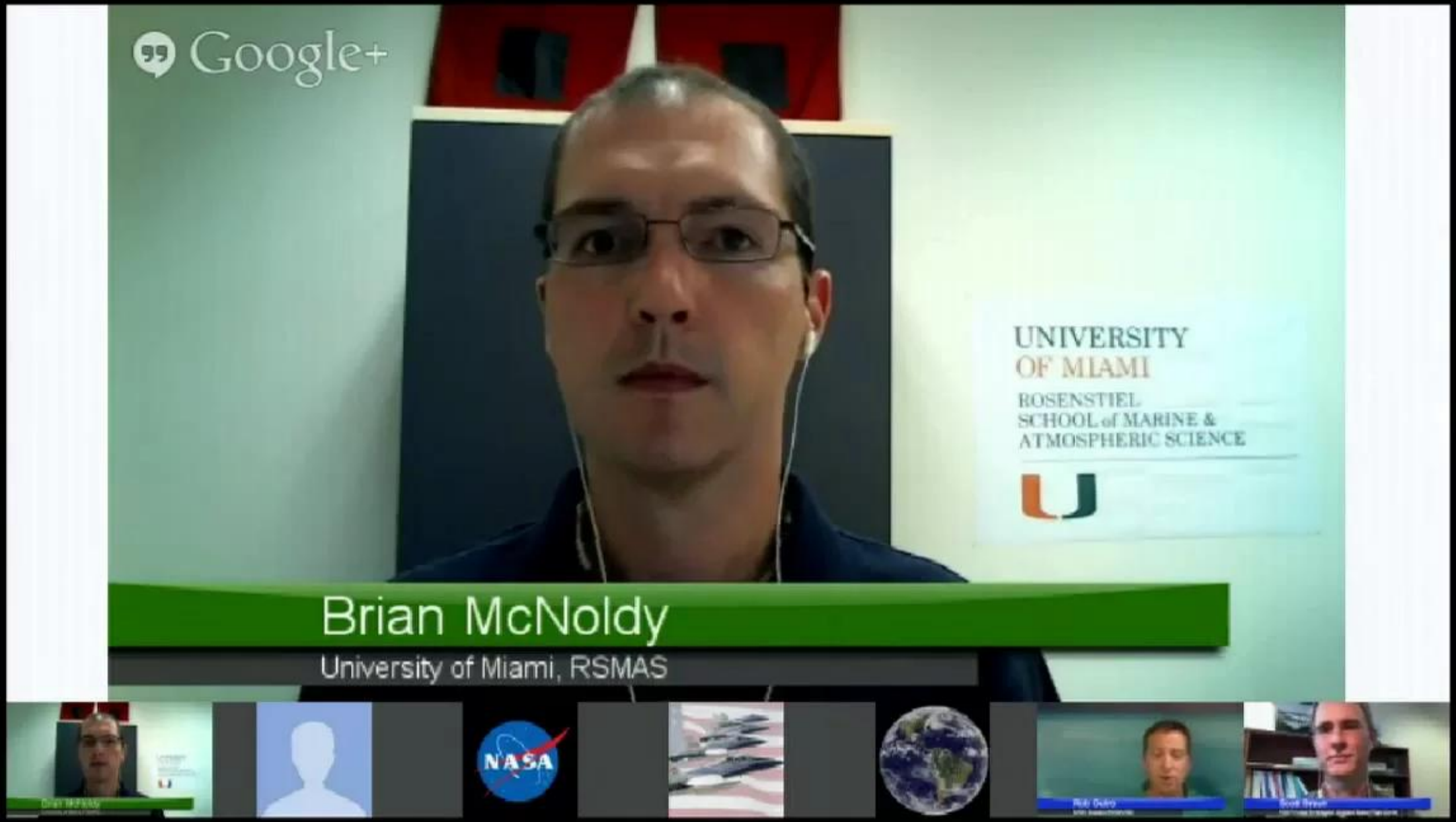
Google+
UNIVERSITY
OF MIAMI
ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE
Brian McNoldy
University of Miami, RSMAS
NASA

1
00:00:05,829 --> 00:00:03,590
hi good afternoon i'm rob gutrow from

2
00:00:07,349 --> 00:00:05,839
nasa's goddard space flight center

3
00:00:09,270 --> 00:00:07,359
in the office of communications also

4
00:00:12,390 --> 00:00:09,280
manager of the nasa hurricane page we're

5
00:00:15,190 --> 00:00:12,400
here today for uh an hs3 google hangout

6
00:00:16,630 --> 00:00:15,200
hs3 means hurricane and severe storm

7
00:00:18,550 --> 00:00:16,640
sentinel

8
00:00:20,950 --> 00:00:18,560
google hangout

9
00:00:23,109 --> 00:00:20,960
the hs3 mission is a five year mission

10
00:00:24,790 --> 00:00:23,119
this is the second year of the mission

11
00:00:26,710 --> 00:00:24,800
and we'll be finding out what's brand

12
00:00:28,310 --> 00:00:26,720
new for this year with our four

13
00:00:31,029 --> 00:00:28,320

panelists

14
00:00:33,270 --> 00:00:31,039
just a little bit about the hs3 mission

15
00:00:34,870 --> 00:00:33,280
um the hs3 mission

16
00:00:36,950 --> 00:00:34,880
purpose is to

17
00:00:39,110 --> 00:00:36,960
investigate the processes that underlie

18
00:00:40,950 --> 00:00:39,120
hurricane formation and the intensity

19
00:00:42,229 --> 00:00:40,960
changes of tropical cyclones in the

20
00:00:44,709 --> 00:00:42,239
atlantic ocean

21
00:00:47,990 --> 00:00:44,719
among those factors hs3 will address the

22
00:00:49,830 --> 00:00:48,000
controversial uh hot dry and dusty

23
00:00:51,510 --> 00:00:49,840
saharan air layer

24
00:00:53,270 --> 00:00:51,520
in tropical storm formation and

25
00:00:54,470 --> 00:00:53,280
intensification

26
00:00:57,350 --> 00:00:54,480
and the extent to which the deep

27
00:00:59,029 --> 00:00:57,360
convection of the inner core of those

28
00:01:01,670 --> 00:00:59,039
storms

29
00:01:04,310 --> 00:01:01,680
is the key driver of intensity change

30
00:01:06,870 --> 00:01:04,320
the hs3 mentioned will run between

31
00:01:09,030 --> 00:01:06,880
august 20th and september 23rd based at

32
00:01:11,190 --> 00:01:09,040
wallops flight facility in wallops

33
00:01:14,710 --> 00:01:11,200
island virginia

34
00:01:16,230 --> 00:01:14,720
the hs3 mission page is nasa.gov

35
00:01:17,670 --> 00:01:16,240
hs3

36
00:01:19,990 --> 00:01:17,680
we will be taking questions at the end

37
00:01:22,230 --> 00:01:20,000
of the hangout and you can make some

38
00:01:23,670 --> 00:01:22,240

comments and questions um in the youtube

39
00:01:28,550 --> 00:01:23,680
comments section

40
00:01:31,270 --> 00:01:28,560
on twitter at hashtag nasahs3

41
00:01:33,670 --> 00:01:31,280
and also on the google plus page

42
00:01:36,469 --> 00:01:33,680
our participants today include dr scott

43
00:01:40,550 --> 00:01:36,479
brown he is the principal investigator

44
00:01:43,510 --> 00:01:40,560
tom miller a nasa global hawk pilot uh

45
00:01:45,429 --> 00:01:43,520
live from the airplane hangar at dryden

46
00:01:47,109 --> 00:01:45,439
so you'll be able to see the global hawk

47
00:01:50,149 --> 00:01:47,119
behind him

48
00:01:51,190 --> 00:01:50,159
marilyn vasquez the hs3 project manager

49
00:01:53,990 --> 00:01:51,200
and

50
00:01:55,749 --> 00:01:54,000
our guest brian mcnulty

51
00:01:58,550 --> 00:01:55,759
a senior research associate at the

52
00:02:01,270 --> 00:01:58,560
university of miami's rosenstein school

53
00:02:03,510 --> 00:02:01,280
of marine and atmospheric sciences and a

54
00:02:04,630 --> 00:02:03,520
capital weather gang columnist

55
00:02:07,749 --> 00:02:04,640
so we're going to start the google

56
00:02:09,430 --> 00:02:07,759
hangout by going over to dr scott brown

57
00:02:10,949 --> 00:02:09,440
he's a research meteorologist here at

58
00:02:12,790 --> 00:02:10,959
nasa's goddard space flight center in

59
00:02:14,630 --> 00:02:12,800
greenbelt and he studies hurricanes from

60
00:02:16,070 --> 00:02:14,640
the inside and out

61
00:02:18,790 --> 00:02:16,080
he was

62
00:02:20,949 --> 00:02:18,800
the hs3 principal mission investigator

63
00:02:23,350 --> 00:02:20,959

last year and again this year

64
00:02:25,350 --> 00:02:23,360
he leads a diverse team of scientists

65
00:02:26,710 --> 00:02:25,360
and instrument

66
00:02:29,030 --> 00:02:26,720
specialists

67
00:02:31,510 --> 00:02:29,040
to investigate hurricanes and conduct

68
00:02:34,070 --> 00:02:31,520
experiments using unmanned aircraft to

69
00:02:35,830 --> 00:02:34,080
better understand the conditions that

70
00:02:38,949 --> 00:02:35,840
favor the storm formation and the

71
00:02:41,270 --> 00:02:38,959
development of major hurricanes and

72
00:02:42,869 --> 00:02:41,280
here's dr scott brown to talk about

73
00:02:45,750 --> 00:02:42,879
what's new with the hs3 mission this

74
00:02:48,309 --> 00:02:45,760
year and the science behind it scott

75
00:02:49,430 --> 00:02:48,319
okay thanks rob well as rob

76
00:02:52,309 --> 00:02:49,440
said we're

77
00:02:54,630 --> 00:02:52,319
studying the processes that affect storm

78
00:02:56,390 --> 00:02:54,640
formation and intensity change and we're

79
00:02:58,790 --> 00:02:56,400
particularly interested in the relative

80
00:03:00,630 --> 00:02:58,800
roles of the large-scale environment and

81
00:03:02,229 --> 00:03:00,640
inner core processes

82
00:03:04,229 --> 00:03:02,239
um

83
00:03:05,110 --> 00:03:04,239
and that in terms of the environment one

84
00:03:07,430 --> 00:03:05,120
of the things we're particularly

85
00:03:09,670 --> 00:03:07,440
interested in is the saharan air layer

86
00:03:11,110 --> 00:03:09,680
uh which has been controversial of late

87
00:03:12,949 --> 00:03:11,120
there's been a number of studies early

88
00:03:15,509 --> 00:03:12,959

on that suggests that it can have a

89
00:03:17,430 --> 00:03:15,519
positive influence on storm growth

90
00:03:19,589 --> 00:03:17,440
and that it aids storm formation and

91
00:03:21,430 --> 00:03:19,599
intensification and a number of studies

92
00:03:23,030 --> 00:03:21,440
that suggest that it actually has an

93
00:03:26,070 --> 00:03:23,040
inhibiting effect on storm

94
00:03:27,670 --> 00:03:26,080
intensification uh in addition uh we're

95
00:03:29,670 --> 00:03:27,680
very interested in what happens in the

96
00:03:33,830 --> 00:03:29,680
inner core in particular with very deep

97
00:03:35,910 --> 00:03:33,840
thunderstorms also called hot towers

98
00:03:37,830 --> 00:03:35,920
and some studies have suggested that

99
00:03:39,990 --> 00:03:37,840
when these hot towers are seen within

100
00:03:42,070 --> 00:03:40,000
the eye wall of a hurricane the storm is

101
00:03:44,149 --> 00:03:42,080
more likely to undergo intensification

102
00:03:47,670 --> 00:03:44,159
in the day that follows whereas if a

103
00:03:50,229 --> 00:03:47,680
tower is not seen they tend you know not

104
00:03:52,710 --> 00:03:50,239
to intensify or to weaken but it's still

105
00:03:55,030 --> 00:03:52,720
not clear whether these hot towers are

106
00:03:57,270 --> 00:03:55,040
playing an active key role in the

107
00:03:59,429 --> 00:03:57,280
development or if they're maybe more of

108
00:04:01,670 --> 00:03:59,439
a passive indicator of other processes

109
00:04:03,830 --> 00:04:01,680
that are leading to the intensification

110
00:04:05,429 --> 00:04:03,840
and so hs3 was really designed to try

111
00:04:07,670 --> 00:04:05,439
and look at both the environmental

112
00:04:09,910 --> 00:04:07,680
aspect of the problem uh and the inner

113
00:04:12,070 --> 00:04:09,920

core part of the problem and to do that

114
00:04:15,190 --> 00:04:12,080
we're using two of the nasa unmanned

115
00:04:17,670 --> 00:04:15,200
aircraft uh one uh one equipped

116
00:04:19,590 --> 00:04:17,680
specifically to look at the environment

117
00:04:21,670 --> 00:04:19,600
and i'll describe a little later the

118
00:04:23,189 --> 00:04:21,680
payload that's on there

119
00:04:25,430 --> 00:04:23,199
and the other is equipped with the

120
00:04:27,270 --> 00:04:25,440
payload to really look at the inner core

121
00:04:28,950 --> 00:04:27,280
in particular the precipitation and

122
00:04:30,230 --> 00:04:28,960
winds within the eye wall and the rain

123
00:04:32,870 --> 00:04:30,240
bands

124
00:04:33,670 --> 00:04:32,880
last year was our first deployment

125
00:04:35,590 --> 00:04:33,680
and

126
00:04:39,110 --> 00:04:35,600
in that deployment out of walls we only

127
00:04:40,150 --> 00:04:39,120
had the environmental aircraft

128
00:04:42,070 --> 00:04:40,160
and

129
00:04:43,590 --> 00:04:42,080
that was probably due to some logistical

130
00:04:46,629 --> 00:04:43,600
and technical uh

131
00:04:48,230 --> 00:04:46,639
issues with the other aircraft excuse me

132
00:04:49,350 --> 00:04:48,240
your bud just fell out

133
00:04:51,350 --> 00:04:49,360
um

134
00:04:53,350 --> 00:04:51,360
but but it proved extremely useful

135
00:04:55,189 --> 00:04:53,360
having that one aircraft to work out a

136
00:04:57,110 --> 00:04:55,199
number of the issues involved in a very

137
00:04:58,790 --> 00:04:57,120
complex operation

138
00:05:00,629 --> 00:04:58,800

operating out of walls for the very

139
00:05:03,430 --> 00:05:00,639
first time

140
00:05:05,430 --> 00:05:03,440
with a global hawk uh with a science

141
00:05:08,710 --> 00:05:05,440
team that had never

142
00:05:10,469 --> 00:05:08,720
done this type of campaign

143
00:05:14,150 --> 00:05:10,479
in just this sort of way so it was

144
00:05:16,790 --> 00:05:14,160
really a challenge um we had uh six

145
00:05:18,390 --> 00:05:16,800
flights that were done last year uh the

146
00:05:20,870 --> 00:05:18,400
first one was actually our transit

147
00:05:22,790 --> 00:05:20,880
flight from dryden out to wallops uh

148
00:05:24,710 --> 00:05:22,800
hurricane leslie was out in the western

149
00:05:26,150 --> 00:05:24,720
atlantic at the time and we decided to

150
00:05:28,310 --> 00:05:26,160
fly around

151
00:05:29,990 --> 00:05:28,320
the outskirts of leslie to look at its

152
00:05:31,670 --> 00:05:30,000
outflow layer and that was our very

153
00:05:33,909 --> 00:05:31,680
first flight we got some very unique

154
00:05:35,909 --> 00:05:33,919
observations in the outflow layer

155
00:05:37,830 --> 00:05:35,919
from the probably for the first time

156
00:05:40,310 --> 00:05:37,840
from above the storm all the way through

157
00:05:42,629 --> 00:05:40,320
the alpha layer and down to the surface

158
00:05:46,150 --> 00:05:42,639
our next five flights were into a very

159
00:05:48,390 --> 00:05:46,160
long-lived hurricane nadine uh which uh

160
00:05:50,150 --> 00:05:48,400
the first flight being when it first

161
00:05:52,230 --> 00:05:50,160
became a tropical storm the second

162
00:05:53,749 --> 00:05:52,240
flight when it first became a hurricane

163
00:05:55,350 --> 00:05:53,759

and then if you remember hurricane

164
00:05:57,909 --> 00:05:55,360
nadine moved out into the eastern

165
00:05:59,670 --> 00:05:57,919
atlantic around the azores and just sort

166
00:06:01,590 --> 00:05:59,680
of meandered out there for almost two

167
00:06:03,110 --> 00:06:01,600
weeks or about two weeks

168
00:06:04,550 --> 00:06:03,120
and we were able to do three flights

169
00:06:06,150 --> 00:06:04,560
during that time something that you

170
00:06:07,990 --> 00:06:06,160
really wouldn't be able to do with the

171
00:06:10,629 --> 00:06:08,000
manned aircraft because of the range and

172
00:06:12,070 --> 00:06:10,639
duration of the global hawk

173
00:06:13,670 --> 00:06:12,080
and during that time we saw the

174
00:06:15,430 --> 00:06:13,680
weakening of the storm when it went

175
00:06:17,590 --> 00:06:15,440
post-tropical and then we saw its

176
00:06:20,070 --> 00:06:17,600
redevelopment including

177
00:06:22,230 --> 00:06:20,080
the onset of its reintensification back

178
00:06:23,990 --> 00:06:22,240
into a hurricane and it subsequently

179
00:06:25,830 --> 00:06:24,000
reached its maximum intensity over its

180
00:06:27,749 --> 00:06:25,840
entire life cycle

181
00:06:29,350 --> 00:06:27,759
so we got some very unique measurements

182
00:06:31,110 --> 00:06:29,360
last year

183
00:06:33,990 --> 00:06:31,120
now this year we're adding in the second

184
00:06:35,749 --> 00:06:34,000
aircraft which will have uh the suite of

185
00:06:36,870 --> 00:06:35,759
instruments designed to look at the

186
00:06:38,710 --> 00:06:36,880
inner core

187
00:06:41,430 --> 00:06:38,720
uh and and by

188
00:06:43,830 --> 00:06:41,440

taking using the the two planes uh

189
00:06:45,749 --> 00:06:43,840
potentially one right after the other uh

190
00:06:48,309 --> 00:06:45,759
we'll be able to get snapshots of the

191
00:06:50,469 --> 00:06:48,319
environment i shouldn't say snap shots

192
00:06:51,909 --> 00:06:50,479
but continuous looks at the environment

193
00:06:53,749 --> 00:06:51,919
and then the inner core and then

194
00:06:56,710 --> 00:06:53,759
potentially going back and forth between

195
00:06:58,710 --> 00:06:56,720
the two with time in between uh for crew

196
00:06:59,830 --> 00:06:58,720
rest given the long duration of these

197
00:07:01,189 --> 00:06:59,840
flights

198
00:07:02,790 --> 00:07:01,199
um

199
00:07:05,350 --> 00:07:02,800
rob if you guys want to show the

200
00:07:06,790 --> 00:07:05,360
interactive on the uh the instruments i

201
00:07:09,270 --> 00:07:06,800
can talk a little bit about the payload

202
00:07:16,150 --> 00:07:09,280
or we can pause a moment and discuss

203
00:07:19,510 --> 00:07:17,909
okay uh let's uh let's pull up the

204
00:07:26,550 --> 00:07:19,520
interactive um

205
00:07:31,589 --> 00:07:27,909
all right as we wait for the uh the

206
00:07:33,749 --> 00:07:31,599
interactive um the uh the unmanned

207
00:07:35,670 --> 00:07:33,759
aircraft will actually be able to to go

208
00:07:37,350 --> 00:07:35,680
for twice as long as the hurricane

209
00:07:38,309 --> 00:07:37,360
hunter aircraft is that is that correct

210
00:07:39,749 --> 00:07:38,319
scott

211
00:07:42,469 --> 00:07:39,759
a lot of

212
00:07:44,790 --> 00:07:42,479
its total flight duration is uh two to

213
00:07:47,430 --> 00:07:44,800

three times as long as a typical manned

214
00:07:49,430 --> 00:07:47,440
aircraft uh depending on where the storm

215
00:07:51,270 --> 00:07:49,440
is in the atlantic will either be if

216
00:07:53,670 --> 00:07:51,280
it's close to the u.s we'll be able to

217
00:07:55,189 --> 00:07:53,680
spend maybe two to three times as much

218
00:07:57,110 --> 00:07:55,199
time over the storm as you would with

219
00:07:58,790 --> 00:07:57,120
the manned aircraft uh but if it's out

220
00:08:00,710 --> 00:07:58,800
in the central atlantic we can actually

221
00:08:02,469 --> 00:08:00,720
get the storms that we wouldn't normally

222
00:08:04,629 --> 00:08:02,479
get to with manned aircraft because of

223
00:08:05,909 --> 00:08:04,639
the long range and nadine was a good

224
00:08:07,589 --> 00:08:05,919
example that where it was in the

225
00:08:09,990 --> 00:08:07,599
northeastern atlantic and we were able

226
00:08:11,430 --> 00:08:10,000
to spend 10 to 12 hours over the storm

227
00:08:12,629 --> 00:08:11,440
whereas a manned aircraft really would

228
00:08:15,270 --> 00:08:12,639
not have been able to get to it and

229
00:08:20,230 --> 00:08:15,280
spend any time at all in it uh so that

230
00:08:23,510 --> 00:08:21,830
and and this year we're actually going

231
00:08:26,070 --> 00:08:23,520
to be double teaming with the two global

232
00:08:27,350 --> 00:08:26,080
hawks uh one to get the data from the

233
00:08:29,110 --> 00:08:27,360
guts of the storm and the other

234
00:08:31,029 --> 00:08:29,120
basically to look at the the whole

235
00:08:32,949 --> 00:08:31,039
environment

236
00:08:36,310 --> 00:08:32,959
of the storm so that's something we

237
00:08:38,469 --> 00:08:36,320
weren't able to do last year right

238
00:08:43,589 --> 00:08:38,479

is that interactive ready

239
00:08:43,599 --> 00:08:53,990
we are bringing the uh

240
00:08:59,190 --> 00:08:56,310
let's um let's take

241
00:09:01,269 --> 00:08:59,200
let's turn to uh to some of the the uh

242
00:09:02,630 --> 00:09:01,279
instruments on the on the global hawks

243
00:09:03,509 --> 00:09:02,640
as we wait for the interactive to come

244
00:09:04,630 --> 00:09:03,519
up

245
00:09:07,190 --> 00:09:04,640
well that's what i was hoping for the

246
00:09:09,750 --> 00:09:07,200
interactive for but uh

247
00:09:12,070 --> 00:09:09,760
one thing we can say is uh as we're

248
00:09:14,630 --> 00:09:12,080
doing these flights we're interacting uh

249
00:09:15,509 --> 00:09:14,640
quite a bit with noah uh noah is one of

250
00:09:17,590 --> 00:09:15,519
our

251
00:09:20,550 --> 00:09:17,600
uh team members they provide one of the

252
00:09:22,550 --> 00:09:20,560
instruments uh and the the the sort of

253
00:09:24,710 --> 00:09:22,560
the manpower behind operating the

254
00:09:26,150 --> 00:09:24,720
instrument and processing the data

255
00:09:27,990 --> 00:09:26,160
in addition they're providing a few of

256
00:09:30,870 --> 00:09:28,000
the pilots and some of the ground crews

257
00:09:32,550 --> 00:09:30,880
they're a significant partner for us um

258
00:09:33,990 --> 00:09:32,560
in addition to that

259
00:09:37,269 --> 00:09:34,000
the noaa

260
00:09:39,110 --> 00:09:37,279
hurricane hunter aircraft and air force

261
00:09:40,630 --> 00:09:39,120
hurricane hunter aircraft will be out

262
00:09:42,389 --> 00:09:40,640
there at the same time

263
00:09:43,990 --> 00:09:42,399

and we are planning to

264
00:09:46,150 --> 00:09:44,000
collaborate with them as much as

265
00:09:47,509 --> 00:09:46,160
possible to try to time our flight so

266
00:09:49,590 --> 00:09:47,519
that we're either flying together to

267
00:09:53,509 --> 00:09:49,600
maximize the data being collected at any

268
00:09:56,150 --> 00:09:53,519
one time or to fly

269
00:09:57,509 --> 00:09:56,160
in series with each other so that we we

270
00:09:59,590 --> 00:09:57,519
maintain

271
00:10:03,350 --> 00:09:59,600
as continuous coverage of the storm as

272
00:10:06,710 --> 00:10:05,509
so if the interactive is not going to be

273
00:10:08,150 --> 00:10:06,720
up i can just

274
00:10:09,750 --> 00:10:08,160
it's alright it's up and running you

275
00:10:15,269 --> 00:10:09,760
just just look on the bottom of your

276
00:10:18,710 --> 00:10:16,790
all right so

277
00:10:22,389 --> 00:10:18,720
this is our environmental aircraft it

278
00:10:24,949 --> 00:10:22,399
has uh three instruments on it for 2013.

279
00:10:27,030 --> 00:10:24,959
uh the first is the cloud physics lidar

280
00:10:31,110 --> 00:10:27,040
which is up in the nose of the aircraft

281
00:10:33,430 --> 00:10:31,120
uh it's specifically designed to look at

282
00:10:34,710 --> 00:10:33,440
profiles of saharan dust which is one of

283
00:10:36,470 --> 00:10:34,720
the things that we're trying to track

284
00:10:38,389 --> 00:10:36,480
and how it interacts with the storm so

285
00:10:39,910 --> 00:10:38,399
this gives us a way to identify where

286
00:10:42,949 --> 00:10:39,920
the saharan air

287
00:10:44,790 --> 00:10:42,959
air layer air mass is

288
00:10:46,389 --> 00:10:44,800

a second instrument

289
00:10:48,389 --> 00:10:46,399
in the belly of the aircraft although it

290
00:10:49,910 --> 00:10:48,399
lifts twilight there uh that's one that

291
00:10:51,030 --> 00:10:49,920
we're not actually flying this year but

292
00:10:53,430 --> 00:10:51,040
there's another instrument that's going

293
00:10:55,670 --> 00:10:53,440
to be there called scanning his or the

294
00:10:57,750 --> 00:10:55,680
interferometer sounder that'll give us

295
00:11:00,069 --> 00:10:57,760
vertical profiles of temperature and

296
00:11:02,150 --> 00:11:00,079
humidity in the clear air environment

297
00:11:04,949 --> 00:11:02,160
and then when we're overflying clouds it

298
00:11:07,110 --> 00:11:04,959
gives us information uh on the

299
00:11:09,030 --> 00:11:07,120
properties of the cloud tops

300
00:11:11,190 --> 00:11:09,040
and then at the back of the aircraft

301
00:11:12,949 --> 00:11:11,200
there's an instrument known as avaps

302
00:11:15,509 --> 00:11:12,959
which is a drop sound system so it

303
00:11:17,670 --> 00:11:15,519
releases a small tube from the aircraft

304
00:11:19,750 --> 00:11:17,680
that floats down to the surface on a

305
00:11:21,590 --> 00:11:19,760
parachute and as it's going down it

306
00:11:23,829 --> 00:11:21,600
collects information on temperature

307
00:11:25,829 --> 00:11:23,839
humidity pressure wind speed and

308
00:11:27,750 --> 00:11:25,839
direction with very high vertical

309
00:11:29,030 --> 00:11:27,760
resolution so we get very detailed

310
00:11:31,829 --> 00:11:29,040
measurements of some of the vertical

311
00:11:33,670 --> 00:11:31,839
structures uh and that's one one of the

312
00:11:35,910 --> 00:11:33,680
instruments that we also then can feed

313
00:11:37,350 --> 00:11:35,920

in to some of the operational centers

314
00:11:38,870 --> 00:11:37,360
and potentially into some of the

315
00:11:40,790 --> 00:11:38,880
forecast models

316
00:11:42,150 --> 00:11:40,800
now we had also planned to fly a wind

317
00:11:43,829 --> 00:11:42,160
lighter that would have been in the

318
00:11:46,710 --> 00:11:43,839
belly of the aircraft that would provide

319
00:11:49,350 --> 00:11:46,720
continuous wind uh speed and direction

320
00:11:50,870 --> 00:11:49,360
uh measurements in the clear air

321
00:11:53,990 --> 00:11:50,880
but there's been some issues with that

322
00:11:56,150 --> 00:11:54,000
that we haven't been able to fly yet

323
00:11:59,269 --> 00:11:56,160
i guess i won't get into that part uh if

324
00:12:01,750 --> 00:11:59,279
you can go to the other aircraft um

325
00:12:04,710 --> 00:12:01,760
our overstorm aircraft is carrying

326
00:12:08,550 --> 00:12:04,720
uh the plan iii instruments which are a

327
00:12:11,190 --> 00:12:08,560
hamster in the nose of the aircraft

328
00:12:14,069 --> 00:12:11,200
it's a microwave sounder uh that's

329
00:12:16,470 --> 00:12:14,079
capable of giving us uh sort of

330
00:12:18,550 --> 00:12:16,480
low resolution vertical profiles of

331
00:12:20,790 --> 00:12:18,560
temperature and humidity in both clear

332
00:12:22,310 --> 00:12:20,800
and cloudy air and then when we're in

333
00:12:23,750 --> 00:12:22,320
precipitating areas it gives us

334
00:12:25,910 --> 00:12:23,760
information on the vertical

335
00:12:28,710 --> 00:12:25,920
precipitation profiles

336
00:12:30,710 --> 00:12:28,720
in the belly of the aircraft is a

337
00:12:33,110 --> 00:12:30,720
dual frequency conically scanning

338
00:12:35,990 --> 00:12:33,120

doppler radar so this provides

339
00:12:38,629 --> 00:12:36,000
information on both winds wind speed and

340
00:12:40,389 --> 00:12:38,639
direction and precipitation profiles

341
00:12:42,230 --> 00:12:40,399
within the storm and then when we're

342
00:12:44,550 --> 00:12:42,240
outside of precipitation areas it can

343
00:12:46,710 --> 00:12:44,560
give us wind speed and direction uh at

344
00:12:47,990 --> 00:12:46,720
the surface to look at the overall

345
00:12:50,470 --> 00:12:48,000
surface flow

346
00:12:52,870 --> 00:12:50,480
uh and then in the tail the aircraft as

347
00:12:55,350 --> 00:12:52,880
an instrument it's a microwave

348
00:12:57,910 --> 00:12:55,360
radiometer uh that gives us a broad

349
00:13:00,629 --> 00:12:57,920
swath of surface wind speed and

350
00:13:02,230 --> 00:13:00,639
precipitation information so in one pass

351
00:13:05,269 --> 00:13:02,240
of the storm we'll be able to map out

352
00:13:07,190 --> 00:13:05,279
the surface wind speed field and look at

353
00:13:09,590 --> 00:13:07,200
the the structure of the of the wind

354
00:13:11,910 --> 00:13:09,600
maximum uh how broad the wind speed

355
00:13:13,030 --> 00:13:11,920
maximum is and things of that sort

356
00:13:14,710 --> 00:13:13,040
now this year it's not on the

357
00:13:16,150 --> 00:13:14,720
interactive diagram but we're also

358
00:13:17,670 --> 00:13:16,160
flying what we call a piggyback

359
00:13:18,389 --> 00:13:17,680
instrument something that

360
00:13:21,030 --> 00:13:18,399
uh

361
00:13:23,590 --> 00:13:21,040
got itself funded to ride along with us

362
00:13:26,310 --> 00:13:23,600
uh and it's a gamma-ray detector looking

363
00:13:28,550 --> 00:13:26,320

at gamma rays emitted from lightning uh

364
00:13:30,069 --> 00:13:28,560
within the storm so those those are the

365
00:13:36,310 --> 00:13:30,079
instruments that we have for for this

366
00:13:40,310 --> 00:13:37,910
thank you scott

367
00:13:42,790 --> 00:13:40,320
um just a reminder uh we are taking

368
00:13:45,509 --> 00:13:42,800
questions um and you can make

369
00:13:47,910 --> 00:13:45,519
comments or or questions on youtube uh

370
00:13:49,230 --> 00:13:47,920
you can make them on twitter using

371
00:13:52,389 --> 00:13:49,240
nasa

372
00:13:53,509 --> 00:13:52,399
hs3 and also uh comments will be taken

373
00:13:55,509 --> 00:13:53,519
on the google

374
00:13:56,710 --> 00:13:55,519
google plus page and we will get to your

375
00:13:58,069 --> 00:13:56,720
questions and answers at the end of the

376
00:14:00,310 --> 00:13:58,079
session

377
00:14:03,430 --> 00:14:00,320
now i'd like to move on to nasa dryden

378
00:14:05,030 --> 00:14:03,440
and to tom miller a project pilot for

379
00:14:07,030 --> 00:14:05,040
the global hawk who is sitting in the

380
00:14:09,509 --> 00:14:07,040
hangar with the global hawk uh behind

381
00:14:13,189 --> 00:14:09,519
him uh tom miller is a project pilot for

382
00:14:15,350 --> 00:14:13,199
the uh the unmanned spacecraft uh at uh

383
00:14:17,750 --> 00:14:15,360
edwards california and he determines

384
00:14:20,389 --> 00:14:17,760
training objectives and standards

385
00:14:21,590 --> 00:14:20,399
he evaluates aircrew performance and he

386
00:14:23,509 --> 00:14:21,600
is a subject matter expert for

387
00:14:26,310 --> 00:14:23,519
development on the ground station and

388
00:14:29,030 --> 00:14:26,320

command and control communication system

389
00:14:30,790 --> 00:14:29,040
that's used to fly the aircraft so tom

390
00:14:32,470 --> 00:14:30,800
uh tell us about the aircraft

391
00:14:34,629 --> 00:14:32,480
operational

392
00:14:36,230 --> 00:14:34,639
okay well uh just uh i'll begin with a

393
00:14:37,670 --> 00:14:36,240
description of the airplane itself and

394
00:14:38,949 --> 00:14:37,680
let everybody get a look at the whole

395
00:14:41,750 --> 00:14:38,959
thing here

396
00:14:45,110 --> 00:14:41,760
this is actually uh air vehicle one this

397
00:14:46,870 --> 00:14:45,120
was the aircraft that uh ryan first flew

398
00:14:50,389 --> 00:14:46,880
the first global hawk to fly back in

399
00:14:52,150 --> 00:14:50,399
1998. so we resurrected it for a nasa

400
00:14:54,470 --> 00:14:52,160
science mission and it's still going

401
00:14:55,910 --> 00:14:54,480
strong

402
00:14:58,150 --> 00:14:55,920
we um

403
00:14:59,990 --> 00:14:58,160
as uh scott talked about there we

404
00:15:01,350 --> 00:15:00,000
develop our mission plans in in

405
00:15:03,189 --> 00:15:01,360
conjunction with the scientists

406
00:15:04,069 --> 00:15:03,199
typically a couple days prior to the

407
00:15:05,990 --> 00:15:04,079
flight

408
00:15:07,990 --> 00:15:06,000
we'll go ahead and start working with

409
00:15:10,389 --> 00:15:08,000
the science team and up up to about the

410
00:15:12,710 --> 00:15:10,399
day prior but we'll finalize this and

411
00:15:14,150 --> 00:15:12,720
turn it into a flight plan uh then we'll

412
00:15:15,590 --> 00:15:14,160
also on that day we'll also be

413
00:15:17,670 --> 00:15:15,600

coordinating with the air traffic

414
00:15:19,189 --> 00:15:17,680
authorities and lining up everything to

415
00:15:22,710 --> 00:15:19,199
conduct the mission

416
00:15:25,189 --> 00:15:22,720
the day of flight will show up about

417
00:15:26,870 --> 00:15:25,199
three hours prior to flight time to our

418
00:15:28,230 --> 00:15:26,880
briefing to our pre-flights and prepare

419
00:15:30,069 --> 00:15:28,240
the aircraft

420
00:15:32,150 --> 00:15:30,079
during all the time this is going on the

421
00:15:34,310 --> 00:15:32,160
ground crew has been working really hard

422
00:15:35,910 --> 00:15:34,320
uh getting the aircraft ready ready to

423
00:15:37,910 --> 00:15:35,920
go

424
00:15:39,670 --> 00:15:37,920
so we'll conduct the pre-flight

425
00:15:41,990 --> 00:15:39,680
and then we go ahead and launch the

426
00:15:43,509 --> 00:15:42,000
aircraft using the local command and

427
00:15:46,230 --> 00:15:43,519
control links

428
00:15:48,550 --> 00:15:46,240
uh about three hours after the launch

429
00:15:50,629 --> 00:15:48,560
we'll be driving out to the uh mission

430
00:15:53,990 --> 00:15:50,639
area we'll go ahead and hand off the

431
00:15:56,069 --> 00:15:54,000
aircraft back to a crew here at dryden

432
00:15:58,230 --> 00:15:56,079
uh that's in our global hawk operations

433
00:16:00,949 --> 00:15:58,240
center and they will take over the

434
00:16:03,110 --> 00:16:00,959
aircraft and either continue enroute to

435
00:16:05,430 --> 00:16:03,120
the mission area depending on how close

436
00:16:08,710 --> 00:16:05,440
the missionary is or or go ahead and

437
00:16:11,189 --> 00:16:08,720
start right into the science bush

438
00:16:13,509 --> 00:16:11,199

this crew will do a shift of about nine

439
00:16:14,949 --> 00:16:13,519
to ten hours they'll hand it off to

440
00:16:16,949 --> 00:16:14,959
another crew

441
00:16:18,550 --> 00:16:16,959
who again does another nine or ten hours

442
00:16:21,590 --> 00:16:18,560
of doing the scientists

443
00:16:23,509 --> 00:16:21,600
and again we'll either continue that or

444
00:16:25,670 --> 00:16:23,519
depending on where the storm is will

445
00:16:28,790 --> 00:16:25,680
start to drive home

446
00:16:31,189 --> 00:16:28,800
approximately four hours prior to uh

447
00:16:33,509 --> 00:16:31,199
landing they'll hand the aircraft back

448
00:16:34,550 --> 00:16:33,519
off to the crew at wallops the recovery

449
00:16:39,269 --> 00:16:34,560
crew

450
00:16:42,230 --> 00:16:39,279
join up with the chase aircraft and

451
00:16:44,710 --> 00:16:42,240
go ahead and land

452
00:16:46,230 --> 00:16:44,720
so as far as how the airplane flies it's

453
00:16:48,150 --> 00:16:46,240
very similar to flying any other

454
00:16:50,629 --> 00:16:48,160
airplane just kind of a full-time

455
00:16:53,269 --> 00:16:50,639
autopilot we uh drive the airplane

456
00:16:55,910 --> 00:16:53,279
around and work the work scientists to

457
00:16:58,949 --> 00:16:55,920
achieve whatever objectives they need to

458
00:17:03,110 --> 00:17:00,710
and again the mission depends on whether

459
00:17:05,590 --> 00:17:03,120
we're flying the overstorm aircraft or

460
00:17:10,789 --> 00:17:05,600
the environmental aircraft as to how

461
00:17:14,230 --> 00:17:11,909
let's see

462
00:17:16,470 --> 00:17:14,240
uh what else can i talk about here about

463
00:17:20,470 --> 00:17:18,789

airplane uh some of the challenges that

464
00:17:22,949 --> 00:17:20,480
we talked about and the advantages

465
00:17:24,870 --> 00:17:22,959
obviously one of the advantages of using

466
00:17:26,309 --> 00:17:24,880
an unmanned aircraft is that we do have

467
00:17:29,029 --> 00:17:26,319
the endurance we don't have to carry a

468
00:17:33,830 --> 00:17:31,909
we swap out during uh during the flight

469
00:17:36,070 --> 00:17:33,840
so that's uh that's a big advantage that

470
00:17:38,310 --> 00:17:36,080
this aircraft offers whereas a manned

471
00:17:40,470 --> 00:17:38,320
aircraft is typically limited to

472
00:17:42,390 --> 00:17:40,480
through the endurance of the aircrew we

473
00:17:43,510 --> 00:17:42,400
can change ours out right in the middle

474
00:17:45,350 --> 00:17:43,520
to mission

475
00:17:47,110 --> 00:17:45,360
but this also brings some challenges in

476
00:17:49,430 --> 00:17:47,120
that it is an unmanned aircraft and

477
00:17:51,430 --> 00:17:49,440
we're still trying to fully integrate

478
00:17:53,750 --> 00:17:51,440
in the airspace with the other manned

479
00:17:54,950 --> 00:17:53,760
aircraft so that's proved to be a

480
00:17:58,070 --> 00:17:54,960
challenge but we've got a really good

481
00:18:00,630 --> 00:17:58,080
relationship with the faa and the oceana

482
00:18:02,310 --> 00:18:00,640
control authorities and they've really

483
00:18:06,470 --> 00:18:02,320
helped us out a lot we've come a long

484
00:18:06,480 --> 00:18:11,029
to continue doing that

485
00:18:16,150 --> 00:18:13,350
thank you tom so i have a question for

486
00:18:19,029 --> 00:18:16,160
you the uh in terms of the duration of

487
00:18:20,789 --> 00:18:19,039
global hawks uh how long can they stay

488
00:18:22,549 --> 00:18:20,799

in the air

489
00:18:24,549 --> 00:18:22,559
well of course

490
00:18:26,710 --> 00:18:24,559
yeah this depends on how the aircraft is

491
00:18:29,750 --> 00:18:26,720
loaded but uh general uh flight time is

492
00:18:32,070 --> 00:18:29,760
about 28 hours

493
00:18:35,270 --> 00:18:32,080
and what altitude did they fly at we'll

494
00:18:37,430 --> 00:18:35,280
go uh well above 60 000 feet

495
00:18:39,909 --> 00:18:37,440
we get to a cruise climb altitude based

496
00:18:42,549 --> 00:18:39,919
on weight and at that point we have to

497
00:18:43,270 --> 00:18:42,559
burn off more fuel to continue climbing

498
00:18:46,150 --> 00:18:43,280
so

499
00:18:48,470 --> 00:18:46,160
it achieves an initial altitude and then

500
00:18:51,669 --> 00:18:48,480
just does this kind of slow climb up to

501
00:18:57,190 --> 00:18:53,830
so what is it like piloting the global

502
00:18:59,029 --> 00:18:57,200
hawk from where you are

503
00:19:00,549 --> 00:18:59,039
well it's a little strange you in in

504
00:19:02,310 --> 00:19:00,559
some cases you're you're a little

505
00:19:03,909 --> 00:19:02,320
disconnected um

506
00:19:05,830 --> 00:19:03,919
from the aircraft you don't have the

507
00:19:08,070 --> 00:19:05,840
same sensations that

508
00:19:11,590 --> 00:19:08,080
you would in a manned aircraft

509
00:19:14,630 --> 00:19:11,600
you don't have you know

510
00:19:16,310 --> 00:19:14,640
sound um the sound of the aircraft the

511
00:19:19,430 --> 00:19:16,320
sound of the engines the seat of the

512
00:19:20,870 --> 00:19:19,440
pants sensations the g-forces that uh

513
00:19:21,909 --> 00:19:20,880

come on an airplane when you're flying

514
00:19:23,430 --> 00:19:21,919
you know if

515
00:19:25,110 --> 00:19:23,440
if something were to go wrong for

516
00:19:27,510 --> 00:19:25,120
example and the engine were to roll back

517
00:19:29,190 --> 00:19:27,520
you don't hear that as you would in a

518
00:19:30,230 --> 00:19:29,200
manned aircraft so that brings its own

519
00:19:32,710 --> 00:19:30,240
challenges

520
00:19:34,310 --> 00:19:32,720
basically we all we have this site let's

521
00:19:35,029 --> 00:19:34,320
project

522
00:19:37,270 --> 00:19:35,039
so

523
00:19:39,750 --> 00:19:37,280
it's a bit like flying uh any other

524
00:19:41,909 --> 00:19:39,760
aircraft but on a full-time auto pilot

525
00:19:43,750 --> 00:19:41,919
we don't have direct uh control over the

526
00:19:47,029 --> 00:19:43,760
flight controls but we give the aircraft

527
00:19:49,430 --> 00:19:47,039
altitude headings and air speeds and the

528
00:19:50,830 --> 00:19:49,440
mission management computers decide how

529
00:19:53,110 --> 00:19:50,840
to hit the

530
00:19:55,350 --> 00:19:53,120
airplane where we asked him to go

531
00:19:57,669 --> 00:19:55,360
and in 60 000 feet you're well over the

532
00:20:00,470 --> 00:19:57,679
top of a tropical storm

533
00:20:02,870 --> 00:20:00,480
uh generally we are yes

534
00:20:05,590 --> 00:20:02,880
so last year i understand that during

535
00:20:07,669 --> 00:20:05,600
hurricane nadine we dropped somewhere in

536
00:20:09,510 --> 00:20:07,679
the vicinity of 300 drop songs is that

537
00:20:11,110 --> 00:20:09,520
correct

538
00:20:13,029 --> 00:20:11,120

so that that provided a lot of

539
00:20:14,549 --> 00:20:13,039
information that we otherwise couldn't

540
00:20:16,950 --> 00:20:14,559
get

541
00:20:18,950 --> 00:20:16,960
uh yeah it sure did i i think scott you

542
00:20:21,669 --> 00:20:18,960
know probably speak more to the data

543
00:20:23,830 --> 00:20:21,679
that was collected

544
00:20:25,430 --> 00:20:23,840
yeah i think overall we collected about

545
00:20:26,710 --> 00:20:25,440
350

546
00:20:28,230 --> 00:20:26,720
drops on

547
00:20:29,990 --> 00:20:28,240
profiles

548
00:20:32,070 --> 00:20:30,000
the drop sign instruments capable of

549
00:20:33,990 --> 00:20:32,080
carrying up to 88 suns in a single

550
00:20:38,870 --> 00:20:34,000
flight i think the most that we did was

551
00:20:43,270 --> 00:20:41,110
scott can you explain uh for the viewers

552
00:20:45,190 --> 00:20:43,280
what a drop sonde is and what what it

553
00:20:48,149 --> 00:20:45,200
tells us

554
00:20:50,549 --> 00:20:48,159
uh yeah i thought i did earlier but um

555
00:20:52,630 --> 00:20:50,559
so basically again it's a small tube uh

556
00:20:54,950 --> 00:20:52,640
that has a parachute at one end and a

557
00:20:56,870 --> 00:20:54,960
sensor at the other end and it's ejected

558
00:20:59,029 --> 00:20:56,880
from the aircraft craft it's a fairly

559
00:21:00,230 --> 00:20:59,039
lightweight tube uh

560
00:21:01,669 --> 00:21:00,240
about the

561
00:21:02,390 --> 00:21:01,679
you know maybe an inch and a half in

562
00:21:05,510 --> 00:21:02,400
diameter

563
00:21:07,270 --> 00:21:05,520

and uh maybe 15 inches long

564
00:21:09,669 --> 00:21:07,280
and as it falls to the surface on this

565
00:21:12,070 --> 00:21:09,679
small with the small parachute uh it's

566
00:21:13,909 --> 00:21:12,080
collecting temperature pressure uh wind

567
00:21:14,870 --> 00:21:13,919
speed relative humidity and wind

568
00:21:16,950 --> 00:21:14,880
direction

569
00:21:18,789 --> 00:21:16,960
uh and then when it hits the surface it

570
00:21:20,710 --> 00:21:18,799
stops collecting data

571
00:21:24,149 --> 00:21:20,720
but it basically gives us a very high

572
00:21:29,270 --> 00:21:24,159
resolution profile of those parameters

573
00:21:32,630 --> 00:21:30,390
thank you scott

574
00:21:34,630 --> 00:21:32,640
um back to you tom uh anything you want

575
00:21:36,630 --> 00:21:34,640
to add

576
00:21:39,190 --> 00:21:36,640
i don't think so maybe i'll uh save it

577
00:21:40,950 --> 00:21:39,200
for uh some questions and answers later

578
00:21:42,390 --> 00:21:40,960
okay

579
00:21:44,630 --> 00:21:42,400
very good thank you and that's a

580
00:21:46,470 --> 00:21:44,640
beautiful aircraft behind you

581
00:21:48,870 --> 00:21:46,480
again just a reminder for those who are

582
00:21:51,350 --> 00:21:48,880
watching us on youtube or

583
00:21:53,190 --> 00:21:51,360
on google plus you can comment on both

584
00:21:54,470 --> 00:21:53,200
of those and also on twitter with

585
00:21:57,510 --> 00:21:54,480
hashtag

586
00:22:02,149 --> 00:21:59,350
next we're going to take you to marilyn

587
00:22:04,870 --> 00:22:02,159
vasquez she's the hs3 project manager

588
00:22:06,789 --> 00:22:04,880

and she has been leading more than 200

589
00:22:08,950 --> 00:22:06,799
people will be involved in preparing and

590
00:22:11,029 --> 00:22:08,960
supporting the aircraft so she's going

591
00:22:13,750 --> 00:22:11,039
to tell us what it takes to get the

592
00:22:15,029 --> 00:22:13,760
flight off the ground

593
00:22:17,990 --> 00:22:15,039
marilyn does flight planning and

594
00:22:20,710 --> 00:22:18,000
aircraft coordination and she conducts

595
00:22:22,789 --> 00:22:20,720
the science data collection which is a

596
00:22:24,950 --> 00:22:22,799
big job all in itself

597
00:22:27,270 --> 00:22:24,960
all this work is done to support the hs3

598
00:22:29,510 --> 00:22:27,280
mission which has the two global hawks

599
00:22:31,590 --> 00:22:29,520
as we've been talking about and uh carry

600
00:22:33,830 --> 00:22:31,600
these these science instruments over

601
00:22:35,430 --> 00:22:33,840
hurricanes and tropical cyclones so

602
00:22:36,870 --> 00:22:35,440
marilyn uh tell us about flight planning

603
00:22:38,870 --> 00:22:36,880
and what it takes to get a flight off

604
00:22:40,470 --> 00:22:38,880
the ground

605
00:22:42,710 --> 00:22:40,480
all right um

606
00:22:44,710 --> 00:22:42,720
getting some echo here um anyway i

607
00:22:46,630 --> 00:22:44,720
wanted to let you know that uh this

608
00:22:48,230 --> 00:22:46,640
whole project is a

609
00:22:50,070 --> 00:22:48,240
great amount of coordination

610
00:22:52,789 --> 00:22:50,080
communication and planning that's how we

611
00:22:54,870 --> 00:22:52,799
do this we have i worked the project

612
00:22:57,190 --> 00:22:54,880
development with scott

613
00:22:58,789 --> 00:22:57,200

and then with the global hawk team at

614
00:23:01,909 --> 00:22:58,799
dryden for all of

615
00:23:04,230 --> 00:23:01,919
the operations and then also with our

616
00:23:07,029 --> 00:23:04,240
hosts here at wallops for the logistics

617
00:23:09,110 --> 00:23:07,039
and operations for flying the plane

618
00:23:10,230 --> 00:23:09,120
so do you have that um yes i see you've

619
00:23:14,230 --> 00:23:10,240
got the

620
00:23:18,630 --> 00:23:16,630
so what i'm showing you here if it comes

621
00:23:21,110 --> 00:23:18,640
up

622
00:23:22,870 --> 00:23:21,120
you guys seeing it

623
00:23:25,430 --> 00:23:22,880
anyway it's going it's the integration

624
00:23:28,390 --> 00:23:25,440
of the environmental aircraft you're

625
00:23:31,270 --> 00:23:28,400
going to see them uh load scanning his

626
00:23:32,710 --> 00:23:31,280
into the belly of the plane then cpl

627
00:23:34,789 --> 00:23:32,720
into the nose

628
00:23:36,149 --> 00:23:34,799
and avaps which that was the drop sun

629
00:23:37,110 --> 00:23:36,159
system they'll be loading that into the

630
00:23:38,630 --> 00:23:37,120
tail

631
00:23:40,870 --> 00:23:38,640
so you can watch that while i tell you a

632
00:23:42,630 --> 00:23:40,880
little bit about how we do a mission so

633
00:23:44,310 --> 00:23:42,640
for example when the instruments first

634
00:23:45,270 --> 00:23:44,320
arrive the first thing we do is we weigh

635
00:23:49,029 --> 00:23:45,280
them

636
00:23:51,510 --> 00:23:49,039
computer that's going to communicate and

637
00:23:52,710 --> 00:23:51,520
find out if the instrument is properly

638
00:23:54,230 --> 00:23:52,720

communicating because we want to have

639
00:23:55,430 --> 00:23:54,240
the status of the of the instruments

640
00:23:57,590 --> 00:23:55,440
while they're flying we want it to be

641
00:23:59,669 --> 00:23:57,600
able to talk to us on the ground

642
00:24:01,190 --> 00:23:59,679
we also want to plug it in and see what

643
00:24:02,630 --> 00:24:01,200
kind of power

644
00:24:04,149 --> 00:24:02,640
it's going to draw so we want to have a

645
00:24:06,470 --> 00:24:04,159
very good characterization

646
00:24:07,750 --> 00:24:06,480
characterization of the plane of the

647
00:24:10,149 --> 00:24:07,760
instruments before we put them on the

648
00:24:11,830 --> 00:24:10,159
plane so once we've done that with all

649
00:24:13,430 --> 00:24:11,840
the instruments we put them all on the

650
00:24:15,590 --> 00:24:13,440
plane we

651
00:24:17,430 --> 00:24:15,600
attach all the fairings

652
00:24:18,470 --> 00:24:17,440
get the whole plane ready as if it's

653
00:24:20,149 --> 00:24:18,480
going to fly

654
00:24:23,110 --> 00:24:20,159
then we weigh it

655
00:24:25,830 --> 00:24:23,120
that gives us the center of gravity

656
00:24:29,510 --> 00:24:25,840
for um the calculations that we need for

657
00:24:30,950 --> 00:24:29,520
the fuel load after that we um

658
00:24:32,950 --> 00:24:30,960
we're getting ready for communication

659
00:24:35,350 --> 00:24:32,960
testing so what we want to do at that

660
00:24:37,830 --> 00:24:35,360
point is make sure that the scientists

661
00:24:40,070 --> 00:24:37,840
who will be at the facility of the

662
00:24:41,510 --> 00:24:40,080
operations facility at wallops

663
00:24:43,029 --> 00:24:41,520

they will be able to talk to their

664
00:24:45,669 --> 00:24:43,039
instruments and the instruments at that

665
00:24:47,990 --> 00:24:45,679
time are on the plane on the ground at

666
00:24:49,990 --> 00:24:48,000
dryden so that's our first test then we

667
00:24:51,830 --> 00:24:50,000
do a series of other communication tests

668
00:24:53,190 --> 00:24:51,840
to make sure everything's going to run

669
00:24:54,870 --> 00:24:53,200
when we're very confident that

670
00:24:57,110 --> 00:24:54,880
everything is communicating whether it

671
00:24:58,870 --> 00:24:57,120
be a science instrument or facility

672
00:25:01,269 --> 00:24:58,880
instrument which would be things like a

673
00:25:02,870 --> 00:25:01,279
camera or the basic communication system

674
00:25:04,710 --> 00:25:02,880
for the plane

675
00:25:07,029 --> 00:25:04,720
no once all that is working

676
00:25:09,990 --> 00:25:07,039
then we're ready for a test flight so at

677
00:25:12,870 --> 00:25:10,000
that point we fly the plane in the area

678
00:25:14,230 --> 00:25:12,880
right around dryden to make sure that

679
00:25:16,710 --> 00:25:14,240
all the instruments are working well

680
00:25:18,070 --> 00:25:16,720
communicate well they fly for about five

681
00:25:21,190 --> 00:25:18,080
hours

682
00:25:24,630 --> 00:25:21,200
and at that point they um

683
00:25:28,390 --> 00:25:24,640
uh we're ready for a transit flight so

684
00:25:30,549 --> 00:25:28,400
we are at that at that point um we're

685
00:25:33,110 --> 00:25:30,559
not quite at that point yet we are right

686
00:25:35,510 --> 00:25:33,120
now for hs3 2013

687
00:25:37,990 --> 00:25:35,520
we have

688
00:25:39,590 --> 00:25:38,000

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

689
00:25:41,590 --> 00:25:39,600
distracted i'm not seeing the video

690
00:25:44,230 --> 00:25:41,600
sorry rob

691
00:25:46,549 --> 00:25:44,240
so yeah that's better um anyway no

692
00:25:48,470 --> 00:25:46,559
offense rob but anyway the uh so when we

693
00:25:49,750 --> 00:25:48,480
transit the airplane

694
00:25:51,990 --> 00:25:49,760
and we'll do that the week of august

695
00:25:53,990 --> 00:25:52,000
second we'll transit both the airplanes

696
00:25:55,430 --> 00:25:54,000
right now in the process of that what i

697
00:25:56,789 --> 00:25:55,440
described to you we are at the point

698
00:25:58,549 --> 00:25:56,799
where the instruments have all been

699
00:26:00,230 --> 00:25:58,559
loaded on the plane

700
00:26:01,990 --> 00:26:00,240
we've done weight and balance and we've

701
00:26:03,990 --> 00:26:02,000
done the beginning of the communications

702
00:26:05,669 --> 00:26:04,000
test so soon we'll be ready for the

703
00:26:07,190 --> 00:26:05,679
range test and then we'll start planning

704
00:26:08,870 --> 00:26:07,200
our transit

705
00:26:10,630 --> 00:26:08,880
so this whole operation is very

706
00:26:12,630 --> 00:26:10,640
complicated there's a very large

707
00:26:14,390 --> 00:26:12,640
infrastructure at dryden for supporting

708
00:26:16,630 --> 00:26:14,400
the airplane but as you can imagine we

709
00:26:19,110 --> 00:26:16,640
have to do the same thing at wallops so

710
00:26:21,350 --> 00:26:19,120
we work with our colleagues here to be

711
00:26:23,350 --> 00:26:21,360
sure we have a hangar we have the proper

712
00:26:25,430 --> 00:26:23,360
fuel we have the proper ground support

713
00:26:27,350 --> 00:26:25,440

equipment tom was talking about in the

714
00:26:30,149 --> 00:26:27,360
plane taking off on the runway we have

715
00:26:31,510 --> 00:26:30,159
to realize since there isn't a pilot the

716
00:26:33,830 --> 00:26:31,520
pilot can't see if there is an

717
00:26:36,230 --> 00:26:33,840
obstruction on the runway for any reason

718
00:26:38,070 --> 00:26:36,240
so we have a a truck that goes alongside

719
00:26:39,830 --> 00:26:38,080
the plane when it's on the runway to be

720
00:26:41,750 --> 00:26:39,840
sure that there's no obstructions before

721
00:26:44,230 --> 00:26:41,760
it takes off so all those things have to

722
00:26:48,310 --> 00:26:44,240
be coordinated we have

723
00:26:49,909 --> 00:26:48,320
space for the scientists space for the

724
00:26:52,870 --> 00:26:49,919
all the different instruments we have

725
00:26:55,190 --> 00:26:52,880
labs for them we have so many people

726
00:26:56,789 --> 00:26:55,200
involved it is very complex to set it

727
00:26:58,230 --> 00:26:56,799
all up we need to get them badged we

728
00:26:59,669 --> 00:26:58,240
need to make sure they all

729
00:27:03,029 --> 00:26:59,679
know how to work safely around the

730
00:27:05,669 --> 00:27:03,039
airplane we lay out an evacuation plan

731
00:27:07,269 --> 00:27:05,679
way in advance so that we're in case a

732
00:27:10,470 --> 00:27:07,279
storm comes our way we know how to get

733
00:27:11,830 --> 00:27:10,480
the planes and the people out safely

734
00:27:12,789 --> 00:27:11,840
all that is involved in the initial

735
00:27:14,149 --> 00:27:12,799
planning

736
00:27:16,070 --> 00:27:14,159
then we get ready to actually plan a

737
00:27:16,789 --> 00:27:16,080
particular flight

738
00:27:18,950 --> 00:27:16,799

so

739
00:27:20,549 --> 00:27:18,960
scott's told you about our goals well we

740
00:27:22,470 --> 00:27:20,559
have the goals then we have what the

741
00:27:25,190 --> 00:27:22,480
nature has put out as our targets do we

742
00:27:26,950 --> 00:27:25,200
have a storm out there that's going to

743
00:27:28,470 --> 00:27:26,960
it looks like it's developing do we have

744
00:27:30,710 --> 00:27:28,480
one that looks like it's going to

745
00:27:32,310 --> 00:27:30,720
intensify which one's closer which one

746
00:27:36,470 --> 00:27:32,320
should we choose

747
00:27:38,149 --> 00:27:36,480
and we have to do this 48 hours in

748
00:27:39,990 --> 00:27:38,159
advance we have to have a flight plan so

749
00:27:40,710 --> 00:27:40,000
we have to think about what we want to

750
00:27:44,789 --> 00:27:40,720
do

751
00:27:47,110 --> 00:27:44,799
groups the the noaa and air force

752
00:27:49,990 --> 00:27:47,120
aircraft that scott mentioned do we want

753
00:27:51,510 --> 00:27:50,000
to have them in the storm while we're

754
00:27:54,070 --> 00:27:51,520
going back and getting another plane how

755
00:27:55,909 --> 00:27:54,080
do we want to do it and we talk to them

756
00:27:58,549 --> 00:27:55,919
to the whole group once a week i mean

757
00:28:00,710 --> 00:27:58,559
once a day to look at our planning to

758
00:28:02,630 --> 00:28:00,720
see what we want to do

759
00:28:18,710 --> 00:28:02,640
all those things have to come together

760
00:28:26,630 --> 00:28:20,470
hey rob i think we lost her feed from

761
00:28:31,029 --> 00:28:28,310
okay it uh it looks like we may have

762
00:28:33,909 --> 00:28:31,039
lost uh maryland we're getting a lot of

763
00:28:35,110 --> 00:28:33,919

great questions um which we will begin

764
00:28:37,190 --> 00:28:35,120
to address

765
00:28:38,870 --> 00:28:37,200
first i would like to go over to our

766
00:28:40,870 --> 00:28:38,880
guest

767
00:28:42,710 --> 00:28:40,880
brian mcnulty he's a senior research

768
00:28:44,470 --> 00:28:42,720
associate at the university of miami's

769
00:28:46,789 --> 00:28:44,480
rosenstein school of marine and

770
00:28:48,789 --> 00:28:46,799
atmospheric sciences in miami he's a

771
00:28:50,870 --> 00:28:48,799
tropical weather expert too for the

772
00:28:52,389 --> 00:28:50,880
washington post's capital weather gang

773
00:28:54,230 --> 00:28:52,399
blog

774
00:28:55,909 --> 00:28:54,240
some cool things about brian is that he

775
00:28:57,830 --> 00:28:55,919
actually spent a summer here at nasa

776
00:29:01,110 --> 00:28:57,840
goddard in 1997 so we get to see the

777
00:29:03,750 --> 00:29:01,120
trim spacecraft and meet one of his um

778
00:29:05,110 --> 00:29:03,760
his his role models joanne simpson whom

779
00:29:07,590 --> 00:29:05,120
he calls the mother of tropical

780
00:29:09,269 --> 00:29:07,600
meteorology

781
00:29:13,029 --> 00:29:09,279
he's most of his current research is on

782
00:29:16,070 --> 00:29:13,039
vortex initialization in models and it's

783
00:29:18,789 --> 00:29:16,080
about an analyzing a model and creating

784
00:29:20,789 --> 00:29:18,799
a new vortex that hopefully more closely

785
00:29:22,389 --> 00:29:20,799
resembles nature so brian why don't we

786
00:29:25,110 --> 00:29:22,399
just jump over to you and see if you

787
00:29:26,470 --> 00:29:25,120
have any questions for the panel

788
00:29:28,310 --> 00:29:26,480

and go from there

789
00:29:31,269 --> 00:29:28,320
all right thanks rob i appreciate the

790
00:29:35,590 --> 00:29:31,279
invitation to be on here with with uh

791
00:29:37,269 --> 00:29:35,600
the experts from hs 3 program

792
00:29:39,909 --> 00:29:37,279
um

793
00:29:41,990 --> 00:29:39,919
yeah uh the the work being done by this

794
00:29:43,990 --> 00:29:42,000
is incredible um

795
00:29:46,789 --> 00:29:44,000
being able to

796
00:29:49,029 --> 00:29:46,799
to go out to the far eastern atlantic

797
00:29:51,590 --> 00:29:49,039
and look at storms is certainly a unique

798
00:29:54,789 --> 00:29:51,600
opportunity uh the manda aircraft at

799
00:29:56,950 --> 00:29:54,799
best can get out to about the

800
00:29:58,230 --> 00:29:56,960
mid-atlantic and that's a that's a

801
00:30:00,310 --> 00:29:58,240
stretch

802
00:30:01,669 --> 00:30:00,320
so this is this is really an incredible

803
00:30:02,870 --> 00:30:01,679
opportunity

804
00:30:05,190 --> 00:30:02,880
and uh

805
00:30:06,950 --> 00:30:05,200
it's it's really great to see

806
00:30:10,070 --> 00:30:06,960
that we have you know year after year of

807
00:30:11,430 --> 00:30:10,080
this so um anyway so then this is year

808
00:30:13,909 --> 00:30:11,440
number two so we'll see what sort of

809
00:30:14,789 --> 00:30:13,919
storms we can get this year

810
00:30:16,389 --> 00:30:14,799
um

811
00:30:19,510 --> 00:30:16,399
as far as

812
00:30:22,389 --> 00:30:19,520
questions go i guess maybe my first one

813
00:30:25,190 --> 00:30:22,399

would be uh for

814
00:30:28,710 --> 00:30:25,200
tom um

815
00:30:29,909 --> 00:30:28,720
now you've mentioned we can fly

816
00:30:38,310 --> 00:30:29,919
we can fly

817
00:30:39,830 --> 00:30:38,320
a time and

818
00:30:43,590 --> 00:30:39,840
those can be

819
00:30:45,590 --> 00:30:43,600
in coordination with either a noaa or a

820
00:30:47,029 --> 00:30:45,600
uh an air force plane so they could be

821
00:30:49,510 --> 00:30:47,039
flying through the same

822
00:30:51,350 --> 00:30:49,520
storm or on top of the same storm at the

823
00:30:53,830 --> 00:30:51,360
same time

824
00:30:55,350 --> 00:30:53,840
yeah that's true uh however uh remember

825
00:30:57,669 --> 00:30:55,360
these aircraft are typically going to be

826
00:31:01,110 --> 00:30:57,679
at different altitudes obviously we're

827
00:31:05,190 --> 00:31:03,110
the other aircraft will be but we do

828
00:31:06,870 --> 00:31:05,200
have a pretty um

829
00:31:08,630 --> 00:31:06,880
good communications plan this is

830
00:31:10,230 --> 00:31:08,640
something we've been working on for a

831
00:31:12,389 --> 00:31:10,240
long time in fact it's been years in

832
00:31:14,389 --> 00:31:12,399
development

833
00:31:16,630 --> 00:31:14,399
nasa and noaa have been doing hurricane

834
00:31:18,389 --> 00:31:16,640
research for a long time so

835
00:31:20,389 --> 00:31:18,399
that's key as marilyn said is the

836
00:31:21,430 --> 00:31:20,399
coordination between all the external

837
00:31:24,470 --> 00:31:21,440
agencies

838
00:31:43,029 --> 00:31:24,480

so we have this plan that we use and

839
00:31:43,039 --> 00:31:47,269
network kicked me off there for a second

840
00:31:51,750 --> 00:31:50,310
so we uh uh follow this plan pretty uh

841
00:31:53,750 --> 00:31:51,760
pretty closely to make sure that

842
00:31:55,669 --> 00:31:53,760
everybody is uh um

843
00:31:57,909 --> 00:31:55,679
not in the same airspace at the same

844
00:32:02,950 --> 00:31:57,919
time and we're not dropping things

845
00:32:06,870 --> 00:32:04,710
you know maryland does a really good job

846
00:32:12,789 --> 00:32:06,880
of corralling everybody together and

847
00:32:16,230 --> 00:32:14,870
terrific so yeah i guess i mean one

848
00:32:18,310 --> 00:32:16,240
thing that just

849
00:32:20,870 --> 00:32:18,320
if anyone

850
00:32:22,470 --> 00:32:20,880
is curious if these these planes don't

851
00:32:23,509 --> 00:32:22,480
replace what we have now in terms of

852
00:32:25,190 --> 00:32:23,519
demand

853
00:32:27,190 --> 00:32:25,200
missions that fly right into the eye of

854
00:32:29,830 --> 00:32:27,200
a hurricane and measure the

855
00:32:31,669 --> 00:32:29,840
maximum winds and all that so these are

856
00:32:33,190 --> 00:32:31,679
just kind of a really great extra

857
00:32:34,950 --> 00:32:33,200
resource

858
00:32:36,870 --> 00:32:34,960
um to

859
00:32:38,950 --> 00:32:36,880
go ahead yeah that's that's true brian

860
00:32:40,549 --> 00:32:38,960
that's really the same for any aircraft

861
00:32:42,870 --> 00:32:40,559
all aircraft

862
00:32:44,870 --> 00:32:42,880
are good at doing certain things and

863
00:32:47,590 --> 00:32:44,880

really the key is combining all of these

864
00:32:49,350 --> 00:32:47,600
aircraft together and uh using the

865
00:32:51,269 --> 00:32:49,360
advantages of each of them it provides a

866
00:32:52,710 --> 00:32:51,279
lot of synergy for the whole project as

867
00:32:54,470 --> 00:32:52,720
a whole

868
00:32:56,389 --> 00:32:54,480
absolutely yeah it's wonderful and being

869
00:32:59,190 --> 00:32:56,399
able to go out and get the

870
00:33:00,470 --> 00:32:59,200
wind fields from storms in the far east

871
00:33:02,630 --> 00:33:00,480
eastern atlantic is something we've

872
00:33:03,990 --> 00:33:02,640
never been able to do

873
00:33:07,990 --> 00:33:04,000
um

874
00:33:12,389 --> 00:33:08,000
and then again the the big push on

875
00:33:14,950 --> 00:33:12,399
being able to understand the uh dry air

876
00:33:17,509 --> 00:33:14,960
coming off of africa the these saharan

877
00:33:20,070 --> 00:33:17,519
air layers is a huge mystery

878
00:33:21,590 --> 00:33:20,080
um what what impact that has on

879
00:33:25,590 --> 00:33:21,600
hurricane

880
00:33:26,549 --> 00:33:25,600
or if they strengthen at all

881
00:33:28,149 --> 00:33:26,559
um

882
00:33:29,909 --> 00:33:28,159
there's some

883
00:33:31,350 --> 00:33:29,919
some proof that

884
00:33:32,950 --> 00:33:31,360
that the

885
00:33:34,310 --> 00:33:32,960
saharan air layer can actually help

886
00:33:36,149 --> 00:33:34,320
storms and

887
00:33:39,350 --> 00:33:36,159
some on the flip side that it's not so

888
00:33:40,389 --> 00:33:39,360

good for them um

889
00:33:41,430 --> 00:33:40,399
so

890
00:33:43,190 --> 00:33:41,440
um

891
00:33:45,430 --> 00:33:43,200
maybe a question then for

892
00:33:47,750 --> 00:33:45,440
scott would be what happens to these

893
00:33:49,590 --> 00:33:47,760
instruments after

894
00:33:51,430 --> 00:33:49,600
hs3 is over

895
00:33:52,630 --> 00:33:51,440
obviously there's some great instruments

896
00:33:53,509 --> 00:33:52,640
at work here

897
00:33:55,430 --> 00:33:53,519
um

898
00:33:57,669 --> 00:33:55,440
do they just get retired or what's their

899
00:33:59,669 --> 00:33:57,679
future

900
00:34:01,509 --> 00:33:59,679
no they won't be retired

901
00:34:03,029 --> 00:34:01,519
all these instruments are generally

902
00:34:03,909 --> 00:34:03,039
funded

903
00:34:06,070 --> 00:34:03,919
through

904
00:34:08,869 --> 00:34:06,080
various research programs so right now

905
00:34:11,669 --> 00:34:08,879
they're committed to hs3 for three years

906
00:34:12,869 --> 00:34:11,679
of flights uh when this is done

907
00:34:13,750 --> 00:34:12,879
they'll

908
00:34:15,510 --> 00:34:13,760
likely

909
00:34:18,869 --> 00:34:15,520
be trying to get funding for additional

910
00:34:21,109 --> 00:34:18,879
support for other campaigns for example

911
00:34:24,069 --> 00:34:21,119
hsu was funded under the first round of

912
00:34:26,790 --> 00:34:24,079
nasa's earth venture suborbital call

913
00:34:29,510 --> 00:34:26,800

back in 2009 and right now they're going

914
00:34:31,589 --> 00:34:29,520
through the process of select of getting

915
00:34:33,349 --> 00:34:31,599
new proposals and next year they'll make

916
00:34:34,869 --> 00:34:33,359
selections for a new round and so it's

917
00:34:36,950 --> 00:34:34,879
possible that some of these instruments

918
00:34:39,990 --> 00:34:36,960
will get funded for other projects

919
00:34:42,230 --> 00:34:40,000
whether it's hurricanes uh winter storms

920
00:34:43,750 --> 00:34:42,240
uh maybe more climate and chemistry well

921
00:34:45,510 --> 00:34:43,760
these wouldn't be necessary for climate

922
00:34:48,389 --> 00:34:45,520
chemistry some of them might be

923
00:34:50,790 --> 00:34:48,399
um but basically they're

924
00:34:51,589 --> 00:34:50,800
tied to opportunities for funding

925
00:34:53,270 --> 00:34:51,599
uh

926
00:34:54,950 --> 00:34:53,280
and so it's kind of hard to say what

927
00:34:56,389 --> 00:34:54,960
will happen next for a lot of these

928
00:34:57,990 --> 00:34:56,399
instruments other than that they'll

929
00:34:59,910 --> 00:34:58,000
eventually find their way into another

930
00:35:02,069 --> 00:34:59,920
project somewhere

931
00:35:03,270 --> 00:35:02,079
all right and speaking of that um is

932
00:35:05,990 --> 00:35:03,280
there

933
00:35:08,069 --> 00:35:06,000
uh

934
00:35:08,870 --> 00:35:08,079
have you guys kind of put on the wish

935
00:35:10,790 --> 00:35:08,880
list

936
00:35:12,310 --> 00:35:10,800
being able to have a global hawk in the

937
00:35:14,470 --> 00:35:12,320
long term for

938
00:35:16,630 --> 00:35:14,480

hurricane recon

939
00:35:18,470 --> 00:35:16,640
uh well with nasa with hs3 you know

940
00:35:20,630 --> 00:35:18,480
again it's only funded for the five

941
00:35:24,470 --> 00:35:20,640
years and there's no real plan for for

942
00:35:26,790 --> 00:35:24,480
the long term uh within nasa as as

943
00:35:28,390 --> 00:35:26,800
regular reconnaissance since we do more

944
00:35:31,030 --> 00:35:28,400
or more research oriented rather than

945
00:35:33,109 --> 00:35:31,040
operational uh operationally oriented

946
00:35:35,589 --> 00:35:33,119
however we are having some discussions

947
00:35:37,829 --> 00:35:35,599
with noah noah has a a very deep

948
00:35:39,910 --> 00:35:37,839
interest in using the aircraft for both

949
00:35:41,670 --> 00:35:39,920
hurricanes and winter storms and there

950
00:35:44,470 --> 00:35:41,680
are some discussions at high levels

951
00:35:45,910 --> 00:35:44,480
about trying to

952
00:35:48,630 --> 00:35:45,920
make the earth want at least one of the

953
00:35:50,390 --> 00:35:48,640
aircraft or maybe both available to noaa

954
00:35:51,829 --> 00:35:50,400
uh contingent upon

955
00:35:53,109 --> 00:35:51,839
being able to work out some of the

956
00:35:54,950 --> 00:35:53,119
funding issues

957
00:35:57,510 --> 00:35:54,960
terrific

958
00:35:59,190 --> 00:35:57,520
all right i think that's that's my main

959
00:36:01,030 --> 00:35:59,200
questions right now

960
00:36:03,030 --> 00:36:01,040
thank you guys all right thank you brian

961
00:36:06,150 --> 00:36:03,040
uh we have uh quite a number of reporter

962
00:36:08,230 --> 00:36:06,160
questions um and questions from google

963
00:36:10,069 --> 00:36:08,240

youtube and twitter um

964
00:36:12,790 --> 00:36:10,079
the first question is from carrie rose

965
00:36:14,630 --> 00:36:12,800
and carrie has addressed to scott

966
00:36:15,990 --> 00:36:14,640
uh scott she would like to know she

967
00:36:18,230 --> 00:36:16,000
would like you to restate which

968
00:36:20,390 --> 00:36:18,240
piggyback instrument is being added to

969
00:36:22,470 --> 00:36:20,400
the overstorm aircraft

970
00:36:25,589 --> 00:36:22,480
uh well the acronym for the instrument

971
00:36:27,589 --> 00:36:25,599
is adele a d e l

972
00:36:29,910 --> 00:36:27,599
i can't off the top of my head remember

973
00:36:31,670 --> 00:36:29,920
what the acronym stands for but it's a

974
00:36:34,390 --> 00:36:31,680
gamma-ray uh

975
00:36:36,150 --> 00:36:34,400
detector so basically looking for gamma

976
00:36:38,390 --> 00:36:36,160
rays that are emitted from lightning at

977
00:36:39,510 --> 00:36:38,400
the top of the storm uh well the gamma

978
00:36:42,390 --> 00:36:39,520
rays are emitted from the top of the

979
00:36:44,069 --> 00:36:42,400
storm um and so they're

980
00:36:45,589 --> 00:36:44,079
they're they're relatively rare events

981
00:36:47,349 --> 00:36:45,599
but this was an opportunity for them to

982
00:36:49,030 --> 00:36:47,359
get on a high altitude aircraft where

983
00:36:51,750 --> 00:36:49,040
they might be readily able to see these

984
00:36:53,270 --> 00:36:51,760
types of phenomena

985
00:36:56,550 --> 00:36:53,280
and adele is not named after the pop

986
00:36:58,069 --> 00:36:56,560
singer who's saying skyfall by the way

987
00:37:00,310 --> 00:36:58,079
um and by the way we're getting a lot of

988
00:37:02,230 --> 00:37:00,320

questions about whether or not uh hs3

989
00:37:04,390 --> 00:37:02,240
will see a sharknado

990
00:37:06,150 --> 00:37:04,400
and the answer to that is no

991
00:37:07,829 --> 00:37:06,160
so for everybody who sent out that

992
00:37:09,910 --> 00:37:07,839
question we could just move on from

993
00:37:11,750 --> 00:37:09,920
there no sharknados occur on too small

994
00:37:13,990 --> 00:37:11,760
of a scale

995
00:37:17,510 --> 00:37:14,000
thank you scott

996
00:37:18,630 --> 00:37:17,520
uh another reported question um

997
00:37:21,270 --> 00:37:18,640
this question

998
00:37:23,190 --> 00:37:21,280
is how do the instruments on hs3

999
00:37:26,790 --> 00:37:23,200
compared to the instruments that are

1000
00:37:29,750 --> 00:37:26,800
already in use by satellites

1001
00:37:31,670 --> 00:37:29,760
uh well some of the instruments are are

1002
00:37:32,790 --> 00:37:31,680
similar in some ways to what's on

1003
00:37:34,630 --> 00:37:32,800
satellites

1004
00:37:36,150 --> 00:37:34,640
the scanning his instrument is very

1005
00:37:37,990 --> 00:37:36,160
similar to the ayers instrument that's

1006
00:37:39,190 --> 00:37:38,000
on the aqua satellite

1007
00:37:40,550 --> 00:37:39,200
um

1008
00:37:43,190 --> 00:37:40,560
which basically gives you temperature

1009
00:37:44,630 --> 00:37:43,200
and humidity profiles uh the cloud

1010
00:37:47,270 --> 00:37:44,640
physics lidar and the nose of the

1011
00:37:49,190 --> 00:37:47,280
environmental aircraft uh is basically

1012
00:37:51,589 --> 00:37:49,200
the same type of measurement as we get

1013
00:37:55,190 --> 00:37:51,599

from a satellite called calypso

1014
00:37:56,390 --> 00:37:55,200
that gives profiles and dust and clouds

1015
00:37:59,430 --> 00:37:56,400
um

1016
00:38:02,470 --> 00:37:59,440
in terms of the overstorm aircraft the

1017
00:38:04,069 --> 00:38:02,480
doppler radar is is sort of an advanced

1018
00:38:05,910 --> 00:38:04,079
version of something that we'll see

1019
00:38:08,150 --> 00:38:05,920
right now with our tropical rainfall

1020
00:38:10,470 --> 00:38:08,160
measuring mission uh satellite that's

1021
00:38:12,790 --> 00:38:10,480
been going for about more than 15 years

1022
00:38:16,630 --> 00:38:12,800
now it has the first and only

1023
00:38:18,069 --> 00:38:16,640
rain or precipitation radar in space

1024
00:38:19,990 --> 00:38:18,079
but it's there's going to be a follow-on

1025
00:38:21,430 --> 00:38:20,000
mission that launches next february

1026
00:38:23,349 --> 00:38:21,440
called the global precipitation

1027
00:38:26,069 --> 00:38:23,359
measurement mission which will be a dual

1028
00:38:27,910 --> 00:38:26,079
frequency radar uh just getting

1029
00:38:29,829 --> 00:38:27,920
precipitation profiles not wind

1030
00:38:31,829 --> 00:38:29,839
information from space but the two

1031
00:38:33,589 --> 00:38:31,839
frequencies on the gpm satellite are

1032
00:38:36,150 --> 00:38:33,599
identical to what we have on the high

1033
00:38:37,670 --> 00:38:36,160
rep doppler radar

1034
00:38:41,829 --> 00:38:37,680
the

1035
00:38:45,270 --> 00:38:41,839
and don't really necessarily have a

1036
00:38:47,270 --> 00:38:45,280
space equivalent at this point

1037
00:38:49,109 --> 00:38:47,280
thank you scott um there are a couple

1038
00:38:51,109 --> 00:38:49,119

more couple of questions from tiarno

1039
00:38:53,430 --> 00:38:51,119
thiano tall

1040
00:38:54,950 --> 00:38:53,440
one question is it partic is it possible

1041
00:38:56,950 --> 00:38:54,960
to access the data about hurricane

1042
00:38:57,290 --> 00:38:56,960
nadine um

1043
00:38:58,390 --> 00:38:57,300
from

1044
00:39:01,190 --> 00:38:58,400
[Music]

1045
00:39:03,270 --> 00:39:01,200
a non-hs3 perspective or actually even

1046
00:39:05,109 --> 00:39:03,280
including an hs3 perspective you can

1047
00:39:08,470 --> 00:39:05,119
find nadine under the nasa hurricane

1048
00:39:11,589 --> 00:39:08,480
page archives at nasa.gov hurricane in

1049
00:39:13,190 --> 00:39:11,599
the 2012 list of storms where we do have

1050
00:39:16,230 --> 00:39:13,200
a lot of the different nasa satellite

1051
00:39:18,230 --> 00:39:16,240
data as well as some of the information

1052
00:39:20,630 --> 00:39:18,240
from when hs3

1053
00:39:21,829 --> 00:39:20,640
sent the global hawks over it

1054
00:39:25,349 --> 00:39:21,839
scott would you like to follow up with

1055
00:39:27,510 --> 00:39:25,359
that uh yeah all the data is made

1056
00:39:30,310 --> 00:39:27,520
freely available to the public anybody

1057
00:39:33,030 --> 00:39:30,320
who wants to use it if people go to our

1058
00:39:33,910 --> 00:39:33,040
project webpage

1059
00:39:37,030 --> 00:39:33,920
which is

1060
00:39:42,630 --> 00:39:40,390
hs3 there's a link on the left side that

1061
00:39:43,990 --> 00:39:42,640
is for data and and we it basically

1062
00:39:45,750 --> 00:39:44,000
links you to

1063
00:39:48,630 --> 00:39:45,760

archive web pages for each of the

1064
00:39:51,510 --> 00:39:48,640
instruments uh that have that flew on

1065
00:39:52,790 --> 00:39:51,520
the environmental aircraft last year um

1066
00:39:54,790 --> 00:39:52,800
of course it takes some level of

1067
00:39:56,390 --> 00:39:54,800
expertise to learn how to use these data

1068
00:39:57,990 --> 00:39:56,400
sets but for any researchers in

1069
00:39:59,910 --> 00:39:58,000
particular who are interested in using

1070
00:40:02,150 --> 00:39:59,920
these data they can just go to those

1071
00:40:03,750 --> 00:40:02,160
websites and and download the data and

1072
00:40:05,990 --> 00:40:03,760
start working with them

1073
00:40:07,910 --> 00:40:06,000
typically after data is collected while

1074
00:40:10,950 --> 00:40:07,920
we're in the field there's a period of

1075
00:40:13,349 --> 00:40:10,960
about six months where the data is

1076
00:40:15,109 --> 00:40:13,359
processed quality controlled and then

1077
00:40:17,589 --> 00:40:15,119
once we make sure everything is all

1078
00:40:19,510 --> 00:40:17,599
right then we we put the link on the web

1079
00:40:22,829 --> 00:40:19,520
page so that it becomes available to

1080
00:40:28,390 --> 00:40:25,349
okay thank you scott

1081
00:40:32,069 --> 00:40:28,400
um the next question is about education

1082
00:40:33,910 --> 00:40:32,079
materials on hs3 and hurricanes for

1083
00:40:35,270 --> 00:40:33,920
education materials on hurricanes in

1084
00:40:37,990 --> 00:40:35,280
general you can also go back to the

1085
00:40:40,150 --> 00:40:38,000
national arcane page nasa.gov hurricane

1086
00:40:42,069 --> 00:40:40,160
there is an educators section there

1087
00:40:46,069 --> 00:40:42,079
i'm going to throw it to maryland

1088
00:40:49,030 --> 00:40:46,079

vasquez about the hs3

1089
00:40:52,150 --> 00:40:49,040
yes thank you i'm glad to be back um

1090
00:40:53,829 --> 00:40:52,160
the we do have a materials uh there's

1091
00:40:56,150 --> 00:40:53,839
infra information on our website that

1092
00:40:58,710 --> 00:40:56,160
scott talked about um i think that's the

1093
00:40:59,910 --> 00:40:58,720
best place we also have links to

1094
00:41:01,990 --> 00:40:59,920
information

1095
00:41:05,349 --> 00:41:02,000
in our calendar about events that have

1096
00:41:07,030 --> 00:41:05,359
to do with epo or public affairs so i

1097
00:41:09,910 --> 00:41:07,040
would say the best place to start is our

1098
00:41:13,190 --> 00:41:11,670
thank you marilyn

1099
00:41:15,430 --> 00:41:13,200
uh we have a question from seth

1100
00:41:17,750 --> 00:41:15,440
bornstein of associated press

1101
00:41:19,030 --> 00:41:17,760
and this one involves operational data

1102
00:41:21,270 --> 00:41:19,040
well the national hurricane center

1103
00:41:25,030 --> 00:41:21,280
forecasters be able to use any of the

1104
00:41:28,630 --> 00:41:26,309
all right well

1105
00:41:31,510 --> 00:41:28,640
from the environmental aircraft

1106
00:41:33,589 --> 00:41:31,520
the drops on data does get used it's

1107
00:41:36,309 --> 00:41:33,599
processed in real time

1108
00:41:38,230 --> 00:41:36,319
by people at the noaa hurricane research

1109
00:41:39,430 --> 00:41:38,240
division and then they pass the

1110
00:41:42,550 --> 00:41:39,440
information

1111
00:41:45,750 --> 00:41:42,560
on to the national hurricane center

1112
00:41:47,030 --> 00:41:45,760
in addition the data is uploaded to a

1113
00:41:49,430 --> 00:41:47,040

global

1114
00:41:50,309 --> 00:41:49,440
system for sharing the data and it's so

1115
00:41:52,230 --> 00:41:50,319
it's available not only for the

1116
00:41:54,390 --> 00:41:52,240
hurricane center but for operational

1117
00:41:56,470 --> 00:41:54,400
forecast centers who might want to

1118
00:41:57,430 --> 00:41:56,480
ingest that data into the forecast

1119
00:41:59,270 --> 00:41:57,440
models

1120
00:42:01,270 --> 00:41:59,280
the other data such as from the cloud

1121
00:42:02,710 --> 00:42:01,280
physics lidar and scanning his

1122
00:42:05,510 --> 00:42:02,720
are not as

1123
00:42:07,910 --> 00:42:05,520
easy to use operationally

1124
00:42:10,230 --> 00:42:07,920
but we we can make some of the data

1125
00:42:11,750 --> 00:42:10,240
available in real time i think they're

1126
00:42:14,309 --> 00:42:11,760
going to be particularly interested in

1127
00:42:15,990 --> 00:42:14,319
the data from our overstorm aircraft and

1128
00:42:19,030 --> 00:42:16,000
since this is our first year of flying

1129
00:42:20,870 --> 00:42:19,040
the overstorm aircraft and the field

1130
00:42:21,589 --> 00:42:20,880
we have to see what we can do in terms

1131
00:42:24,069 --> 00:42:21,599
of

1132
00:42:25,750 --> 00:42:24,079
getting that data to them in real time

1133
00:42:27,990 --> 00:42:25,760
when you're trying to

1134
00:42:29,829 --> 00:42:28,000
download large data sets from an

1135
00:42:31,990 --> 00:42:29,839
aircraft down to the ground we're

1136
00:42:34,470 --> 00:42:32,000
limited by bandwidth and and it can be

1137
00:42:36,710 --> 00:42:34,480
hard to get the information down uh

1138
00:42:38,870 --> 00:42:36,720

quickly uh and with the sort of products

1139
00:42:41,670 --> 00:42:38,880
that they want to see so this year sort

1140
00:42:43,190 --> 00:42:41,680
of a test for us to to

1141
00:42:45,990 --> 00:42:43,200
produce certain types of products that

1142
00:42:47,750 --> 00:42:46,000
we think would be useful for them

1143
00:42:49,430 --> 00:42:47,760
share that with them maybe not

1144
00:42:51,349 --> 00:42:49,440
necessarily in real time but shortly

1145
00:42:53,030 --> 00:42:51,359
after to get some feedback and then

1146
00:42:55,430 --> 00:42:53,040
hopefully by next year

1147
00:42:57,270 --> 00:42:55,440
we can try to get the data to them in

1148
00:42:59,670 --> 00:42:57,280
real time where it could help with their

1149
00:43:01,670 --> 00:42:59,680
forecast operations uh these are things

1150
00:43:03,270 --> 00:43:01,680
that we're not required to do but uh we

1151
00:43:05,270 --> 00:43:03,280
certainly try to do on a best effort

1152
00:43:07,349 --> 00:43:05,280
basis because we know that they will

1153
00:43:09,270 --> 00:43:07,359
that they can be beneficial and so we're

1154
00:43:11,030 --> 00:43:09,280
making every effort to do it but again

1155
00:43:14,470 --> 00:43:11,040
you need to keep in mind that this is a

1156
00:43:17,030 --> 00:43:14,480
a fairly complex operation a lot of

1157
00:43:18,790 --> 00:43:17,040
things being done for the first time and

1158
00:43:20,870 --> 00:43:18,800
there's some kinks to be worked out and

1159
00:43:23,030 --> 00:43:20,880
communicating such large data sets in

1160
00:43:24,390 --> 00:43:23,040
real time

1161
00:43:26,069 --> 00:43:24,400
all right thank you scott we have

1162
00:43:28,150 --> 00:43:26,079
another question from elizabeth harbaugh

1163
00:43:30,470 --> 00:43:28,160

she actually would like you to elaborate

1164
00:43:33,190 --> 00:43:30,480
on the saharan air layer

1165
00:43:35,510 --> 00:43:33,200
and why it may help hurricanes either

1166
00:43:36,950 --> 00:43:35,520
intensify or it may

1167
00:43:39,030 --> 00:43:36,960
uh

1168
00:43:41,430 --> 00:43:39,040
help them fizzle out

1169
00:43:43,430 --> 00:43:41,440
okay well it helps to kind of keep in

1170
00:43:45,589 --> 00:43:43,440
mind certain things that that are needed

1171
00:43:48,790 --> 00:43:45,599
for hurricanes to form and grow

1172
00:43:51,109 --> 00:43:48,800
uh one you need to have fairly humid air

1173
00:43:53,349 --> 00:43:51,119
to foster cloud development dry air

1174
00:43:55,430 --> 00:43:53,359
tends to disrupt cloud development and

1175
00:43:57,589 --> 00:43:55,440
and even lead the cooling down near the

1176
00:43:59,589 --> 00:43:57,599
surface due in downdrafts

1177
00:44:01,910 --> 00:43:59,599
um you also need the air to be fairly

1178
00:44:03,910 --> 00:44:01,920
unstable so where when it starts to rise

1179
00:44:06,150 --> 00:44:03,920
it wants to continue to rise to develop

1180
00:44:08,630 --> 00:44:06,160
a deep thunderstorm uh whereas the air

1181
00:44:10,950 --> 00:44:08,640
becomes stable it might tend to

1182
00:44:12,390 --> 00:44:10,960
prevent that rising motion

1183
00:44:13,750 --> 00:44:12,400
uh and then also

1184
00:44:15,589 --> 00:44:13,760
hurricanes

1185
00:44:17,750 --> 00:44:15,599
and developing trouble storms don't like

1186
00:44:20,710 --> 00:44:17,760
what's called vertical wind shear

1187
00:44:23,109 --> 00:44:20,720
this is the change of winds with height

1188
00:44:24,710 --> 00:44:23,119

and that can have a shearing effect on

1189
00:44:26,710 --> 00:44:24,720
the storms and basically rip them apart

1190
00:44:28,390 --> 00:44:26,720
if the shear becomes too strong

1191
00:44:31,670 --> 00:44:28,400
so with the saharan air layer it's a

1192
00:44:32,710 --> 00:44:31,680
very hot dry dusty air mass

1193
00:44:34,790 --> 00:44:32,720
and

1194
00:44:37,270 --> 00:44:34,800
in that layer itself

1195
00:44:38,630 --> 00:44:37,280
that hot air overrides cooler air near

1196
00:44:40,390 --> 00:44:38,640
the surface so it tends to be very

1197
00:44:42,790 --> 00:44:40,400
stable and it's hard to get deep cloud

1198
00:44:45,589 --> 00:44:42,800
development the dry air can potentially

1199
00:44:47,990 --> 00:44:45,599
mix into storms and kind of cause them

1200
00:44:50,390 --> 00:44:48,000
to lose some energy and then on the

1201
00:44:52,870 --> 00:44:50,400
southern side of the saharan air layer

1202
00:44:55,030 --> 00:44:52,880
there tends to be a strong mid-level

1203
00:44:56,710 --> 00:44:55,040
wind maximum or jet

1204
00:44:57,910 --> 00:44:56,720
that can increase the vertical wind

1205
00:44:59,910 --> 00:44:57,920
shear so those are some of the arguments

1206
00:45:01,910 --> 00:44:59,920
about why it may inhibit storm

1207
00:45:03,829 --> 00:45:01,920
development just through increasing

1208
00:45:05,829 --> 00:45:03,839
stability bringing dry air and

1209
00:45:08,870 --> 00:45:05,839
increasing vertical wind shear

1210
00:45:11,109 --> 00:45:08,880
now the arguments as for why it may have

1211
00:45:13,030 --> 00:45:11,119
a positive influence on growth is a

1212
00:45:14,710 --> 00:45:13,040
little bit more complex but it has to do

1213
00:45:17,670 --> 00:45:14,720

with the energetics of the large-scale

1214
00:45:19,349 --> 00:45:17,680
wave uh in which the storm is embedded

1215
00:45:22,150 --> 00:45:19,359
and basically the southern side of the

1216
00:45:24,309 --> 00:45:22,160
sow acts kind of like a front

1217
00:45:26,309 --> 00:45:24,319
and it may foster a vertical circulation

1218
00:45:28,630 --> 00:45:26,319
that leads to rising motion south of

1219
00:45:31,910 --> 00:45:28,640
that front uh which is where you would

1220
00:45:33,910 --> 00:45:31,920
typically get a tropical cloud formation

1221
00:45:36,950 --> 00:45:33,920
and so it may enhance that

1222
00:45:39,270 --> 00:45:36,960
in addition it may allow for conversions

1223
00:45:43,430 --> 00:45:39,280
of energy from the larger scale down to

1224
00:45:45,670 --> 00:45:43,440
the scale of the developing hurricane

1225
00:45:49,190 --> 00:45:45,680
a sort of large-scale dynamical

1226
00:45:51,030 --> 00:45:49,200
instability that may favor growth uh and

1227
00:45:52,150 --> 00:45:51,040
it's a little bit hard to determine at

1228
00:45:53,670 --> 00:45:52,160
this point

1229
00:45:56,950 --> 00:45:53,680
whether the

1230
00:45:59,430 --> 00:45:56,960
positive influences outweigh uh the

1231
00:46:00,950 --> 00:45:59,440
negative influences or if it may vary

1232
00:46:02,309 --> 00:46:00,960
from case to case so that's one of the

1233
00:46:05,270 --> 00:46:02,319
things that we want to do is get some

1234
00:46:06,950 --> 00:46:05,280
data uh on these storms these things

1235
00:46:08,550 --> 00:46:06,960
are most prominent out in the central

1236
00:46:11,109 --> 00:46:08,560
and eastern atlantic where we often

1237
00:46:12,870 --> 00:46:11,119
don't get uh much data so that's one of

1238
00:46:15,829 --> 00:46:12,880

the motivations for us is to get out to

1239
00:46:17,190 --> 00:46:15,839
these storms much earlier and look at

1240
00:46:18,870 --> 00:46:17,200
this interaction in a way that we

1241
00:46:23,030 --> 00:46:18,880
haven't been able to do

1242
00:46:27,190 --> 00:46:24,950
okay thank you scott we have another

1243
00:46:31,829 --> 00:46:27,200
question

1244
00:46:33,109 --> 00:46:31,839
are the small cylindrical tube sensors

1245
00:46:35,430 --> 00:46:33,119
that you mentioned

1246
00:46:38,550 --> 00:46:35,440
able to be recovered or are they and

1247
00:46:40,309 --> 00:46:38,560
reused or are they single use only

1248
00:46:43,510 --> 00:46:40,319
no they're a single use only they're

1249
00:46:45,670 --> 00:46:43,520
basically falling uh to the surface

1250
00:46:47,910 --> 00:46:45,680
while they do have a gps sensor in it to

1251
00:46:50,150 --> 00:46:47,920
tell us their exact position

1252
00:46:51,910 --> 00:46:50,160
um i don't believe that they float or at

1253
00:46:53,750 --> 00:46:51,920
least not for long and they'd be pretty

1254
00:46:55,670 --> 00:46:53,760
difficult to recover so they're

1255
00:46:58,790 --> 00:46:55,680
basically expendables that are used once

1256
00:47:01,990 --> 00:47:00,069
i do think the national weather service

1257
00:47:04,230 --> 00:47:02,000
has a program where you can mail the

1258
00:47:05,670 --> 00:47:04,240
drops on back though if it falls over

1259
00:47:07,990 --> 00:47:05,680
land somewhere

1260
00:47:11,829 --> 00:47:08,000
but we're so far out at sea

1261
00:47:14,150 --> 00:47:11,839
yeah we do not drop over land

1262
00:47:16,630 --> 00:47:14,160
thank you scott

1263
00:47:19,270 --> 00:47:16,640

let's see we have um another question

1264
00:47:20,550 --> 00:47:19,280
from twitter uh julie bookman uh before

1265
00:47:21,510 --> 00:47:20,560
i get to that just a reminder we have

1266
00:47:23,670 --> 00:47:21,520
about

1267
00:47:25,589 --> 00:47:23,680
12 minutes left on the hangout if you

1268
00:47:28,150 --> 00:47:25,599
have any comments you can ask your

1269
00:47:30,950 --> 00:47:28,160
comments through youtube or twitter by

1270
00:47:33,030 --> 00:47:30,960
hashtag nasahs3

1271
00:47:34,230 --> 00:47:33,040
or you can ask them on the google plus

1272
00:47:35,190 --> 00:47:34,240
page

1273
00:47:38,309 --> 00:47:35,200
so the

1274
00:47:42,390 --> 00:47:38,319
the next question from julie bookman um

1275
00:47:46,309 --> 00:47:44,390
let's see from julie book and write how

1276
00:47:47,829 --> 00:47:46,319
frequently does the drop song collect

1277
00:47:51,190 --> 00:47:47,839
temperature data

1278
00:47:52,390 --> 00:47:51,200
and is drops on data used to verify or

1279
00:47:55,829 --> 00:47:52,400
qualify

1280
00:47:57,349 --> 00:47:55,839
temperature data collected by hamster

1281
00:47:58,390 --> 00:47:57,359
all right well the the data are

1282
00:48:01,030 --> 00:47:58,400
collected i'm trying to remember what

1283
00:48:03,589 --> 00:48:01,040
the number is it's like 1 or 10 hertz

1284
00:48:05,829 --> 00:48:03,599
that's about 1 to 10 times per second so

1285
00:48:07,109 --> 00:48:05,839
very high resolution

1286
00:48:09,109 --> 00:48:07,119
so we get

1287
00:48:11,430 --> 00:48:09,119
very you know basically extreme vertical

1288
00:48:13,829 --> 00:48:11,440

resolution

1289
00:48:15,829 --> 00:48:13,839
which is extremely helpful

1290
00:48:17,829 --> 00:48:15,839
the hamster unfortunately is on the

1291
00:48:20,470 --> 00:48:17,839
other aircraft so we're not able to

1292
00:48:23,829 --> 00:48:20,480
verify the hamster profiles although in

1293
00:48:25,990 --> 00:48:23,839
in one of our test flights in 2011

1294
00:48:28,790 --> 00:48:26,000
we flew scanning his hamster and the

1295
00:48:30,630 --> 00:48:28,800
drop signs together uh for two flights

1296
00:48:33,109 --> 00:48:30,640
uh that and we were able to collect the

1297
00:48:37,030 --> 00:48:33,119
data set that was used to to verify the

1298
00:48:38,870 --> 00:48:37,040
retrieval algorithm for hamster now uh

1299
00:48:40,870 --> 00:48:38,880
within our hurricane flights you know

1300
00:48:43,510 --> 00:48:40,880
scanning his and drop center on on the

1301
00:48:45,190 --> 00:48:43,520
same uh aircraft and scanning his also

1302
00:48:47,670 --> 00:48:45,200
gets vertical profiles of temperature

1303
00:48:50,230 --> 00:48:47,680
and humidity uh primarily in the clear

1304
00:48:52,950 --> 00:48:50,240
air so it uh we are able to use the

1305
00:48:57,030 --> 00:48:52,960
drops on data to validate uh or verify

1306
00:49:01,910 --> 00:48:59,430
okay thank you scott we're uh actually

1307
00:49:03,990 --> 00:49:01,920
seeing a video of a flyover from the

1308
00:49:06,470 --> 00:49:04,000
belly of the global hawk right now

1309
00:49:10,069 --> 00:49:06,480
as it flew over hurricane carl

1310
00:49:14,470 --> 00:49:11,270
and i think that was from the grip

1311
00:49:15,670 --> 00:49:14,480
mission in 2010.

1312
00:49:17,750 --> 00:49:15,680
there's another question that came

1313
00:49:19,510 --> 00:49:17,760

through from christopher anderson and

1314
00:49:21,910 --> 00:49:19,520
christopher wants to know uh was the

1315
00:49:23,829 --> 00:49:21,920
global hawk custom made by lockheed or

1316
00:49:27,109 --> 00:49:23,839
was it repurposed from

1317
00:49:29,829 --> 00:49:27,119
the navy or air force version

1318
00:49:33,589 --> 00:49:29,839
i guess we can go over to maybe tom or

1319
00:49:35,510 --> 00:49:33,599
uh scott whoever wants to answer that

1320
00:49:37,829 --> 00:49:35,520
yeah um yeah i could probably speak to

1321
00:49:39,829 --> 00:49:37,839
that this this uh like i mentioned in uh

1322
00:49:42,790 --> 00:49:39,839
earlier this aircraft behind me was

1323
00:49:45,829 --> 00:49:42,800
actually the technology demonstrator

1324
00:49:48,870 --> 00:49:45,839
built by northrop grumman ryan back in

1325
00:49:51,270 --> 00:49:48,880
mid 90s and it first flew in 1998 so

1326
00:49:52,470 --> 00:49:51,280
these aircraft were accessed by the air

1327
00:49:54,790 --> 00:49:52,480
force

1328
00:49:56,470 --> 00:49:54,800
so we've repurposed them they are they

1329
00:49:59,109 --> 00:49:56,480
are essentially what the air force have

1330
00:50:01,030 --> 00:49:59,119
thrown as their glock 10 aircraft they

1331
00:50:03,030 --> 00:50:01,040
have a larger version of it now that

1332
00:50:05,270 --> 00:50:03,040
they're flying operationally

1333
00:50:07,750 --> 00:50:05,280
and nasa has actually obtained a couple

1334
00:50:12,950 --> 00:50:07,760
more of those aircraft we hope to use in

1335
00:50:15,109 --> 00:50:14,230
thank you tom

1336
00:50:16,710 --> 00:50:15,119
um

1337
00:50:19,349 --> 00:50:16,720
we have one more question says how many

1338
00:50:22,230 --> 00:50:19,359

research planes would be flying during a

1339
00:50:25,589 --> 00:50:22,240
hurricane at one time will both planes

1340
00:50:27,829 --> 00:50:25,599
be flying or will it just be one

1341
00:50:29,589 --> 00:50:27,839
well we'll always be flying just one at

1342
00:50:31,990 --> 00:50:29,599
a time um

1343
00:50:33,910 --> 00:50:32,000
that's part of hs3 we don't have the the

1344
00:50:35,990 --> 00:50:33,920
capability or manpower at the moment to

1345
00:50:37,589 --> 00:50:36,000
fly both simultaneously

1346
00:50:39,430 --> 00:50:37,599
uh in terms of the number of aircraft

1347
00:50:41,670 --> 00:50:39,440
that could be flying in the storm at any

1348
00:50:43,910 --> 00:50:41,680
one time it could be multiple aircraft

1349
00:50:47,190 --> 00:50:43,920
you you could potentially have one of

1350
00:50:49,510 --> 00:50:47,200
our global hawks uh the noaa uh

1351
00:50:51,829 --> 00:50:49,520
p3 aircraft which is sort of a load of

1352
00:50:53,910 --> 00:50:51,839
mid-level flying aircraft

1353
00:50:56,870 --> 00:50:53,920
there's a noaa gulfstream 4 aircraft

1354
00:50:58,870 --> 00:50:56,880
that flies at somewhere higher altitude

1355
00:51:00,230 --> 00:50:58,880
and then potentially air force aircraft

1356
00:51:03,030 --> 00:51:00,240
out there as well

1357
00:51:05,109 --> 00:51:03,040
back in 2010 during our

1358
00:51:07,190 --> 00:51:05,119
grip campaign or genesis and rapid

1359
00:51:08,710 --> 00:51:07,200
intensification experiment

1360
00:51:10,630 --> 00:51:08,720
at one point we actually had i think

1361
00:51:13,829 --> 00:51:10,640
five aircraft in the storm at one point

1362
00:51:16,390 --> 00:51:13,839
there was uh three nasa aircraft uh two

1363
00:51:18,950 --> 00:51:16,400

no aircraft uh and at various times in

1364
00:51:20,870 --> 00:51:18,960
air force aircraft so uh it is possible

1365
00:51:24,309 --> 00:51:20,880
to have multiple aircraft operating at

1366
00:51:28,630 --> 00:51:26,309
thank you scott um before we get back to

1367
00:51:30,710 --> 00:51:28,640
questions i just want to identify the

1368
00:51:33,349 --> 00:51:30,720
partners because this is a

1369
00:51:34,870 --> 00:51:33,359
quite an immense effort

1370
00:51:37,910 --> 00:51:34,880
of coming together there are several

1371
00:51:39,829 --> 00:51:37,920
nasa centers involved with uh with hs3

1372
00:51:41,030 --> 00:51:39,839
wallops flight facility is one center

1373
00:51:43,030 --> 00:51:41,040
where the

1374
00:51:45,349 --> 00:51:43,040
the global hawks will be based

1375
00:51:47,349 --> 00:51:45,359
we have ames research center

1376
00:51:48,710 --> 00:51:47,359
uh the earth science project office is

1377
00:51:51,109 --> 00:51:48,720
located there and they manage the

1378
00:51:53,270 --> 00:51:51,119
project goddard space flight center the

1379
00:51:55,270 --> 00:51:53,280
dryden research center where tom miller

1380
00:51:57,670 --> 00:51:55,280
is broadcasting from the marshall space

1381
00:51:59,670 --> 00:51:57,680
flight center in hultsville alabama and

1382
00:52:01,030 --> 00:51:59,680
nasa's jet propulsion laboratory in

1383
00:52:02,630 --> 00:52:01,040
california

1384
00:52:04,630 --> 00:52:02,640
in addition to nasa though there are

1385
00:52:06,950 --> 00:52:04,640
other outside partners that have

1386
00:52:09,510 --> 00:52:06,960
contributed quite a bit to this mission

1387
00:52:11,510 --> 00:52:09,520
noaa's hurricane research division

1388
00:52:13,990 --> 00:52:11,520

is a is a part of this mission and the

1389
00:52:15,430 --> 00:52:14,000
earth system research laboratory uh the

1390
00:52:17,829 --> 00:52:15,440
national centers for environmental

1391
00:52:20,069 --> 00:52:17,839
prediction the naval postgraduate school

1392
00:52:21,510 --> 00:52:20,079
the naval research laboratory

1393
00:52:22,470 --> 00:52:21,520
northrop grumman

1394
00:52:25,109 --> 00:52:22,480
uh

1395
00:52:27,589 --> 00:52:25,119
encar the nasa the national center for

1396
00:52:29,430 --> 00:52:27,599
atmospheric research state university of

1397
00:52:31,430 --> 00:52:29,440
new york at albany university of

1398
00:52:34,150 --> 00:52:31,440
maryland baltimore county university of

1399
00:52:36,549 --> 00:52:34,160
wisconsin and the university of utah so

1400
00:52:37,430 --> 00:52:36,559
as you can see this is a quite an effort

1401
00:52:39,190 --> 00:52:37,440
that

1402
00:52:41,750 --> 00:52:39,200
brings together all of these scientific

1403
00:52:43,030 --> 00:52:41,760
organizations

1404
00:52:45,589 --> 00:52:43,040
just a reminder before we get to the

1405
00:52:48,390 --> 00:52:45,599
next question that the all of these

1406
00:52:53,270 --> 00:52:48,400
videos and images will be on the nasa

1407
00:52:55,750 --> 00:52:53,280
hs3 website nasa.gov slash hs3

1408
00:52:57,670 --> 00:52:55,760
um and we also have additional

1409
00:52:59,589 --> 00:52:57,680
information on the nasa.gov slash

1410
00:53:01,829 --> 00:52:59,599
hurricane page

1411
00:53:02,950 --> 00:53:01,839
okay let's take another question

1412
00:53:05,030 --> 00:53:02,960
um

1413
00:53:06,150 --> 00:53:05,040

let's see from twitter

1414
00:53:21,270 --> 00:53:06,160
uh

1415
00:53:23,190 --> 00:53:21,280
that information offhand

1416
00:53:25,910 --> 00:53:23,200
my focus last year was primarily while

1417
00:53:29,190 --> 00:53:25,920
we were in the field uh superstorm sandy

1418
00:53:31,349 --> 00:53:29,200
was probably uh the deadliest but i

1419
00:53:35,589 --> 00:53:31,359
can't confirm that it's certainly

1420
00:53:40,230 --> 00:53:37,510
brian do you happen to uh

1421
00:53:42,710 --> 00:53:40,240
you want to add into that

1422
00:53:43,910 --> 00:53:42,720
oh yeah i don't have that

1423
00:53:46,710 --> 00:53:43,920
um

1424
00:53:48,790 --> 00:53:46,720
right on hand either but i think that's

1425
00:53:51,430 --> 00:53:48,800
correct the the only other storm of

1426
00:53:52,549 --> 00:53:51,440
significance that made landfall was

1427
00:53:54,150 --> 00:53:52,559
isaac

1428
00:53:55,430 --> 00:53:54,160
uh and that did cause some issues too

1429
00:53:56,630 --> 00:53:55,440
but no i

1430
00:53:58,630 --> 00:53:56,640
don't have that right in front of me it

1431
00:54:00,069 --> 00:53:58,640
would be on the national hurricane

1432
00:54:03,030 --> 00:54:00,079
center website though you can look up

1433
00:54:05,190 --> 00:54:03,040
the previous years or any years

1434
00:54:07,030 --> 00:54:05,200
tropical cyclone reports or

1435
00:54:10,910 --> 00:54:07,040
tcrs they're called

1436
00:54:12,870 --> 00:54:10,920
so they can just click on the

1437
00:54:15,589 --> 00:54:12,880
nhc.noaa.gov and

1438
00:54:17,430 --> 00:54:15,599

look for the tropical cyclone reports

1439
00:54:19,670 --> 00:54:17,440
okay thanks brian

1440
00:54:22,309 --> 00:54:19,680
um one more question from youtube do you

1441
00:54:24,470 --> 00:54:22,319
stage locations overseas for other

1442
00:54:27,750 --> 00:54:24,480
tropical cyclone areas besides the

1443
00:54:33,030 --> 00:54:30,549
um for hs3 we're not we're

1444
00:54:34,710 --> 00:54:33,040
simply focused on the atlantic there is

1445
00:54:37,829 --> 00:54:34,720
another earth venture

1446
00:54:39,349 --> 00:54:37,839
suborbital project called aatrex which

1447
00:54:41,270 --> 00:54:39,359
uh expects to have one of their

1448
00:54:43,270 --> 00:54:41,280
deployments out of guam i believe this

1449
00:54:45,589 --> 00:54:43,280
year and tom can probably speak more to

1450
00:54:49,750 --> 00:54:47,270
yeah that's correct scott we uh we'll

1451
00:54:54,630 --> 00:54:49,760
plan to go to uh guam earlier

1452
00:54:57,589 --> 00:54:56,069
all right thank you both

1453
00:54:59,589 --> 00:54:57,599
um

1454
00:55:02,790 --> 00:54:59,599
do uh brian do you have any additional

1455
00:55:05,270 --> 00:55:02,800
questions for the the team

1456
00:55:06,870 --> 00:55:05,280
no i don't this was a lot of very good

1457
00:55:08,549 --> 00:55:06,880
questions asked asked by some other

1458
00:55:10,390 --> 00:55:08,559
folks too

1459
00:55:12,950 --> 00:55:10,400
okay um

1460
00:55:14,230 --> 00:55:12,960
marilyn tom and scott

1461
00:55:20,390 --> 00:55:14,240
are there any other things that you want

1462
00:55:24,790 --> 00:55:22,549
can't think of anything

1463
00:55:29,030 --> 00:55:24,800

okay so the uh the first

1464
00:55:30,390 --> 00:55:29,040
the first flight is august 20th

1465
00:55:31,349 --> 00:55:30,400
and that's leaving that's departing

1466
00:55:33,109 --> 00:55:31,359
wallops

1467
00:55:35,910 --> 00:55:33,119
that'll be the first potential science

1468
00:55:37,510 --> 00:55:35,920
fight our operational window for science

1469
00:55:39,750 --> 00:55:37,520
flights is august 20th to about

1470
00:55:41,510 --> 00:55:39,760
september 23rd

1471
00:55:43,109 --> 00:55:41,520
of course whether or not we fly that

1472
00:55:44,630 --> 00:55:43,119
particular day or any other particular

1473
00:55:45,670 --> 00:55:44,640
day depends on whether targets are

1474
00:55:47,670 --> 00:55:45,680
available

1475
00:55:50,069 --> 00:55:47,680
it depends on the weather at wallops

1476
00:55:52,230 --> 00:55:50,079
because we're an unmanned aircraft

1477
00:55:54,630 --> 00:55:52,240
we require a chase aircraft

1478
00:55:56,549 --> 00:55:54,640
the pilots to act as the eyes

1479
00:55:58,630 --> 00:55:56,559
of the pilots on the ground

1480
00:56:01,030 --> 00:55:58,640
and so bad weather at walt would keep us

1481
00:56:03,190 --> 00:56:01,040
grounded

1482
00:56:05,430 --> 00:56:03,200
but the planes will actually transit uh

1483
00:56:08,309 --> 00:56:05,440
the week of the august 12th so they will

1484
00:56:09,750 --> 00:56:08,319
leave dryden and landon at wallops at

1485
00:56:14,390 --> 00:56:09,760
that time and that will that's when they

1486
00:56:18,470 --> 00:56:16,710
okay and the peak of hurricane season

1487
00:56:20,710 --> 00:56:18,480
is usually the first or second week of

1488
00:56:22,950 --> 00:56:20,720

september it's around september 10th or

1489
00:56:25,270 --> 00:56:22,960
so september 10th

1490
00:56:26,950 --> 00:56:25,280
so we're hoping for uh a number of

1491
00:56:27,990 --> 00:56:26,960
cyclones tropical cycles out there to

1492
00:56:31,430 --> 00:56:28,000
study

1493
00:56:33,510 --> 00:56:31,440
um nadine was very cooperative last year

1494
00:56:35,510 --> 00:56:33,520
scott how long did nadine hang around

1495
00:56:36,870 --> 00:56:35,520
last year i don't remember the exact

1496
00:56:39,829 --> 00:56:36,880
number of days i think it was on the

1497
00:56:41,270 --> 00:56:39,839
order of about 24 to 28 days something

1498
00:56:44,789 --> 00:56:41,280
like that i think it was the fifth

1499
00:56:46,549 --> 00:56:44,799
longest uh storm on record uh the odd

1500
00:56:48,950 --> 00:56:46,559
thing about last year was it was a very

1501
00:56:51,190 --> 00:56:48,960
active season uh you know obviously we

1502
00:56:53,109 --> 00:56:51,200
got all the way up at least through s on

1503
00:56:55,910 --> 00:56:53,119
the list of names and yet during the

1504
00:56:58,630 --> 00:56:55,920
five weeks we were in the field uh we

1505
00:57:00,150 --> 00:56:58,640
really only had a couple storms occur

1506
00:57:02,710 --> 00:57:00,160
fortunately for us

1507
00:57:04,789 --> 00:57:02,720
nadine stuck around for a long time and

1508
00:57:06,150 --> 00:57:04,799
provided some very useful information it

1509
00:57:07,190 --> 00:57:06,160
was a storm that

1510
00:57:09,190 --> 00:57:07,200
by all

1511
00:57:11,430 --> 00:57:09,200
rights should have died much earlier

1512
00:57:12,789 --> 00:57:11,440
than it did and yet it somehow kept

1513
00:57:14,710 --> 00:57:12,799

going and we collected some very

1514
00:57:16,710 --> 00:57:14,720
interesting data that i think will tell

1515
00:57:18,309 --> 00:57:16,720
us a little bit about how it was able to

1516
00:57:19,670 --> 00:57:18,319
maintain itself and then eventually

1517
00:57:20,870 --> 00:57:19,680
redevelop

1518
00:57:22,549 --> 00:57:20,880
and this is another case where the

1519
00:57:24,390 --> 00:57:22,559
capability of the airplane is really

1520
00:57:27,109 --> 00:57:24,400
important because we were able to go all

1521
00:57:29,510 --> 00:57:27,119
the way over to the azores and and spend

1522
00:57:34,950 --> 00:57:29,520
time in nadine so that's that long-range

1523
00:57:37,829 --> 00:57:36,150
thank you both

1524
00:57:40,789 --> 00:57:37,839
and again for anyone who wants more

1525
00:57:44,630 --> 00:57:40,799
information on how nasa covered

1526
00:57:47,030 --> 00:57:44,640
hurricane over the long course

1527
00:57:50,230 --> 00:57:47,040
of life that it had go to nasa.gov

1528
00:57:51,589 --> 00:57:50,240
hurricane and click on the 2012 archive

1529
00:57:53,109 --> 00:57:51,599
and you'll see information from the

1530
00:57:56,390 --> 00:57:53,119
different nasa satellites as well as

1531
00:57:58,069 --> 00:57:56,400
some of the hs3 input in there

1532
00:58:00,789 --> 00:57:58,079
um

1533
00:58:02,870 --> 00:58:00,799
that concludes our google hangout and i

1534
00:58:05,030 --> 00:58:02,880
just want to remind everybody that

1535
00:58:06,950 --> 00:58:05,040
this video will be archived on the nasa

1536
00:58:09,670 --> 00:58:06,960
goddard youtube channel which is nasa

1537
00:58:13,109 --> 00:58:09,680
explorer for more information you can go

1538
00:58:16,230 --> 00:58:13,119

to the hs3 website which is nasa.gov

1539
00:58:18,230 --> 00:58:16,240
hs3 and again all of the videos that you

1540
00:58:20,789 --> 00:58:18,240
saw playing during the school hangout

1541
00:58:22,710 --> 00:58:20,799
and the images will also be posted up

1542
00:58:24,230 --> 00:58:22,720
there

1543
00:58:26,230 --> 00:58:24,240
from nasa goddard space flight center