --> 00:33:19,360

coming off of africa the these saharan

880

00:33:24,389 --> 00:33:21,840

air layers is a huge mystery

881

00:33:25,990 --> 00:33:24,399

um what what impact that has on

882

00:33:29,990 --> 00:33:26,000

hurricane

883

00:33:30,950 --> 00:33:30,000

or if they strengthen at all

884

00:33:32,549 --> 00:33:30,960

um

885

00:33:34,310 --> 00:33:32,559

there's some

886

00:33:35,750 --> 00:33:34,320

some proof that

887

00:33:37,350 --> 00:33:35,760

that the

888

00:33:38,710 --> 00:33:37,360

saharan air layer can actually help

889

00:33:40,549 --> 00:33:38,720

storms and

890

00:33:42,470 --> 00:33:40,559

some on the flip side that it's not so

891

00:33:43,750 --> 00:33:42,480

good for them

892

00:33:44,789 --> 00:33:43,760

um

893

00:33:45,750 --> 00:33:44,799

so

894

00:33:47,590 --> 00:33:45,760

um

895

00:33:49,750 --> 00:33:47,600

maybe a question then for

896

00:33:53,909 --> 00:33:49,760

scott would be what happens to these

897

00:33:55,750 --> 00:33:53,919

instruments after hs3 is over

898

00:33:57,029 --> 00:33:55,760

obviously there's some great instruments

899

00:33:57,909 --> 00:33:57,039

at work here

900

00:33:59,830 --> 00:33:57,919

um

901  
00:34:01,830 --> 00:33:59,840  
do they just get retired or what's their

902  
00:34:04,470 --> 00:34:01,840  
future

903  
00:34:07,350 --> 00:34:04,480  
uh no they won't be retired uh all these

904  
00:34:08,310 --> 00:34:07,360  
instruments are generally funded uh

905  
00:34:10,470 --> 00:34:08,320  
through

906  
00:34:13,270 --> 00:34:10,480  
various research programs so right now

907  
00:34:14,389 --> 00:34:13,280  
they're committed to hs3 for three years

908  
00:34:16,069 --> 00:34:14,399  
of flights

909  
00:34:17,190 --> 00:34:16,079  
when this is done

910  
00:34:18,149 --> 00:34:17,200  
they'll

911  
00:34:19,829 --> 00:34:18,159  
likely

912  
00:34:22,389 --> 00:34:19,839  
be trying to get funding for additional

913  
00:34:23,270 --> 00:34:22,399

support for other campaigns for example

914

00:34:25,430 --> 00:34:23,280

uh

915

00:34:28,470 --> 00:34:25,440

hsc was funded under the first round of

916

00:34:31,190 --> 00:34:28,480

nasa's earth venture suborbital call uh

917

00:34:33,589 --> 00:34:31,200

back in 2009 and right now they're going

918

00:34:35,750 --> 00:34:33,599

through the process of select of getting

919

00:34:37,589 --> 00:34:35,760

uh new proposals and next year they'll

920

00:34:38,790 --> 00:34:37,599

make selections for a new round and so

921

00:34:40,790 --> 00:34:38,800

it's possible that some of these

922

00:34:43,349 --> 00:34:40,800

instruments will get funded for other

923

00:34:45,829 --> 00:34:43,359

projects whether it's hurricanes uh

924

00:34:47,270 --> 00:34:45,839

winter storms uh maybe more climate and

925

00:34:48,790 --> 00:34:47,280

chemistry well these wouldn't be

926  
00:34:49,909 --> 00:34:48,800  
necessary for climate chemistry some of

927  
00:34:52,790 --> 00:34:49,919  
them might be

928  
00:34:55,190 --> 00:34:52,800  
um but basically they're

929  
00:34:55,990 --> 00:34:55,200  
tied to opportunities for funding

930  
00:34:57,589 --> 00:34:56,000  
uh

931  
00:34:59,349 --> 00:34:57,599  
and so it's kind of hard to say what

932  
00:35:00,790 --> 00:34:59,359  
will happen next for a lot of these

933  
00:35:02,390 --> 00:35:00,800  
instruments other than that they'll

934  
00:35:04,230 --> 00:35:02,400  
eventually find their way into another

935  
00:35:06,470 --> 00:35:04,240  
project somewhere

936  
00:35:07,589 --> 00:35:06,480  
all right and speaking of that um is

937  
00:35:10,390 --> 00:35:07,599  
there

938  
00:35:12,470 --> 00:35:10,400

uh

939

00:35:13,270 --> 00:35:12,480

have you guys kind of put on the wish

940

00:35:15,109 --> 00:35:13,280

list

941

00:35:16,710 --> 00:35:15,119

being able to have a global hawk in the

942

00:35:18,870 --> 00:35:16,720

long term for

943

00:35:21,030 --> 00:35:18,880

hurricane recon

944

00:35:22,790 --> 00:35:21,040

uh well with nasa with hs3 you know

945

00:35:25,030 --> 00:35:22,800

again it's only funded for the five

946

00:35:29,270 --> 00:35:25,040

years and there's no real plan for for

947

00:35:31,510 --> 00:35:29,280

the long term uh within nasa as regular

948

00:35:32,790 --> 00:35:31,520

reconnaissance since we do more or more

949

00:35:35,349 --> 00:35:32,800

research oriented rather than

950

00:35:37,510 --> 00:35:35,359

operational uh operationally oriented

951  
00:35:39,910 --> 00:35:37,520  
however we are having some discussions

952  
00:35:42,230 --> 00:35:39,920  
with noaa noaa has a a very deep

953  
00:35:44,230 --> 00:35:42,240  
interest in using the aircraft for both

954  
00:35:45,990 --> 00:35:44,240  
hurricanes and winter storms and there

955  
00:35:47,670 --> 00:35:46,000  
are some discussions at high levels

956  
00:35:48,870 --> 00:35:47,680  
about trying to

957  
00:35:50,310 --> 00:35:48,880  
um

958  
00:35:53,030 --> 00:35:50,320  
make the earth want at least one of the

959  
00:35:54,790 --> 00:35:53,040  
aircraft or maybe both available to noaa

960  
00:35:56,230 --> 00:35:54,800  
uh contingent upon

961  
00:35:59,349 --> 00:35:56,240  
being able to work out the some of the

962  
00:36:01,030 --> 00:35:59,359  
funding issues terrific

963  
00:36:03,510 --> 00:36:01,040

all right i think that's

964

00:36:05,430 --> 00:36:03,520

that's my main questions right now

965

00:36:07,430 --> 00:36:05,440

thank you guys all right thank you brian

966

00:36:10,550 --> 00:36:07,440

uh we have uh quite a number of reporter

967

00:36:12,950 --> 00:36:10,560

questions um and questions from google

968

00:36:15,510 --> 00:36:12,960

youtube and twitter um the first

969

00:36:17,430 --> 00:36:15,520

question is from carrie rose and carrie

970

00:36:19,109 --> 00:36:17,440

has addressed to scott

971

00:36:20,950 --> 00:36:19,119

scott she would like to know she would

972

00:36:22,710 --> 00:36:20,960

like you to restate which piggyback

973

00:36:25,109 --> 00:36:22,720

instrument is being added to the

974

00:36:27,030 --> 00:36:25,119

overstorm aircraft

975

00:36:29,349 --> 00:36:27,040

well the acronym for the instrument is

976

00:36:31,670 --> 00:36:29,359

the dell a-d-e-l-e

977

00:36:33,910 --> 00:36:31,680

uh i can't off the top of my head

978

00:36:35,990 --> 00:36:33,920

remember what the acronym stands for but

979

00:36:38,390 --> 00:36:36,000

it's a gamma-ray uh

980

00:36:39,990 --> 00:36:38,400

detector so basically it's looking for

981

00:36:42,069 --> 00:36:40,000

gamma rays that are emitted from

982

00:36:43,589 --> 00:36:42,079

lightning at the top of the storm uh

983

00:36:46,790 --> 00:36:43,599

well the gamma rays are emitted from the

984

00:36:48,470 --> 00:36:46,800

top of the storm um and so they're

985

00:36:49,990 --> 00:36:48,480

they're they're relatively rare events

986

00:36:51,670 --> 00:36:50,000

but this is an opportunity for them to

987

00:36:53,430 --> 00:36:51,680

get on a high altitude aircraft where

988

00:36:56,069 --> 00:36:53,440

they might be readily able to see these

989

00:36:57,670 --> 00:36:56,079

types of phenomena

990

00:37:00,870 --> 00:36:57,680

and adele is not named after the pop

991

00:37:02,470 --> 00:37:00,880

singer who's saying sky fall by the way

992

00:37:04,710 --> 00:37:02,480

um and by the way we're getting a lot of

993

00:37:07,270 --> 00:37:04,720

questions about whether or not uh hs3

994

00:37:08,790 --> 00:37:07,280

will see a sharknado and the answer to

995

00:37:10,550 --> 00:37:08,800

that is no

996

00:37:12,069 --> 00:37:10,560

so for everybody who sent out that

997

00:37:14,069 --> 00:37:12,079

question though we could just move on

998

00:37:16,150 --> 00:37:14,079

from there no sharknados occur on too

999

00:37:18,310 --> 00:37:16,160

small of a scale

1000

00:37:20,829 --> 00:37:18,320

thank you scott

1001

00:37:23,030 --> 00:37:20,839

uh another uh reported question

1002

00:37:26,069 --> 00:37:23,040

um this question

1003

00:37:28,150 --> 00:37:26,079

is how do the instruments on hs3 compare

1004

00:37:31,190 --> 00:37:28,160

to the instruments that are already in

1005

00:37:34,069 --> 00:37:31,200

use by satellites

1006

00:37:36,069 --> 00:37:34,079

uh well some of the instruments are are

1007

00:37:38,069 --> 00:37:36,079

similar in some ways to what's on

1008

00:37:39,910 --> 00:37:38,079

satellites uh the scanning his

1009

00:37:42,310 --> 00:37:39,920

instrument is very similar to the ayers

1010

00:37:43,589 --> 00:37:42,320

instrument that's on the aqua satellite

1011

00:37:44,950 --> 00:37:43,599

um

1012

00:37:47,589 --> 00:37:44,960

which basically gives you temperature

1013

00:37:49,030 --> 00:37:47,599

and humidity profiles uh the cloud

1014

00:37:50,390 --> 00:37:49,040

physics lidar and the nose of the

1015

00:37:52,550 --> 00:37:50,400

environmental aircraft

1016

00:37:54,310 --> 00:37:52,560

uh is basically the same type of

1017

00:37:55,990 --> 00:37:54,320

measurement as we get from a satellite

1018

00:37:59,589 --> 00:37:56,000

called calypso

1019

00:38:00,710 --> 00:37:59,599

that gives profiles and dust and clouds

1020

00:38:03,829 --> 00:38:00,720

um

1021

00:38:06,870 --> 00:38:03,839

in terms of the overstorm aircraft the

1022

00:38:08,470 --> 00:38:06,880

doppler radar is is sort of an advanced

1023

00:38:10,230 --> 00:38:08,480

version of something that we'll see

1024

00:38:12,550 --> 00:38:10,240

right now with our tropical rainfall

1025

00:38:14,790 --> 00:38:12,560

measuring mission uh satellite that's

1026  
00:38:17,190 --> 00:38:14,800  
been going for about more than 15 years

1027  
00:38:20,950 --> 00:38:17,200  
now it has the first and only

1028  
00:38:22,390 --> 00:38:20,960  
rain or precipitation radar in space

1029  
00:38:24,310 --> 00:38:22,400  
but it's there's going to be a follow-on

1030  
00:38:25,750 --> 00:38:24,320  
mission that launches next february

1031  
00:38:27,670 --> 00:38:25,760  
called the global precipitation

1032  
00:38:29,670 --> 00:38:27,680  
measurement mission which will be a dual

1033  
00:38:31,990 --> 00:38:29,680  
frequency radar

1034  
00:38:34,150 --> 00:38:32,000  
just getting precipitation profiles not

1035  
00:38:36,230 --> 00:38:34,160  
wind information from space but the two

1036  
00:38:37,990 --> 00:38:36,240  
frequencies on the gpm satellite are

1037  
00:38:40,470 --> 00:38:38,000  
identical to what we have on the high

1038  
00:38:41,990 --> 00:38:40,480

rep doppler radar

1039

00:38:46,230 --> 00:38:42,000

the

1040

00:38:49,670 --> 00:38:46,240

and don't really necessarily have a

1041

00:38:51,589 --> 00:38:49,680

space equivalent at this point

1042

00:38:54,470 --> 00:38:51,599

thank you scott um there are a couple

1043

00:38:55,510 --> 00:38:54,480

more couple of questions from fiona

1044

00:38:57,990 --> 00:38:55,520

tall

1045

00:39:00,310 --> 00:38:58,000

one question is it is it possible to

1046

00:39:01,349 --> 00:39:00,320

access the data about hurricane nadine

1047

00:39:02,790 --> 00:39:01,359

um

1048

00:39:05,589 --> 00:39:02,800

from

1049

00:39:07,670 --> 00:39:05,599

a non-hs3 perspective or actually even

1050

00:39:09,510 --> 00:39:07,680

including an hs3 perspective you can

1051  
00:39:12,790 --> 00:39:09,520  
find nadine under the nasa hurricane

1052  
00:39:15,990 --> 00:39:12,800  
page archives at nasa.gov hurricane in

1053  
00:39:17,510 --> 00:39:16,000  
the 2012 list of storms where we do have

1054  
00:39:18,470 --> 00:39:17,520  
a lot of the different nasa satellite

1055  
00:39:20,870 --> 00:39:18,480  
data

1056  
00:39:22,550 --> 00:39:20,880  
as well as some of the information from

1057  
00:39:24,950 --> 00:39:22,560  
when hs3

1058  
00:39:26,150 --> 00:39:24,960  
sent the global hawks over it

1059  
00:39:29,750 --> 00:39:26,160  
scott would you like to follow up with

1060  
00:39:31,589 --> 00:39:29,760  
that uh yeah all the data is made uh

1061  
00:39:34,069 --> 00:39:31,599  
freely available to the public uh

1062  
00:39:37,349 --> 00:39:34,079  
anybody who wants to use it uh if people

1063  
00:39:38,310 --> 00:39:37,359

go to our project web page

1064

00:39:41,349 --> 00:39:38,320

which is

1065

00:39:47,030 --> 00:39:44,710

hs3 there's a link on the left side that

1066

00:39:49,910 --> 00:39:47,040

is for data and and we it basically

1067

00:39:52,470 --> 00:39:49,920

links you to archived web pages for each

1068

00:39:54,390 --> 00:39:52,480

of the instruments uh that have that

1069

00:39:55,829 --> 00:39:54,400

flew on the environmental aircraft last

1070

00:39:57,109 --> 00:39:55,839

year

1071

00:39:59,190 --> 00:39:57,119

of course it takes some level of

1072

00:40:00,710 --> 00:39:59,200

expertise to learn how to use these data

1073

00:40:02,310 --> 00:40:00,720

sets but for any researchers in

1074

00:40:04,230 --> 00:40:02,320

particular who are interested in using

1075

00:40:06,470 --> 00:40:04,240

these data they can just go to those

1076

00:40:08,150 --> 00:40:06,480

websites and and download the data and

1077

00:40:10,390 --> 00:40:08,160

start working with them

1078

00:40:12,230 --> 00:40:10,400

typically after data is collected while

1079

00:40:14,630 --> 00:40:12,240

we're in the field there's a period of

1080

00:40:17,430 --> 00:40:14,640

about six months where

1081

00:40:19,349 --> 00:40:17,440

the data is processed quality controlled

1082

00:40:21,670 --> 00:40:19,359

and then once we make sure everything is

1083

00:40:23,910 --> 00:40:21,680

all right then we we put the link on the

1084

00:40:26,150 --> 00:40:23,920

web page so that it becomes available to

1085

00:40:28,310 --> 00:40:26,160

anybody who wants to use it

1086

00:40:29,670 --> 00:40:28,320

okay

1087

00:40:32,710 --> 00:40:29,680

thank you scott

1088

00:40:36,390 --> 00:40:32,720

um the next question is about education

1089

00:40:38,230 --> 00:40:36,400

materials on hs3 and hurricanes for

1090

00:40:39,589 --> 00:40:38,240

education materials on hurricanes in

1091

00:40:42,310 --> 00:40:39,599

general you can also go back to the

1092

00:40:44,550 --> 00:40:42,320

national arcane page nasa.gov hurricane

1093

00:40:46,390 --> 00:40:44,560

there is an educators section there

1094

00:40:50,470 --> 00:40:46,400

i'm going to throw it to maryland

1095

00:40:53,430 --> 00:40:50,480

vasquez about the hs3

1096

00:40:56,550 --> 00:40:53,440

yes thank you i'm glad to be back um

1097

00:40:58,230 --> 00:40:56,560

the we do have uh materials uh there's

1098

00:41:00,550 --> 00:40:58,240

in for information on our website that

1099

00:41:03,030 --> 00:41:00,560

scott talked about um i think that's the

1100

00:41:04,230 --> 00:41:03,040

best place we also have links to

1101  
00:41:06,309 --> 00:41:04,240  
information

1102  
00:41:09,750 --> 00:41:06,319  
in our calendar about events that have

1103  
00:41:11,349 --> 00:41:09,760  
to do with epo or public affairs so i

1104  
00:41:14,309 --> 00:41:11,359  
would say the best place to start is our

1105  
00:41:17,589 --> 00:41:16,069  
thank you marilyn

1106  
00:41:20,309 --> 00:41:17,599  
uh we have a question from seth

1107  
00:41:22,390 --> 00:41:20,319  
bornstein of associated press and this

1108  
00:41:24,630 --> 00:41:22,400  
one involves operational data will the

1109  
00:41:26,470 --> 00:41:24,640  
national hurricane center forecasters be

1110  
00:41:29,430 --> 00:41:26,480  
able to use any of the data for their

1111  
00:41:32,950 --> 00:41:31,510  
all right well um from the environmental

1112  
00:41:34,470 --> 00:41:32,960  
aircraft

1113  
00:41:36,550 --> 00:41:34,480

the drops on data

1114

00:41:37,990 --> 00:41:36,560

does get used it's it's processed in

1115

00:41:40,630 --> 00:41:38,000

real time

1116

00:41:42,630 --> 00:41:40,640

by people at the noaa hurricane research

1117

00:41:45,270 --> 00:41:42,640

division and then they pass the

1118

00:41:46,950 --> 00:41:45,280

information uh on to the national

1119

00:41:48,390 --> 00:41:46,960

hurricane center

1120

00:41:51,030 --> 00:41:48,400

in addition the

1121

00:41:53,670 --> 00:41:51,040

data is uploaded to a global

1122

00:41:54,710 --> 00:41:53,680

uh system for sharing the data and it's

1123

00:41:56,550 --> 00:41:54,720

so it's available not only for the

1124

00:41:58,790 --> 00:41:56,560

hurricane center but for operational

1125

00:42:00,790 --> 00:41:58,800

forecast centers who might want to

1126

00:42:01,829 --> 00:42:00,800

ingest that data into the forecast

1127

00:42:03,589 --> 00:42:01,839

models

1128

00:42:05,670 --> 00:42:03,599

the other data such as from the cloud

1129

00:42:07,109 --> 00:42:05,680

physics lidar and scanning his

1130

00:42:09,910 --> 00:42:07,119

are not as

1131

00:42:11,190 --> 00:42:09,920

easy to use operationally

1132

00:42:13,270 --> 00:42:11,200

but we

1133

00:42:14,870 --> 00:42:13,280

can make some of the data available in

1134

00:42:16,870 --> 00:42:14,880

real time i think they're going to be

1135

00:42:19,270 --> 00:42:16,880

particularly interested in the data from

1136

00:42:21,030 --> 00:42:19,280

our overstorm aircraft and since this is

1137

00:42:23,430 --> 00:42:21,040

our first year of flying the overstorm

1138

00:42:25,270 --> 00:42:23,440

aircraft and the field

1139

00:42:25,990 --> 00:42:25,280

we have to see what we can do in terms

1140

00:42:28,390 --> 00:42:26,000

of

1141

00:42:31,589 --> 00:42:28,400

getting that data to them in real time

1142

00:42:33,349 --> 00:42:31,599

when you're trying to download uh large

1143

00:42:35,829 --> 00:42:33,359

data sets from an aircraft down to the

1144

00:42:37,349 --> 00:42:35,839

ground we're limited by bandwidth and

1145

00:42:40,309 --> 00:42:37,359

and it can be hard to get the

1146

00:42:41,670 --> 00:42:40,319

information down uh quickly uh and with

1147

00:42:44,390 --> 00:42:41,680

the sort of products that they want to

1148

00:42:45,510 --> 00:42:44,400

see so this year sort of a test for us

1149

00:42:47,670 --> 00:42:45,520

to to

1150

00:42:50,390 --> 00:42:47,680

uh produce certain types of products we

1151

00:42:52,069 --> 00:42:50,400

think would be useful for them

1152

00:42:53,829 --> 00:42:52,079

share that with them maybe not

1153

00:42:55,670 --> 00:42:53,839

necessarily in real time but shortly

1154

00:42:57,430 --> 00:42:55,680

after to get some feedback and then

1155

00:42:59,829 --> 00:42:57,440

hopefully by next year

1156

00:43:01,670 --> 00:42:59,839

we can try to get the data to them in

1157

00:43:04,069 --> 00:43:01,680

real time where it could help with their

1158

00:43:06,069 --> 00:43:04,079

forecast operations these are things

1159

00:43:07,589 --> 00:43:06,079

that we're not required to do but we

1160

00:43:09,670 --> 00:43:07,599

certainly try to do on a best effort

1161

00:43:11,750 --> 00:43:09,680

basis because we know that they will

1162

00:43:13,670 --> 00:43:11,760

that they can be beneficial and so we're

1163

00:43:15,990 --> 00:43:13,680

making every effort to do it but again

1164

00:43:18,870 --> 00:43:16,000

you need to keep in mind that this is a

1165

00:43:21,349 --> 00:43:18,880

a fairly complex operation a lot of

1166

00:43:23,109 --> 00:43:21,359

things being done for the first time and

1167

00:43:25,270 --> 00:43:23,119

there's some kinks to be worked out in

1168

00:43:27,430 --> 00:43:25,280

communicating such large data sets in

1169

00:43:28,790 --> 00:43:27,440

real time

1170

00:43:30,470 --> 00:43:28,800

all right thank you scott we have

1171

00:43:32,550 --> 00:43:30,480

another question from elizabeth harbaugh

1172

00:43:34,870 --> 00:43:32,560

she actually would like you to elaborate

1173

00:43:37,510 --> 00:43:34,880

on the saharan air layer

1174

00:43:41,270 --> 00:43:37,520

and why it may help hurricanes either

1175

00:43:43,349 --> 00:43:41,280

intensify or it may

1176

00:43:45,829 --> 00:43:43,359

help them fizzle out

1177

00:43:47,750 --> 00:43:45,839

okay well it helps to kind of keep in

1178

00:43:50,309 --> 00:43:47,760

mind certain things that that are needed

1179

00:43:52,069 --> 00:43:50,319

for hurricanes to form and grow

1180

00:43:54,390 --> 00:43:52,079

one you need to have

1181

00:43:56,790 --> 00:43:54,400

fairly humid air to foster cloud

1182

00:43:58,790 --> 00:43:56,800

development dry air tends to disrupt

1183

00:44:00,710 --> 00:43:58,800

cloud development and and even lead the

1184

00:44:02,470 --> 00:44:00,720

cooling down near the surface due to in

1185

00:44:03,990 --> 00:44:02,480

downdrafts

1186

00:44:06,230 --> 00:44:04,000

you also need the air to be fairly

1187

00:44:08,150 --> 00:44:06,240

unstable so where when it starts to rise

1188

00:44:09,829 --> 00:44:08,160

it wants to continue to rise to develop

1189

00:44:12,069 --> 00:44:09,839

a deep thunderstorm

1190

00:44:13,030 --> 00:44:12,079

whereas the air becomes stable it might

1191

00:44:15,589 --> 00:44:13,040

tend to

1192

00:44:16,790 --> 00:44:15,599

prevent that rising motion

1193

00:44:18,150 --> 00:44:16,800

and then also

1194

00:44:19,670 --> 00:44:18,160

hurricanes

1195

00:44:22,069 --> 00:44:19,680

and developing tropical storms don't

1196

00:44:25,109 --> 00:44:22,079

like what's called vertical wind shear

1197

00:44:27,510 --> 00:44:25,119

this is the change of winds with height

1198

00:44:29,109 --> 00:44:27,520

and that can have a shearing effect on

1199

00:44:31,109 --> 00:44:29,119

the storms and basically rip them apart

1200

00:44:32,790 --> 00:44:31,119

if the shear becomes too strong

1201

00:44:37,109 --> 00:44:32,800

so with the saharan air layer it's a

1202

00:44:39,190 --> 00:44:37,119

very hot dry dusty air mass and

1203

00:44:41,589 --> 00:44:39,200

in that layer itself

1204

00:44:42,950 --> 00:44:41,599

that hot air overrides cooler air near

1205

00:44:44,710 --> 00:44:42,960

the surface so it tends to be very

1206

00:44:47,109 --> 00:44:44,720

stable and it's hard to get deep cloud

1207

00:44:49,990 --> 00:44:47,119

development the dry air can potentially

1208

00:44:52,309 --> 00:44:50,000

mix into storms and kind of cause them

1209

00:44:54,710 --> 00:44:52,319

to lose some energy and then on the

1210

00:44:57,190 --> 00:44:54,720

southern side of the saharan air layer

1211

00:44:59,430 --> 00:44:57,200

there tends to be a strong mid-level

1212

00:45:01,030 --> 00:44:59,440

wind maximum or jet

1213

00:45:02,309 --> 00:45:01,040

that can increase the vertical wind

1214

00:45:04,230 --> 00:45:02,319

shear so those are some of the arguments

1215

00:45:06,230 --> 00:45:04,240

about why it may inhibit storm

1216

00:45:08,230 --> 00:45:06,240

development just through increasing

1217

00:45:10,150 --> 00:45:08,240

stability bringing dry air and

1218

00:45:13,270 --> 00:45:10,160

increasing vertical wind shear

1219

00:45:15,510 --> 00:45:13,280

now the arguments as for why it may have

1220

00:45:17,349 --> 00:45:15,520

a positive influence on growth is a

1221

00:45:19,109 --> 00:45:17,359

little bit more complex but it has to do

1222

00:45:21,990 --> 00:45:19,119

with the energetics of the large-scale

1223

00:45:23,750 --> 00:45:22,000

wave uh in which the storm is embedded

1224

00:45:26,550 --> 00:45:23,760

and basically the southern side of the

1225

00:45:28,710 --> 00:45:26,560

sow acts kind of like a front

1226

00:45:30,710 --> 00:45:28,720

and it may foster a vertical circulation

1227

00:45:32,950 --> 00:45:30,720

that leads to rising motion south of

1228

00:45:36,309 --> 00:45:32,960

that front which is where you would

1229

00:45:38,230 --> 00:45:36,319

typically get a tropical cloud formation

1230

00:45:41,349 --> 00:45:38,240

and so it may enhance that

1231

00:45:43,589 --> 00:45:41,359

in addition it may allow for conversions

1232

00:45:45,270 --> 00:45:43,599

of energy from the larger scale down to

1233

00:45:48,230 --> 00:45:45,280

the scale of the

1234

00:45:49,990 --> 00:45:48,240

developing hurricane

1235

00:45:53,109 --> 00:45:50,000

a sort of large-scale dynamical

1236

00:45:55,270 --> 00:45:53,119

instability that may favor growth

1237

00:45:56,550 --> 00:45:55,280

and it's a little bit hard to determine

1238

00:45:57,990 --> 00:45:56,560

at this point

1239

00:46:01,270 --> 00:45:58,000

whether the

1240

00:46:03,829 --> 00:46:01,280

positive influences outweigh uh the

1241

00:46:05,349 --> 00:46:03,839

negative influences or if it may vary

1242

00:46:06,630 --> 00:46:05,359

from case to case so that's one of the

1243

00:46:07,670 --> 00:46:06,640

things that we want to do is get some

1244

00:46:09,670 --> 00:46:07,680

data

1245

00:46:11,270 --> 00:46:09,680

on these storms these things

1246

00:46:12,950 --> 00:46:11,280

are most prominent out in the central

1247

00:46:15,430 --> 00:46:12,960

and eastern atlantic where we often

1248

00:46:17,990 --> 00:46:15,440

don't get uh much data so that's one of

1249

00:46:20,150 --> 00:46:18,000

the motivations for us is to get out to

1250

00:46:21,589 --> 00:46:20,160

these storms much earlier and look at

1251

00:46:23,270 --> 00:46:21,599

this interaction in a way that we

1252

00:46:27,430 --> 00:46:23,280

haven't been able to do

1253

00:46:31,589 --> 00:46:29,349

okay thank you scott um we have another

1254

00:46:34,150 --> 00:46:31,599

question um

1255

00:46:36,150 --> 00:46:34,160

about the drop songs the the question is

1256

00:46:37,430 --> 00:46:36,160

are the small cylindrical tube sensors

1257

00:46:39,829 --> 00:46:37,440

that you mentioned

1258

00:46:42,870 --> 00:46:39,839

able to be recovered or are they and

1259

00:46:44,710 --> 00:46:42,880

reused or are they single use only

1260

00:46:47,910 --> 00:46:44,720

no they're a single use only they're

1261

00:46:49,990 --> 00:46:47,920

basically falling uh to the surface uh

1262

00:46:52,309 --> 00:46:50,000

while they do have a gps sensor in it to

1263

00:46:54,470 --> 00:46:52,319

tell us their exact position

1264

00:46:56,309 --> 00:46:54,480

um i don't believe that they float or at

1265

00:46:58,069 --> 00:46:56,319

least not for long and they'd be pretty

1266

00:47:00,069 --> 00:46:58,079

difficult to recover so they're

1267

00:47:03,109 --> 00:47:00,079

basically expendables that are used once

1268

00:47:06,630 --> 00:47:04,470

i do think the national weather service

1269

00:47:08,950 --> 00:47:06,640

has a program where you can mail a drop

1270

00:47:12,309 --> 00:47:08,960

zone back though if it falls over land

1271

00:47:16,150 --> 00:47:12,319

somewhere but we're so far out at sea

1272

00:47:20,150 --> 00:47:18,550

thank you scott

1273

00:47:22,550 --> 00:47:20,160

let's see we have um

1274

00:47:24,309 --> 00:47:22,560

another question from twitter uh julie

1275

00:47:26,390 --> 00:47:24,319

bookman uh before i get to that just a

1276

00:47:28,550 --> 00:47:26,400

reminder we have about uh 12 minutes

1277

00:47:30,309 --> 00:47:28,560

left on the hangout if you have any

1278

00:47:33,589 --> 00:47:30,319

comments you can ask your comments

1279

00:47:35,349 --> 00:47:33,599

through youtube or twitter by hashtag

1280

00:47:37,349 --> 00:47:35,359

nasahs3

1281

00:47:38,550 --> 00:47:37,359

or you can ask them on the google plus

1282

00:47:39,510 --> 00:47:38,560

page

1283

00:47:41,990 --> 00:47:39,520

so the

1284

00:47:43,589 --> 00:47:42,000

the next question from julie bookman

1285

00:47:46,710 --> 00:47:43,599

um i'm sorry

1286

00:47:50,710 --> 00:47:48,710

let's see from julie book and write how

1287

00:47:53,750 --> 00:47:50,720

frequently does the drop song collect

1288

00:47:56,710 --> 00:47:53,760

temperature data and is drops on data

1289

00:48:00,150 --> 00:47:56,720

used to verify or qualify

1290

00:48:01,670 --> 00:48:00,160

temperature data collected by hamster

1291

00:48:02,790 --> 00:48:01,680

all right well the the data are

1292

00:48:05,349 --> 00:48:02,800

collected i'm trying to remember what

1293

00:48:07,990 --> 00:48:05,359

the number is it's like 1 or 10 hertz

1294

00:48:10,230 --> 00:48:08,000

that's about 1 to 10 times per second so

1295

00:48:11,510 --> 00:48:10,240

very high resolution

1296

00:48:15,750 --> 00:48:11,520

so we get

1297

00:48:18,150 --> 00:48:15,760

very basic extreme vertical resolution

1298

00:48:20,230 --> 00:48:18,160

which is extremely helpful

1299

00:48:22,230 --> 00:48:20,240

the hamster unfortunately is on the

1300

00:48:24,790 --> 00:48:22,240

other aircraft so we're not able to

1301

00:48:27,910 --> 00:48:24,800

verify the hamster profiles although in

1302

00:48:30,390 --> 00:48:27,920

in one of our test flights in 2011

1303

00:48:33,190 --> 00:48:30,400

uh we flew scanning his hamster and the

1304

00:48:34,950 --> 00:48:33,200

drop signs together uh for two flights

1305

00:48:37,510 --> 00:48:34,960

uh that and we were able to collect the

1306

00:48:41,349 --> 00:48:37,520

data set that was used to to verify the

1307

00:48:43,190 --> 00:48:41,359

retrieval algorithm for hamster now uh

1308

00:48:45,270 --> 00:48:43,200

within our hurricane flights you know

1309

00:48:47,910 --> 00:48:45,280

scanning his and drop center on on the

1310

00:48:49,510 --> 00:48:47,920

same uh aircraft and scanning his also

1311

00:48:52,069 --> 00:48:49,520

gets vertical profiles of temperature

1312

00:48:54,630 --> 00:48:52,079

and humidity uh primarily in the clear

1313

00:48:57,910 --> 00:48:54,640

air so it uh we are able to use the

1314

00:49:01,430 --> 00:48:57,920

drops on data to validate or verify the

1315

00:49:06,309 --> 00:49:03,750

okay thank you scott we're uh actually

1316

00:49:08,549 --> 00:49:06,319

seeing a video of a fly over uh from the

1317

00:49:10,870 --> 00:49:08,559

belly of the global hawk right now uh as

1318

00:49:14,390 --> 00:49:10,880

it flew over hurricane carl

1319

00:49:15,589 --> 00:49:14,400

in the eastern pacific ocean um

1320

00:49:18,790 --> 00:49:15,599

and i think that was from the grip

1321

00:49:19,990 --> 00:49:18,800

mission in 2010.

1322

00:49:22,069 --> 00:49:20,000

there's another question that came

1323

00:49:23,829 --> 00:49:22,079

through from christopher anderson and

1324

00:49:26,309 --> 00:49:23,839

christopher wants to know uh was the

1325

00:49:28,150 --> 00:49:26,319

global hawk custom made by lockheed or

1326

00:49:31,430 --> 00:49:28,160

was it repurposed from

1327

00:49:34,230 --> 00:49:31,440

the navy or air force version

1328

00:49:37,910 --> 00:49:34,240

i guess we can go over to maybe tom or

1329

00:49:39,910 --> 00:49:37,920

uh scott whoever wants to answer that

1330

00:49:42,230 --> 00:49:39,920

yeah um yeah i could probably speak to

1331

00:49:44,230 --> 00:49:42,240

that this this uh like i mentioned uh

1332

00:49:47,109 --> 00:49:44,240

earlier this aircraft behind me was

1333

00:49:50,230 --> 00:49:47,119

actually the technology demonstrator

1334

00:49:53,190 --> 00:49:50,240

built by northrop grumman ryan back in

1335

00:49:57,109 --> 00:49:53,200

mid 90s and it first flew in 1998 so

1336

00:49:59,349 --> 00:49:57,119

these aircraft were accessed by the air

1337

00:50:00,870 --> 00:49:59,359

we force them but they are they are

1338

00:50:03,430 --> 00:50:00,880

essentially what the air force have

1339

00:50:05,430 --> 00:50:03,440

thrown as their glock 10 aircraft they

1340

00:50:07,349 --> 00:50:05,440

have a larger version of it now that

1341

00:50:09,589 --> 00:50:07,359

they're flying opposition

1342

00:50:17,349 --> 00:50:09,599

and nasa has actually obtained a couple

1343

00:50:19,510 --> 00:50:18,630

thank you tom

1344

00:50:21,109 --> 00:50:19,520

um

1345

00:50:23,670 --> 00:50:21,119

we have one more question says how many

1346

00:50:26,549 --> 00:50:23,680

research planes would be flying during a

1347

00:50:29,910 --> 00:50:26,559

hurricane at one time will both planes

1348

00:50:32,150 --> 00:50:29,920

be flying or will it just be one

1349

00:50:33,910 --> 00:50:32,160

well we'll always be flying just one at

1350

00:50:36,390 --> 00:50:33,920

a time

1351

00:50:38,309 --> 00:50:36,400

as part of hs3 we don't have the

1352

00:50:40,630 --> 00:50:38,319

capability or manpower at the moment to

1353

00:50:42,150 --> 00:50:40,640

fly both simultaneously

1354

00:50:44,069 --> 00:50:42,160

in terms of the number of aircraft that

1355

00:50:46,470 --> 00:50:44,079

could be flying in the storm at any one

1356

00:50:48,390 --> 00:50:46,480

time it could be multiple aircraft you

1357

00:50:49,910 --> 00:50:48,400

you could potentially have one of our

1358

00:50:51,510 --> 00:50:49,920

global hawks

1359

00:50:53,910 --> 00:50:51,520

the noaa

1360

00:50:56,150 --> 00:50:53,920

p3 aircraft which is sort of a load of

1361

00:50:58,309 --> 00:50:56,160

mid-level flying aircraft

1362

00:51:00,069 --> 00:50:58,319

there's a noaa gulfstream four aircraft

1363

00:51:01,270 --> 00:51:00,079

that flies at uh somewhere higher

1364

00:51:03,270 --> 00:51:01,280

altitude

1365

00:51:04,630 --> 00:51:03,280

and then potentially air force aircraft

1366

00:51:07,430 --> 00:51:04,640

out there as well

1367

00:51:09,430 --> 00:51:07,440

back in 2010 during our

1368

00:51:11,910 --> 00:51:09,440

grip campaign or genesis and rapid

1369

00:51:13,270 --> 00:51:11,920

intensification experiment uh at one

1370

00:51:15,190 --> 00:51:13,280

point we actually had i think five

1371

00:51:18,390 --> 00:51:15,200

aircraft in the storm at one point there

1372

00:51:20,870 --> 00:51:18,400

was a three nasa aircraft uh two no

1373

00:51:22,549 --> 00:51:20,880

aircraft uh and at various times in air

1374

00:51:24,630 --> 00:51:22,559

force aircraft so

1375

00:51:28,710 --> 00:51:24,640

it is possible to have multiple aircraft

1376

00:51:33,030 --> 00:51:30,710

thank you scott um before we get back to

1377

00:51:35,030 --> 00:51:33,040

questions i just want to identify the

1378

00:51:38,069 --> 00:51:35,040

partners because this is a

1379

00:51:39,910 --> 00:51:38,079

quite an immense effort um coming

1380

00:51:42,630 --> 00:51:39,920

together there are several nasa centers

1381

00:51:45,109 --> 00:51:42,640

involved with uh with hs3 wallabies

1382

00:51:47,589 --> 00:51:45,119

flight facility is one center where the

1383

00:51:50,390 --> 00:51:47,599

the global hawks will be based um we

1384

00:51:52,390 --> 00:51:50,400

have ames research center uh the earth

1385

00:51:54,230 --> 00:51:52,400

science project office is located there

1386

00:51:56,390 --> 00:51:54,240

and they manage the project goddard

1387

00:51:58,390 --> 00:51:56,400

space flight center the dryden research

1388

00:52:00,309 --> 00:51:58,400

center where tom miller is broadcasting

1389

00:52:02,549 --> 00:52:00,319

from the marshall space flight center in

1390

00:52:05,349 --> 00:52:02,559

huntsville alabama and nasa's jet

1391

00:52:07,030 --> 00:52:05,359

propulsion laboratory in california

1392

00:52:08,950 --> 00:52:07,040

in addition to nasa though there are

1393

00:52:11,270 --> 00:52:08,960

other outside partners that have

1394

00:52:13,829 --> 00:52:11,280

contributed quite a bit to this mission

1395

00:52:15,910 --> 00:52:13,839

noaa's hurricane research division

1396

00:52:18,309 --> 00:52:15,920

is a is a part of this mission and the

1397

00:52:19,829 --> 00:52:18,319

earth system research laboratory the

1398

00:52:21,589 --> 00:52:19,839

national centers for environmental

1399

00:52:24,390 --> 00:52:21,599

prediction the naval post graduate

1400

00:52:26,790 --> 00:52:24,400

school the naval research laboratory

1401

00:52:29,190 --> 00:52:26,800

norfolk grumman

1402

00:52:31,349 --> 00:52:29,200

encar the nasa uh the national center

1403

00:52:33,190 --> 00:52:31,359

for atmospheric research state

1404

00:52:35,270 --> 00:52:33,200

university of new york at albany

1405

00:52:37,030 --> 00:52:35,280

university of maryland baltimore county

1406

00:52:39,030 --> 00:52:37,040

university of wisconsin and the

1407

00:52:41,750 --> 00:52:39,040

university of utah so as you can see

1408

00:52:43,589 --> 00:52:41,760

this is a quite an effort that

1409

00:52:45,030 --> 00:52:43,599

brings together all of these scientific

1410

00:52:47,430 --> 00:52:45,040

organizations

1411

00:52:49,990 --> 00:52:47,440

um just a reminder before we get to the

1412

00:52:52,710 --> 00:52:50,000

next question that the all of these

1413

00:52:58,230 --> 00:52:52,720

videos and images will be on the nasa

1414

00:52:59,750 --> 00:52:58,240

hs3 website nasa.gov slash hs3

1415

00:53:01,990 --> 00:52:59,760

and we also have

1416

00:53:03,990 --> 00:53:02,000

additional information on the nasa.gov

1417

00:53:06,230 --> 00:53:04,000

hurricane page

1418

00:53:07,270 --> 00:53:06,240

okay let's take another question

1419

00:53:09,430 --> 00:53:07,280

um

1420

00:53:10,470 --> 00:53:09,440

let's see from twitter

1421

00:53:14,230 --> 00:53:10,480

uh

1422

00:53:17,109 --> 00:53:14,240

bear with me for just a moment

1423

00:53:20,950 --> 00:53:17,119

what was the deadliest storm of 2012.

1424

00:53:22,710 --> 00:53:20,960

we'll throw that one over to scott

1425

00:53:25,270 --> 00:53:22,720

uh you know i don't have

1426

00:53:26,870 --> 00:53:25,280

that information offhand um

1427

00:53:29,349 --> 00:53:26,880

you know my focus last year was

1428

00:53:32,309 --> 00:53:29,359

primarily while we were in the field uh

1429

00:53:34,390 --> 00:53:32,319

superstorm sandy was probably uh

1430

00:53:35,750 --> 00:53:34,400

the deadliest but i can't confirm that

1431

00:53:39,990 --> 00:53:35,760

it's certainly

1432

00:53:44,549 --> 00:53:42,470

brian do you happen to uh do you want to

1433

00:53:47,030 --> 00:53:44,559

add into that

1434

00:53:48,309 --> 00:53:47,040

uh yeah i don't have that

1435

00:53:51,030 --> 00:53:48,319

um

1436

00:53:53,109 --> 00:53:51,040

right on hand either but i think that's

1437

00:53:55,750 --> 00:53:53,119

correct the only other storm of

1438

00:53:57,109 --> 00:53:55,760

significance that made landfall was

1439

00:53:58,710 --> 00:53:57,119

isaac

1440

00:53:59,829 --> 00:53:58,720

and that did cause some issues too but

1441

00:54:01,030 --> 00:53:59,839

no i

1442

00:54:01,829 --> 00:54:01,040

don't have that right in front of me it

1443

00:54:03,670 --> 00:54:01,839

would be

1444

00:54:05,829 --> 00:54:03,680

on the national hurricane center website

1445

00:54:08,150 --> 00:54:05,839

though you can look up the previous

1446

00:54:09,510 --> 00:54:08,160

years or any years tropical cyclone

1447

00:54:11,430 --> 00:54:09,520

reports or

1448

00:54:14,309 --> 00:54:11,440

tcr's they're called

1449

00:54:16,390 --> 00:54:14,319

so they can just look on the

1450

00:54:17,270 --> 00:54:16,400

nhc.noaa.gov

1451

00:54:19,990 --> 00:54:17,280

and

1452

00:54:21,829 --> 00:54:20,000

look for the tropical cyclone reports

1453

00:54:23,829 --> 00:54:21,839

okay thanks brian

1454

00:54:26,630 --> 00:54:23,839

um one more question from youtube uh do

1455

00:54:28,870 --> 00:54:26,640

you stage locations overseas for other

1456

00:54:32,069 --> 00:54:28,880

tropical cyclone areas besides the

1457

00:54:37,190 --> 00:54:34,950

um for hs3 we're not we're

1458

00:54:39,030 --> 00:54:37,200

simply focused on the atlantic uh there

1459

00:54:42,150 --> 00:54:39,040

is another earth venture

1460

00:54:43,750 --> 00:54:42,160

sub-orbital project called aatrex which

1461

00:54:45,670 --> 00:54:43,760

uh expects to have one of their

1462

00:54:47,589 --> 00:54:45,680

deployments out of guam i believe this

1463

00:54:49,990 --> 00:54:47,599

year and tom can probably speak more to

1464

00:54:54,549 --> 00:54:51,670

yeah that's correct scott we uh we'll

1465

00:54:59,030 --> 00:54:54,559

plan to go to uh guam earlier uh early

1466

00:55:01,910 --> 00:55:00,390

all right thank you both

1467

00:55:03,910 --> 00:55:01,920

um

1468

00:55:07,109 --> 00:55:03,920

do uh brian do you have any additional

1469

00:55:09,589 --> 00:55:07,119

questions for the the team

1470

00:55:11,270 --> 00:55:09,599

no i don't this was a lot of very good

1471

00:55:12,870 --> 00:55:11,280

questions asked asked by some other

1472

00:55:14,710 --> 00:55:12,880

folks too

1473

00:55:17,349 --> 00:55:14,720

okay um

1474

00:55:18,630 --> 00:55:17,359

marilyn tom and scott

1475

00:55:24,710 --> 00:55:18,640

are there any other things that you want

1476

00:55:29,109 --> 00:55:26,950

can't think of anything

1477

00:55:33,349 --> 00:55:29,119

okay so the the first

1478

00:55:34,710 --> 00:55:33,359

the first flight is august 20th

1479

00:55:37,030 --> 00:55:34,720

and that's leaving that's departing

1480

00:55:39,750 --> 00:55:37,040

wallops that'll be the first potential

1481

00:55:41,589 --> 00:55:39,760

science flight uh our operational window

1482

00:55:43,510 --> 00:55:41,599

for science flights is august 20th to

1483

00:55:45,829 --> 00:55:43,520

about september 23rd

1484

00:55:47,430 --> 00:55:45,839

um of course whether or not we fly that

1485

00:55:48,950 --> 00:55:47,440

particular day or any other particular

1486

00:55:51,109 --> 00:55:48,960

day depends on whether targets are

1487

00:55:52,950 --> 00:55:51,119

available uh depends on the weather at

1488

00:55:54,470 --> 00:55:52,960

wallops because we're an unmanned

1489

00:55:58,950 --> 00:55:54,480

aircraft

1490

00:56:01,030 --> 00:55:58,960

with pilots to act as the eyes

1491

00:56:05,349 --> 00:56:01,040

of the pilots on the ground

1492

00:56:07,589 --> 00:56:05,359

so bad whether it was keep us grounded

1493

00:56:09,829 --> 00:56:07,599

but the planes will actually transit uh

1494

00:56:12,710 --> 00:56:09,839

the week of the august 12th so they will

1495

00:56:13,910 --> 00:56:12,720

leave dryden and landon at wallops at

1496

00:56:18,789 --> 00:56:13,920

that time and that will that's when

1497

00:56:22,870 --> 00:56:21,030

okay and the peak of hurricane season

1498

00:56:25,109 --> 00:56:22,880

is usually the first or second week of

1499

00:56:27,270 --> 00:56:25,119

september it's around september 10th or

1500

00:56:30,309 --> 00:56:27,280

so september 10.

1501

00:56:32,390 --> 00:56:30,319

so we're hoping for a number of cyclones

1502

00:56:35,829 --> 00:56:32,400

tropical cycles out there to study

1503

00:56:37,829 --> 00:56:35,839

um nadine was very cooperative last year

1504

00:56:39,910 --> 00:56:37,839

scott how long did nadine hang around

1505

00:56:41,190 --> 00:56:39,920

last year i don't remember the exact

1506

00:56:44,150 --> 00:56:41,200

number of days i think it was on the

1507

00:56:45,589 --> 00:56:44,160

order of about 24 to 28 days something

1508

00:56:49,190 --> 00:56:45,599

like that i think it was the fifth

1509

00:56:50,950 --> 00:56:49,200

longest uh storm on record uh the odd

1510

00:56:53,349 --> 00:56:50,960

thing about last year was it was a very

1511

00:56:55,349 --> 00:56:53,359

active season uh you know obviously we

1512

00:56:57,430 --> 00:56:55,359

got all the way up at least through s on

1513

00:57:00,309 --> 00:56:57,440

the list of names and yet during the

1514

00:57:02,789 --> 00:57:00,319

five weeks we were in the field uh we

1515

00:57:04,549 --> 00:57:02,799

really only had a couple of storms occur

1516

00:57:07,030 --> 00:57:04,559

uh fortunately for us

1517

00:57:09,190 --> 00:57:07,040

nadine stuck around for a long time and

1518

00:57:10,549 --> 00:57:09,200

provided some very useful information it

1519

00:57:13,109 --> 00:57:10,559

was a storm that

1520

00:57:15,510 --> 00:57:13,119

by all uh right should have died much

1521

00:57:17,190 --> 00:57:15,520

earlier than it did and yet it somehow

1522

00:57:19,030 --> 00:57:17,200

kept going and we collected some very

1523

00:57:21,030 --> 00:57:19,040

interesting data that i think will tell

1524

00:57:22,630 --> 00:57:21,040

us a little bit about how it was able to

1525

00:57:23,990 --> 00:57:22,640

maintain itself and then eventually

1526

00:57:25,270 --> 00:57:24,000

redevelop

1527

00:57:26,950 --> 00:57:25,280

and this is another case where the

1528

00:57:28,789 --> 00:57:26,960

capability of the airplane is really

1529

00:57:31,430 --> 00:57:28,799

important because we were able to go all

1530

00:57:33,829 --> 00:57:31,440

the way over to the azores and and spend

1531

00:57:39,349 --> 00:57:33,839

time in nadine so that's that long-range

1532

00:57:43,589 --> 00:57:41,589

thank you both um and again for anyone

1533

00:57:46,549 --> 00:57:43,599

who wants more information on um how

1534

00:57:48,950 --> 00:57:46,559

nasa covered um hurricane nadine over

1535

00:57:51,430 --> 00:57:48,960

the long course

1536

00:57:54,630 --> 00:57:51,440

of life that it had go to nasa.gov

1537

00:57:55,910 --> 00:57:54,640

hurricane and click on the 2012 archive

1538

00:57:57,430 --> 00:57:55,920

and you'll see information from the

1539

00:58:00,710 --> 00:57:57,440

different nasa satellites as well as

1540

00:58:02,470 --> 00:58:00,720

some of the hs3 input in there

1541

00:58:05,190 --> 00:58:02,480

um

1542

00:58:07,270 --> 00:58:05,200

that concludes our google hangout and i

1543

00:58:09,430 --> 00:58:07,280

just want to remind everybody that

1544

00:58:11,349 --> 00:58:09,440

this video will be archived on the nasa

1545

00:58:12,710 --> 00:58:11,359

goddard youtube channel which is nasa

1546

00:58:14,390 --> 00:58:12,720

explorer

1547

00:58:17,430 --> 00:58:14,400

for more information you can go to the

1548

00:58:20,549 --> 00:58:17,440

hs3 website which is nasa.gov

1549

00:58:22,630 --> 00:58:20,559

hs3 and again all of the videos that you

1550

00:58:25,190 --> 00:58:22,640

saw playing during the school hangout

1551

00:58:27,109 --> 00:58:25,200

and the images will also be posted up

1552

00:58:28,630 --> 00:58:27,119

there

1553

00:58:30,549 --> 00:58:28,640

from nasa goddard space flight center