
Google+
NASA

1
00:00:04,670 --> 00:00:02,990
an artic campaign I'm George Hale here

2
00:00:06,260 --> 00:00:04,680
at NASA Goddard and as this hangout airs

3
00:00:07,760 --> 00:00:06,270
live we'll be answering your questions

4
00:00:10,009 --> 00:00:07,770
about NASA's upcoming mission to

5
00:00:12,320 --> 00:00:10,019
Antarctica you can ask a question in the

6
00:00:14,810 --> 00:00:12,330
YouTube comments box on this google +

7
00:00:16,160 --> 00:00:14,820
page on the ice bridge facebook page or

8
00:00:19,130 --> 00:00:16,170
you can tweet to us using the hashtag

9
00:00:21,140 --> 00:00:19,140
ice bridge joining us for this hangout

10
00:00:22,700 --> 00:00:21,150
from NASA's Wallops Flight Facility on

11
00:00:24,790 --> 00:00:22,710
the Eastern Shore of Virginia is ice

12
00:00:27,350 --> 00:00:24,800
bridge project manager Christie Hanson

13
00:00:28,880 --> 00:00:27,360

also at Wallops in the airplane hangar

14
00:00:31,190 --> 00:00:28,890
in front of our p3 airborne laboratory

15
00:00:33,919 --> 00:00:31,200
is project scientist Michael stew nagar

16
00:00:36,079 --> 00:00:33,929
and coming to us from denver colorado is

17
00:00:38,229 --> 00:00:36,089
chad nuttin he is a science project

18
00:00:40,849 --> 00:00:38,239
manager for the u.s. Antarctic Program

19
00:00:42,889 --> 00:00:40,859
will go straight to questions and the

20
00:00:47,790 --> 00:00:42,899
first one is for Michael Michael what

21
00:00:54,520 --> 00:00:50,529
operation IceBridge is a NASA airborne

22
00:00:57,520 --> 00:00:54,530
campaign that has been started in 2009

23
00:01:00,180 --> 00:00:57,530
to continue the laser altimetry

24
00:01:03,609 --> 00:01:00,190
measurements that have begun with eiza

25
00:01:06,460 --> 00:01:03,619
which ended in 2009 collecting data and

26
00:01:11,410 --> 00:01:06,470
the follow-up mission i sub 2 is

27
00:01:15,010 --> 00:01:11,420
currently scheduled for 2016 and between

28
00:01:18,279 --> 00:01:15,020
2009 2016 that's a very long depth in

29
00:01:22,109 --> 00:01:18,289
data acquisition so nASA has decided to

30
00:01:26,740 --> 00:01:22,119
bridge the step gap in data collection

31
00:01:28,899 --> 00:01:26,750
by using a instrumented aircraft and you

32
00:01:32,949 --> 00:01:28,909
can see one here in the back behind me

33
00:01:36,460 --> 00:01:32,959
this is the p3 aircraft to continue on

34
00:01:38,830 --> 00:01:36,470
collecting elevation measurements over

35
00:01:41,410 --> 00:01:38,840
the polar ice sheets and the Arctic and

36
00:01:44,199 --> 00:01:41,420
Antarctic sea ice in order to build a

37
00:01:52,539 --> 00:01:44,209
very long time series how the polar

38
00:01:54,190 --> 00:01:52,549

regions are changing great ok so this is

39
00:01:56,800 --> 00:01:54,200
the first time that ice bridge has

40
00:01:58,450 --> 00:01:56,810
operated directly from Antarctica now

41
00:02:03,039 --> 00:01:58,460
Christy how is that a benefit to the

42
00:02:04,660 --> 00:02:03,049
program hi George thanks for asking the

43
00:02:06,609 --> 00:02:04,670
question we're pretty excited to be

44
00:02:08,199 --> 00:02:06,619
going to McMurdo this season it'll be

45
00:02:10,930 --> 00:02:08,209
our first ever ice bridge deployment to

46
00:02:12,910 --> 00:02:10,940
McMurdo and one of the benefits we're

47
00:02:15,430 --> 00:02:12,920
going to get from taking our p3 aircraft

48
00:02:16,870 --> 00:02:15,440
down and being based on the continent

49
00:02:19,660 --> 00:02:16,880
down there is that we're going to

50
00:02:22,060 --> 00:02:19,670
collect more science hours of data per

51
00:02:24,220 --> 00:02:22,070
flight time previously when we deployed

52
00:02:25,900 --> 00:02:24,230
from Punta Arenas Chile we lost a lot of

53
00:02:27,880 --> 00:02:25,910
our science data collection time flying

54
00:02:29,380 --> 00:02:27,890
over the Drake Passage so we really only

55
00:02:31,750 --> 00:02:29,390
had about four to five hours of science

56
00:02:34,090 --> 00:02:31,760
collection whereas theoretically McMurdo

57
00:02:35,710 --> 00:02:34,100
will fly eight our missions and we can

58
00:02:43,030 --> 00:02:35,720
start collecting sign stated as soon as

59
00:02:45,340 --> 00:02:43,040
we take off and when we land okay now

60
00:02:47,199 --> 00:02:45,350
Chad you're with the u.s. outer program

61
00:02:49,360 --> 00:02:47,209
and you're essentially in charge of

62
00:02:51,759 --> 00:02:49,370
logistics for this and many other

63
00:02:53,050 --> 00:02:51,769

science missions in Antarctica so what

64
00:02:55,149 --> 00:02:53,060
exactly is involved in getting

65
00:02:58,509 --> 00:02:55,159
scientists and all their equipment to

66
00:03:00,340 --> 00:02:58,519
such a remote location well thanks for

67
00:03:02,290 --> 00:03:00,350
the question yet so it

68
00:03:04,830 --> 00:03:02,300
on a program this size with an aircraft

69
00:03:06,750 --> 00:03:04,840
like this coming down to McMurdo Station

70
00:03:09,220 --> 00:03:06,760
it's kind of a unique opportunity

71
00:03:11,710 --> 00:03:09,230
there's a lot of detailed planning that

72
00:03:14,920 --> 00:03:11,720
needs to occur we started planning for

73
00:03:16,180 --> 00:03:14,930
this over a year ago and will be Denton

74
00:03:18,790 --> 00:03:16,190
the plane will be down for you know

75
00:03:21,310 --> 00:03:18,800
about two weeks so there's a lot of

76
00:03:24,130 --> 00:03:21,320
resources limited resources in McMurdo

77
00:03:26,200 --> 00:03:24,140
Station in Antarctica and we have a lot

78
00:03:29,500 --> 00:03:26,210
of other groups that need to share those

79
00:03:32,980 --> 00:03:29,510
resources so the biggest challenge is

80
00:03:35,350 --> 00:03:32,990
ensuring the time frame and the amount

81
00:03:38,140 --> 00:03:35,360
of people that need to be on this

82
00:03:39,490 --> 00:03:38,150
project to make it successful it's one

83
00:03:46,900 --> 00:03:39,500
of the biggest challenges for any

84
00:03:49,540 --> 00:03:46,910
project coming to Antarctica and I'm

85
00:03:51,010 --> 00:03:49,550
George Hale I'm at NASA Goddard want to

86
00:03:53,020 --> 00:03:51,020
remind everybody you can ask her

87
00:03:55,180 --> 00:03:53,030
questions in the youtube comments box on

88
00:03:57,820 --> 00:03:55,190

the Google+ page our Facebook page or

89
00:04:00,010 --> 00:03:57,830
tweet to us using hashtag ice bridge now

90
00:04:02,880 --> 00:04:00,020
Michael can you explain to us what's

91
00:04:06,310 --> 00:04:02,890
behind you there in the hangar yeah here

92
00:04:09,910 --> 00:04:06,320
directly behind me you can see the tail

93
00:04:13,060 --> 00:04:09,920
of the p3 aircraft and what's happening

94
00:04:16,450 --> 00:04:13,070
this week is the instrument teams and

95
00:04:19,390 --> 00:04:16,460
the aircrew are all here and installing

96
00:04:22,600 --> 00:04:19,400
actually science instruments inside the

97
00:04:25,120 --> 00:04:22,610
aircraft the antennas structures on the

98
00:04:27,280 --> 00:04:25,130
outside of the aircraft and pretty much

99
00:04:30,010 --> 00:04:27,290
getting the right to the plane ready to

100
00:04:32,860 --> 00:04:30,020
decline to Antarctica so once we are

101
00:04:35,740 --> 00:04:32,870
done here with the installation we will

102
00:04:38,050 --> 00:04:35,750
test fly the aircraft Ian ball up some

103
00:04:41,830 --> 00:04:38,060
collect data with it make sure that

104
00:04:44,110 --> 00:04:41,840
everything works properly and calibrate

105
00:04:47,050 --> 00:04:44,120
the instrument seer and before we are

106
00:04:50,170 --> 00:04:47,060
going down south and then once all this

107
00:04:52,090 --> 00:04:50,180
is done we will ferry the aircraft down

108
00:04:55,020 --> 00:04:52,100
to Christchurch and from there to

109
00:04:57,490 --> 00:04:55,030
McMurdo and then we will start

110
00:05:04,450 --> 00:04:57,500
collecting data over the ice sheets in

111
00:05:07,180 --> 00:05:04,460
CI is there all right and our next

112
00:05:10,390 --> 00:05:07,190
question comes from cyril @ underscore

113
00:05:12,610 --> 00:05:10,400

cy VA and this christian for scripture

114
00:05:13,999 --> 00:05:12,620
is for christy what scientists work in

115
00:05:17,329 --> 00:05:14,009
the ice bridge team and who will be

116
00:05:19,489 --> 00:05:17,339
on board during the fights that's a

117
00:05:22,790 --> 00:05:19,499
really good question we have a very

118
00:05:25,249 --> 00:05:22,800
comprehensive science team we also have

119
00:05:28,309 --> 00:05:25,259
a team of instrument operators so when

120
00:05:29,929 --> 00:05:28,319
we actually deploy to the field we bring

121
00:05:31,309 --> 00:05:29,939
a lot of instrument engineers and

122
00:05:33,920 --> 00:05:31,319
operators some of them are scientists

123
00:05:35,359 --> 00:05:33,930
not everybody we have Michael students

124
00:05:37,700 --> 00:05:35,369
your who is our lead project scientist

125
00:05:39,200 --> 00:05:37,710
so sort of in charge of making sure all

126
00:05:41,779 --> 00:05:39,210
the science gets done and helping define

127
00:05:44,600 --> 00:05:41,789
our science objectives on the team that

128
00:05:47,059 --> 00:05:44,610
flies with us so we have we have we have

129
00:05:49,820 --> 00:05:47,069
students and engineers who operate radar

130
00:05:51,950 --> 00:05:49,830
systems we have a team here from wops

131
00:05:53,959 --> 00:05:51,960
who operates the laser altimetry systems

132
00:05:56,629 --> 00:05:53,969
we have a team from california that

133
00:05:58,579 --> 00:05:56,639
operates our digital camera systems we

134
00:06:01,579 --> 00:05:58,589
also have people from columbia

135
00:06:04,700 --> 00:06:01,589
university and also usgs that operate

136
00:06:07,129 --> 00:06:04,710
and can canada operate our ribbon on our

137
00:06:09,219 --> 00:06:07,139
magnetometers so we definitely have an

138
00:06:11,570 --> 00:06:09,229

extensive comprehensive team of

139
00:06:12,709 --> 00:06:11,580
excellent engineers and scientists in

140
00:06:14,989 --> 00:06:12,719
the field who help us collect our data

141
00:06:22,159 --> 00:06:14,999
to try and ultimately meet our level one

142
00:06:24,499 --> 00:06:22,169
science requirements all right and Chad

143
00:06:26,869 --> 00:06:24,509
you've worked in Antarctica for quite a

144
00:06:30,459 --> 00:06:26,879
while a good question we have here is

145
00:06:35,540 --> 00:06:30,469
how do you stay warm at the South Pole

146
00:06:37,459 --> 00:06:35,550
we have issued gear for external layers

147
00:06:39,529 --> 00:06:37,469
that help you withstand the elements and

148
00:06:41,629 --> 00:06:39,539
so you bring down a combination of

149
00:06:45,350 --> 00:06:41,639
depending on where you're from what

150
00:06:47,409 --> 00:06:45,360
works for you we have people that a lot

151
00:06:49,519 --> 00:06:47,419
of people that come down live in Alaska

152
00:06:50,899 --> 00:06:49,529
Minnesota across the top of the High

153
00:06:52,820 --> 00:06:50,909
Line of the United States but we also

154
00:06:55,159 --> 00:06:52,830
have people that come from Florida or

155
00:06:56,899 --> 00:06:55,169
you know southern states so we get a

156
00:06:59,480 --> 00:06:56,909
good mix and but we make sure they have

157
00:07:02,209 --> 00:06:59,490
the right gear for where they're going

158
00:07:03,860 --> 00:07:02,219
specifically we have three stations so

159
00:07:08,480 --> 00:07:03,870
at each station you receive different

160
00:07:11,600 --> 00:07:08,490
gear so most of it's warm it's intended

161
00:07:14,989 --> 00:07:11,610
to you know to do that and so that and

162
00:07:21,049 --> 00:07:14,999
layering is important layering is the

163
00:07:22,670 --> 00:07:21,059

key layering is indeed the key chat we

164
00:07:25,759 --> 00:07:22,680
have another question this one from at

165
00:07:27,230 --> 00:07:25,769
Poly Pete wants to see if you would

166
00:07:28,370 --> 00:07:27,240
speak more about the logistics involved

167
00:07:31,060 --> 00:07:28,380
at McMurdo to

168
00:07:34,640 --> 00:07:31,070
support icebridge such as air field ops

169
00:07:36,290 --> 00:07:34,650
absolutely yes we have a typically we

170
00:07:40,370 --> 00:07:36,300
operate anywhere from one to three

171
00:07:44,090 --> 00:07:40,380
airfields in McMurdo region one is

172
00:07:46,730 --> 00:07:44,100
typically on the sea ice which can go

173
00:07:48,020 --> 00:07:46,740
out and an annual basis or it can stick

174
00:07:50,620 --> 00:07:48,030
around for a while depending on the

175
00:07:53,750 --> 00:07:50,630
environmental conditions that year

176
00:07:55,700 --> 00:07:53,760
another airfield is what's what we call

177
00:07:57,830 --> 00:07:55,710
Pegasus and it is actually on the ice

178
00:08:01,820 --> 00:07:57,840
shelf so it's hundreds of feet thick and

179
00:08:05,810 --> 00:08:01,830
that is also a wheeled aircraft airfield

180
00:08:08,270 --> 00:08:05,820
and then some seasons and in past years

181
00:08:09,890 --> 00:08:08,280
we used to run a narrow field called

182
00:08:13,310 --> 00:08:09,900
Williams field and that is probably

183
00:08:17,330 --> 00:08:13,320
equipped ski equipped aircraft like the

184
00:08:19,490 --> 00:08:17,340
military l c-130s each airfield has its

185
00:08:22,070 --> 00:08:19,500
own unique capabilities as well as

186
00:08:24,950 --> 00:08:22,080
planning the logistics of getting them

187
00:08:27,800 --> 00:08:24,960
started and operational is a huge effort

188
00:08:29,420 --> 00:08:27,810

it's a monumental effort and they've got

189
00:08:31,130 --> 00:08:29,430
a pretty good handle on it now so they

190
00:08:33,320 --> 00:08:31,140
can get things going really quickly in

191
00:08:36,050 --> 00:08:33,330
the beginning of a season to support

192
00:08:38,450 --> 00:08:36,060
aircraft oftentimes in the winter you

193
00:08:40,670 --> 00:08:38,460
might have medevacs and they have to get

194
00:08:42,140 --> 00:08:40,680
the airfields ready really quickly so

195
00:08:45,530 --> 00:08:42,150
you're talking about organizing a lot of

196
00:08:47,990 --> 00:08:45,540
people a lot of heavy equipment to groom

197
00:08:53,320 --> 00:08:48,000
the runways move snow put snow back on

198
00:08:59,780 --> 00:08:55,990
hopefully that answers the question okay

199
00:09:01,880 --> 00:08:59,790
well thanks a lot Chad the next question

200
00:09:05,330 --> 00:09:01,890
for Christy and this comes from Rachel

201
00:09:06,980 --> 00:09:05,340
at RP news junkie and Rachel wants to

202
00:09:08,360 --> 00:09:06,990
know what the most exciting and

203
00:09:10,460 --> 00:09:08,370
interesting part of the mission is and

204
00:09:13,310 --> 00:09:10,470
what the public should be expecting as a

205
00:09:16,850 --> 00:09:13,320
result well that's a really good

206
00:09:18,080 --> 00:09:16,860
question let's see if you ask each

207
00:09:19,670 --> 00:09:18,090
person on our team you might get a

208
00:09:22,550 --> 00:09:19,680
different answer for that response so

209
00:09:24,920 --> 00:09:22,560
i'll give my personal perspective of

210
00:09:26,780 --> 00:09:24,930
that i think um i think there's two

211
00:09:29,030 --> 00:09:26,790
exciting parts of this deployment among

212
00:09:32,510 --> 00:09:29,040
many probably the first one which will

213
00:09:34,940 --> 00:09:32,520

be a huge milestone will be watching our

214
00:09:36,920 --> 00:09:34,950
p3 our NASA p3 aircraft land on the

215
00:09:39,110 --> 00:09:36,930
runway the very first day so that'll be

216
00:09:41,960 --> 00:09:39,120
a milestone in NASA history and in our

217
00:09:42,980 --> 00:09:41,970
airborne science program having play

218
00:09:45,050 --> 00:09:42,990
this mission for a year and a half

219
00:09:46,790 --> 00:09:45,060
having worked with ASC in the National

220
00:09:49,970 --> 00:09:46,800
Science Foundation they are National

221
00:09:53,420 --> 00:09:49,980
Guard 109 just putting together all the

222
00:09:56,150 --> 00:09:53,430
facts the requirements having see that

223
00:09:57,410 --> 00:09:56,160
come to fruition and that that's coming

224
00:10:00,379 --> 00:09:57,420
up here just in a couple weeks I think

225
00:10:02,269 --> 00:10:00,389
that will be very exciting because it's

226
00:10:03,920 --> 00:10:02,279
establishing a milestone our first time

227
00:10:08,240 --> 00:10:03,930
to start science data collection based

228
00:10:11,480 --> 00:10:08,250
out of us and our dynamic program retro

229
00:10:13,069 --> 00:10:11,490
station so seeing our p3 land and that's

230
00:10:14,900 --> 00:10:13,079
going to measure our starting point for

231
00:10:17,749 --> 00:10:14,910
collecting science data directly from

232
00:10:19,579 --> 00:10:17,759
the ice I think also the exciting part

233
00:10:20,929 --> 00:10:19,589
of this will be I think we're going to

234
00:10:23,329 --> 00:10:20,939
prove the technology prove the

235
00:10:24,980 --> 00:10:23,339
capability and once we start getting

236
00:10:26,780 --> 00:10:24,990
into our science data collection

237
00:10:28,309 --> 00:10:26,790
ultimately in the long run we're going

238
00:10:30,590 --> 00:10:28,319

to be able to collect more science data

239
00:10:32,300 --> 00:10:30,600
than on previous fall deployments when

240
00:10:33,949 --> 00:10:32,310
we were based out of chili so our

241
00:10:36,050 --> 00:10:33,959
science team and community is very

242
00:10:37,490 --> 00:10:36,060
excited about us being able to reach

243
00:10:38,809 --> 00:10:37,500
different parts of Antarctica that we

244
00:10:40,730 --> 00:10:38,819
couldn't reach before when we were based

245
00:10:42,170 --> 00:10:40,740
out of puntarenas so we're hitting some

246
00:10:44,240 --> 00:10:42,180
some targets that maybe we didn't hit

247
00:10:46,639 --> 00:10:44,250
before so that's exciting to our science

248
00:10:48,369 --> 00:10:46,649
team as well as well as ultimately in

249
00:10:50,119 --> 00:10:48,379
the long run again just getting more

250
00:10:51,920 --> 00:10:50,129
more data because we're going to be

251
00:10:53,389 --> 00:10:51,930
based directly off the continent so

252
00:10:54,949 --> 00:10:53,399
those two I think are two of the more

253
00:10:56,960 --> 00:10:54,959
exciting milestones though that we're

254
00:11:02,990 --> 00:10:56,970
going to receive see here in a couple

255
00:11:05,179 --> 00:11:03,000
weeks great thanks and once again this

256
00:11:07,490 --> 00:11:05,189
is a NASA Google+ Hangout kicking off

257
00:11:09,499 --> 00:11:07,500
the operation IceBridge 2013 and our

258
00:11:12,379 --> 00:11:09,509
campaign I'm George Hale at NASA Goddard

259
00:11:15,139 --> 00:11:12,389
and this next question we have for

260
00:11:17,480 --> 00:11:15,149
project scientist Michael stew nagar we

261
00:11:19,699 --> 00:11:17,490
have a lot of people on google+ who want

262
00:11:22,579 --> 00:11:19,709
to volunteer to support a NASA mission

263
00:11:27,769 --> 00:11:22,589

in Antarctica what can we say to them is

264
00:11:31,610 --> 00:11:27,779
that possible it's gonna be a challenge

265
00:11:34,429 --> 00:11:31,620
as chad has set the resources that are

266
00:11:37,160 --> 00:11:34,439
available in McMurdo are very limited

267
00:11:42,049 --> 00:11:37,170
and have to be shared between many many

268
00:11:44,689 --> 00:11:42,059
projects so we we have to we have to

269
00:11:48,860 --> 00:11:44,699
keep our group small on purpose in order

270
00:11:53,960 --> 00:11:48,870
to not impose a big logistic footprint

271
00:11:55,670 --> 00:11:53,970
on the community in in McMurdo so I

272
00:11:59,210 --> 00:11:55,680
think you really have to

273
00:12:02,150 --> 00:11:59,220
think keeping you are your size down

274
00:12:05,510 --> 00:12:02,160
when you go to places like McMurdo but

275
00:12:09,260 --> 00:12:05,520
we do have from other areas like in

276
00:12:11,810 --> 00:12:09,270
Greenland where people and then actually

277
00:12:14,389 --> 00:12:11,820
fly in commercially where we have

278
00:12:17,620 --> 00:12:14,399
pickell space where we for example can

279
00:12:20,870 --> 00:12:17,630
accommodate the school teachers and and

280
00:12:24,019 --> 00:12:20,880
have them join our mission and then we

281
00:12:27,199 --> 00:12:24,029
bought report back to the classroom what

282
00:12:31,040 --> 00:12:27,209
they experience the kind of signs that

283
00:12:35,630 --> 00:12:31,050
we do so I would say Antarctica is a bit

284
00:12:38,780 --> 00:12:35,640
of a challenge in getting just them more

285
00:12:40,670 --> 00:12:38,790
than the absolute necessary instrument

286
00:12:43,190 --> 00:12:40,680
teams and air prove their pool down

287
00:12:46,160 --> 00:12:43,200
there but we have certainly other play

288
00:12:49,400 --> 00:12:46,170

places where we where we can't

289
00:12:53,139 --> 00:12:49,410
accommodate people from the outside like

290
00:12:55,670 --> 00:12:53,149
in kangaroos like dreaming for example

291
00:12:59,180 --> 00:12:55,680
but maybe that said there are many other

292
00:13:01,910 --> 00:12:59,190
ways to to get involved in NASA signs

293
00:13:03,170 --> 00:13:01,920
and contribute to NASA science you don't

294
00:13:05,840 --> 00:13:03,180
really have to actually go into the

295
00:13:08,210 --> 00:13:05,850
field you can apply for summer

296
00:13:10,610 --> 00:13:08,220
internships and other things so there

297
00:13:16,460 --> 00:13:10,620
are many different ways to get involved

298
00:13:17,900 --> 00:13:16,470
with NASA thanks Michael we actually

299
00:13:21,260 --> 00:13:17,910
have another question for you hear from

300
00:13:23,530 --> 00:13:21,270
Stephanie at SPR burn and Stephanie

301
00:13:25,490 --> 00:13:23,540
wants to know what climate science

302
00:13:27,440 --> 00:13:25,500
IceBridge is doing and how the

303
00:13:33,829 --> 00:13:27,450
government shutdown affected the field

304
00:13:37,699 --> 00:13:33,839
campaign and science um IceBridge per se

305
00:13:41,740 --> 00:13:37,709
is not doing climate science we are

306
00:13:46,810 --> 00:13:41,750
producing the data that is necessary to

307
00:13:50,210 --> 00:13:46,820
feed into models how I see the

308
00:13:54,769 --> 00:13:50,220
potentially can evolve over long time

309
00:13:57,769 --> 00:13:54,779
scales but we we are not doing climate

310
00:14:02,780 --> 00:13:57,779
science were saved so I think the the

311
00:14:07,340 --> 00:14:02,790
data that we collect is important in for

312
00:14:09,470 --> 00:14:07,350
climate scientists to understand how ice

313
00:14:13,189 --> 00:14:09,480

sheets change over time

314
00:14:16,970 --> 00:14:13,199
what is driving this change is it coming

315
00:14:19,490 --> 00:14:16,980
from let's say increase or reduce snow

316
00:14:23,150 --> 00:14:19,500
accumulation increase surface melting

317
00:14:28,160 --> 00:14:23,160
because of warmer temperatures and I

318
00:14:31,310 --> 00:14:28,170
screeches in a unique position to to

319
00:14:34,430 --> 00:14:31,320
sort out all these kind of different

320
00:14:37,699 --> 00:14:34,440
aspects and they the results we produce

321
00:14:40,819 --> 00:14:37,709
they will feed directly into climate

322
00:14:43,579 --> 00:14:40,829
models and people who try to understand

323
00:14:46,370 --> 00:14:43,589
the the whole climate system we are just

324
00:14:48,410 --> 00:14:46,380
dealing with a tiny aspect from the

325
00:14:51,230 --> 00:14:48,420
finite system and those are polar ice

326
00:14:52,879 --> 00:14:51,240
sheets and sea ice if you want to

327
00:14:56,780 --> 00:14:52,889
understand the earth climate and how it

328
00:14:59,150 --> 00:14:56,790
changes you really need to look at the

329
00:15:01,699 --> 00:14:59,160
entire planet today and run global

330
00:15:05,870 --> 00:15:01,709
models and that's a far more complex

331
00:15:09,379 --> 00:15:05,880
than question than what we do with ice

332
00:15:11,449 --> 00:15:09,389
which now the second part of the

333
00:15:18,139 --> 00:15:11,459
question was and how the government

334
00:15:21,710 --> 00:15:18,149
shutdown impacted ice which it has put

335
00:15:25,610 --> 00:15:21,720
our preparations on old for more than

336
00:15:29,689 --> 00:15:25,620
two weeks and added some other headaches

337
00:15:33,019 --> 00:15:29,699
that we had to resolve but most

338
00:15:38,360 --> 00:15:33,029

importantly because and its effort to

339
00:15:43,430 --> 00:15:38,370
prepare for turning the Antarctic basis

340
00:15:46,730 --> 00:15:43,440
into care take a status our field season

341
00:15:51,559 --> 00:15:46,740
has been shot if I about 75% so that

342
00:15:53,360 --> 00:15:51,569
means we will collect them considerably

343
00:15:56,090 --> 00:15:53,370
less science data than we had planned

344
00:15:59,329 --> 00:15:56,100
for and let's say potentially a big

345
00:16:01,610 --> 00:15:59,339
issue because one of the reasons and has

346
00:16:04,639 --> 00:16:01,620
been said before why we go to McMurdo is

347
00:16:08,780 --> 00:16:04,649
because we can reach areas that we

348
00:16:13,879 --> 00:16:08,790
haven't been able to reach since 2009

349
00:16:16,730 --> 00:16:13,889
and for example the M the ice creams

350
00:16:20,389 --> 00:16:16,740
along the cyber coast in West Antarctica

351
00:16:22,220 --> 00:16:20,399
are changing them their ice surface

352
00:16:23,360 --> 00:16:22,230
velocity we knows you notice from

353
00:16:25,960 --> 00:16:23,370
satellite measurements

354
00:16:28,160 --> 00:16:25,970
from space but we don't know how the

355
00:16:34,990 --> 00:16:28,170
volume changes there the ice surface

356
00:16:37,940 --> 00:16:35,000
elevation and so between 2009 and 2016

357
00:16:40,640 --> 00:16:37,950
we have potentially only one data point

358
00:16:44,900 --> 00:16:40,650
or maybe not even the single data point

359
00:16:48,530 --> 00:16:44,910
and I think that's a big deal to help

360
00:16:54,560 --> 00:16:48,540
interpreting the data that we will

361
00:16:57,740 --> 00:16:54,570
observe with iso to in 2016 great thanks

362
00:17:00,560 --> 00:16:57,750
Michael now Chad nuttin um following up

363
00:17:01,940 --> 00:17:00,570

on the shutdown question in your job as

364
00:17:03,290 --> 00:17:01,950
a science project manager for the u.s.

365
00:17:06,260 --> 00:17:03,300
Antarctic Program how has it affected

366
00:17:07,669 --> 00:17:06,270
your work well we've been running

367
00:17:09,520 --> 00:17:07,679
through that's a good question we've

368
00:17:12,110 --> 00:17:09,530
been running through a lot of scenarios

369
00:17:13,850 --> 00:17:12,120
once October one hit and we realized

370
00:17:17,600 --> 00:17:13,860
that things were going to be a little

371
00:17:19,699 --> 00:17:17,610
bit different this season essentially

372
00:17:21,590 --> 00:17:19,709
we're a pretty good team here and we

373
00:17:26,569 --> 00:17:21,600
have a lot of priorities so we have to

374
00:17:27,949 --> 00:17:26,579
work on identifying scenarios we went

375
00:17:32,180 --> 00:17:27,959
through a lot of motions the first three

376
00:17:34,910 --> 00:17:32,190
weeks of October and in the end we we

377
00:17:36,710 --> 00:17:34,920
prevailed and we're all systems go for a

378
00:17:41,000 --> 00:17:36,720
lot of the good science that's coming

379
00:17:44,330 --> 00:17:41,010
down and so it there's it seems like

380
00:17:45,470 --> 00:17:44,340
annually there's always I wouldn't say

381
00:17:48,110 --> 00:17:45,480
there's always something but there's

382
00:17:50,510 --> 00:17:48,120
always in it I there is always something

383
00:17:53,330 --> 00:17:50,520
that pops up that is a challenge for

384
00:17:54,740 --> 00:17:53,340
program-wide that affects affects a lot

385
00:17:57,650 --> 00:17:54,750
of the science and a lot of logistics

386
00:18:00,140 --> 00:17:57,660
and so this you know in my perspective

387
00:18:02,810 --> 00:18:00,150
was this was a big one but I think we

388
00:18:05,510 --> 00:18:02,820

got through it and I think you know a

389
00:18:07,540 --> 00:18:05,520
lot of the science that then SF funds on

390
00:18:09,860 --> 00:18:07,550
an annual basis is going to continue

391
00:18:11,840 --> 00:18:09,870
there's a lot of groups that come down

392
00:18:14,660 --> 00:18:11,850
like the LTR that have been coming down

393
00:18:17,030 --> 00:18:14,670
for a long time Noah has some operations

394
00:18:19,730 --> 00:18:17,040
at South Pole measuring co2

395
00:18:21,080 --> 00:18:19,740
concentrations that they are no longer

396
00:18:23,900 --> 00:18:21,090
going to have a skip year and their data

397
00:18:25,490 --> 00:18:23,910
so there's a lot of priorities out there

398
00:18:28,190 --> 00:18:25,500
and we're able to support a lot of that

399
00:18:30,500 --> 00:18:28,200
so we went through some gyrations and we

400
00:18:32,330 --> 00:18:30,510
figured it all out and what we're going

401
00:18:34,580 --> 00:18:32,340
to do some groups got deferred and a lot

402
00:18:36,680 --> 00:18:34,590
of them like Michael mentioned maybe a

403
00:18:39,590 --> 00:18:36,690
little bit of reduce scope

404
00:18:41,090 --> 00:18:39,600
it's unfortunate but it's the climate

405
00:18:43,310 --> 00:18:41,100
we're in and we'll just continue plowing

406
00:18:49,100 --> 00:18:43,320
forward and supporting the science then

407
00:18:51,350 --> 00:18:49,110
SF funds great thanks and we have a

408
00:18:54,010 --> 00:18:51,360
question for ice bridge project manager

409
00:18:57,170 --> 00:18:54,020
Christie Hanson from youtube user

410
00:19:00,890 --> 00:18:57,180
gandalf extreme wants to know how much a

411
00:19:03,920 --> 00:19:00,900
mission like ice bridge costs well

412
00:19:07,040 --> 00:19:03,930
that's a tricky question um depends on

413
00:19:09,830 --> 00:19:07,050

what you what you uh you count in the

414
00:19:12,890 --> 00:19:09,840
cost right do you count people's labor

415
00:19:14,180 --> 00:19:12,900
so all the time that is put in on any

416
00:19:16,220 --> 00:19:14,190
given workday like how much of my time

417
00:19:18,230 --> 00:19:16,230
if I spent on the group planning so that

418
00:19:20,840 --> 00:19:18,240
could factor in that could factor into

419
00:19:23,600 --> 00:19:20,850
the costs um then you actually have

420
00:19:26,690 --> 00:19:23,610
hardware and cargo so tangible things

421
00:19:29,660 --> 00:19:26,700
like I need to ship 55,000 pounds of

422
00:19:31,190 --> 00:19:29,670
cargo from the United States down to

423
00:19:34,160 --> 00:19:31,200
McMurdo so there's a cost associated

424
00:19:37,070 --> 00:19:34,170
with that does it cost associated with

425
00:19:40,220 --> 00:19:37,080
getting all of our bodies are our team

426
00:19:43,370 --> 00:19:40,230
flying down to McMurdo does it cost with

427
00:19:45,260 --> 00:19:43,380
that we also have technology upgrades

428
00:19:47,690 --> 00:19:45,270
that can factor into the cost so we had

429
00:19:49,580 --> 00:19:47,700
some new upgrades that went with the

430
00:19:52,970 --> 00:19:49,590
people that actually were implemented on

431
00:19:55,750 --> 00:19:52,980
to the t3 that that's a cost so without

432
00:19:58,460 --> 00:19:55,760
giving you a exact quote it could be

433
00:20:01,750 --> 00:19:58,470
anywhere from a couple hundred thousand

434
00:20:04,430 --> 00:20:01,760
dollars to maybe a little over a million

435
00:20:06,590 --> 00:20:04,440
so that's kind of a range that you could

436
00:20:08,870 --> 00:20:06,600
think of when when looking at a mission

437
00:20:11,960 --> 00:20:08,880
equivalent to ours getting ready to go

438
00:20:17,180 --> 00:20:11,970

to McMurdo um I hope that answers your

439
00:20:19,130 --> 00:20:17,190
question it was great thanks and we have

440
00:20:21,680 --> 00:20:19,140
another question from YouTube this one

441
00:20:23,840 --> 00:20:21,690
is a little more sciency so for Michael

442
00:20:26,030 --> 00:20:23,850
this from uh this one is from Thomas

443
00:20:30,170 --> 00:20:26,040
Larson and he wants to know when was an

444
00:20:35,870 --> 00:20:30,180
erotica not covered by ice that was a

445
00:20:39,770 --> 00:20:35,880
very very long time ago I think me and I

446
00:20:42,620 --> 00:20:39,780
may not have to write numbers in my my

447
00:20:45,680 --> 00:20:42,630
brain active at this point it was about

448
00:20:48,680 --> 00:20:45,690
35 million years ago or 38 million years

449
00:20:50,600 --> 00:20:48,690
ago when the Drake Passage good between

450
00:20:53,150 --> 00:20:50,610
us South

451
00:20:56,570 --> 00:20:53,160
and the dark pika opened and the circle

452
00:20:59,090 --> 00:20:56,580
and arctic pole akong established and

453
00:21:02,380 --> 00:20:59,100
cool down Antarctica then we started

454
00:21:06,230 --> 00:21:02,390
seeing the first getting the first then

455
00:21:08,870 --> 00:21:06,240
kind of alpine glaciers and that grew

456
00:21:16,580 --> 00:21:08,880
eventually into continental ice sheets

457
00:21:19,970 --> 00:21:16,590
some 30 million years ago great thanks

458
00:21:22,120 --> 00:21:19,980
Michael another question for you you

459
00:21:25,549 --> 00:21:22,130
said that i SAT to will launch in

460
00:21:27,950 --> 00:21:25,559
believe you said 2016 what will ice

461
00:21:33,020 --> 00:21:27,960
bridges role be after the satellite

462
00:21:35,960 --> 00:21:33,030
launches um the the plan is to have at

463
00:21:39,710 --> 00:21:35,970

least one year overlap between I

464
00:21:42,110 --> 00:21:39,720
scription I so too this will give us one

465
00:21:44,780 --> 00:21:42,120
campaign in the Arctic and one campaign

466
00:21:48,620 --> 00:21:44,790
in the Antarctic and this is absolutely

467
00:21:50,960 --> 00:21:48,630
necessary to ensure the continuity and

468
00:21:54,169 --> 00:21:50,970
the consistency of the data that we are

469
00:21:56,240 --> 00:21:54,179
collected because we are flying slightly

470
00:21:58,130 --> 00:21:56,250
different instruments that measure the

471
00:22:00,350 --> 00:21:58,140
ice surface elevation in slightly

472
00:22:02,570 --> 00:22:00,360
different ways than a satellite so we

473
00:22:05,299 --> 00:22:02,580
need to make sure that the measurements

474
00:22:08,360 --> 00:22:05,309
we are doing are consistent with the

475
00:22:11,299 --> 00:22:08,370
measurements that are being done by Isah

476
00:22:14,539 --> 00:22:11,309
too and in order to determine this we

477
00:22:18,710 --> 00:22:14,549
need overlap between the two

478
00:22:22,250 --> 00:22:18,720
measurements beyond that there is a need

479
00:22:25,580 --> 00:22:22,260
for every satellite mission to calibrate

480
00:22:29,080 --> 00:22:25,590
and validate the data that a satellite

481
00:22:31,400 --> 00:22:29,090
collect and that typically requires

482
00:22:34,280 --> 00:22:31,410
airborne measurements it requires

483
00:22:36,500 --> 00:22:34,290
measurements taken on the ground and all

484
00:22:38,570 --> 00:22:36,510
sorts of other things an ice bridge will

485
00:22:41,960 --> 00:22:38,580
certainly play a role in this

486
00:22:50,820 --> 00:22:41,970
calibration and validation phase of ice

487
00:22:57,399 --> 00:22:54,639
okay everyone I like to welcome welcome

488
00:23:00,370 --> 00:22:57,409

you to the NASA Google+ Hangout kicking

489
00:23:02,379 --> 00:23:00,380
off the operation IceBridge 2013 and

490
00:23:04,570 --> 00:23:02,389
order campaign I'm George Hale here at

491
00:23:06,430 --> 00:23:04,580
NASA Goddard and we're answering your

492
00:23:08,620 --> 00:23:06,440
questions you can ask a question in the

493
00:23:10,840 --> 00:23:08,630
youtube comments box on the Google+ page

494
00:23:12,549 --> 00:23:10,850
on the ice bridge facebook page or you

495
00:23:17,200 --> 00:23:12,559
can tweet to us using the hashtag ice

496
00:23:20,039 --> 00:23:17,210
bridge so Michael you talked a little

497
00:23:22,659 --> 00:23:20,049
bit about measuring ice thickness and

498
00:23:24,070 --> 00:23:22,669
elevation can you talk a little bit more

499
00:23:29,919 --> 00:23:24,080
about some of the instruments ice

500
00:23:33,129 --> 00:23:29,929
produces yeah the main purpose is to

501
00:23:35,590 --> 00:23:33,139
measure the change in ice surface

502
00:23:40,360 --> 00:23:35,600
elevation over time from year to year

503
00:23:43,779 --> 00:23:40,370
and this allows us of course to estimate

504
00:23:47,980 --> 00:23:43,789
how much ice ice sheet is gaining or

505
00:23:50,080 --> 00:23:47,990
losing which is important because we

506
00:23:52,299 --> 00:23:50,090
want to understand how much ice of this

507
00:23:55,299 --> 00:23:52,309
melting ice is contributing to sea level

508
00:23:58,060 --> 00:23:55,309
rise in the future and the way I switch

509
00:24:00,940 --> 00:23:58,070
is doing this is we fly a laser

510
00:24:03,820 --> 00:24:00,950
altimeter in the p3 aircraft that you

511
00:24:06,970 --> 00:24:03,830
can see behind here and this laser

512
00:24:09,580 --> 00:24:06,980
altimeter is kind of from sending down

513
00:24:12,610 --> 00:24:09,590

laser beams from the aircraft down to

514
00:24:16,139 --> 00:24:12,620
the ice surface and the couple of

515
00:24:19,240 --> 00:24:16,149
photons get reflected back to the

516
00:24:21,789 --> 00:24:19,250
aircraft and going to a detector or

517
00:24:24,789 --> 00:24:21,799
receiver there and then you can measure

518
00:24:27,330 --> 00:24:24,799
pretty much the time it takes from when

519
00:24:30,580 --> 00:24:27,340
you kind of we're sending out the poles

520
00:24:32,560 --> 00:24:30,590
how long it takes to get back and if you

521
00:24:34,870 --> 00:24:32,570
know the speed of light in air you can

522
00:24:37,899 --> 00:24:34,880
calculate the distance between the

523
00:24:41,830 --> 00:24:37,909
aircraft and the ice surface elevation

524
00:24:43,960 --> 00:24:41,840
and the the next step to figure out

525
00:24:46,149 --> 00:24:43,970
where your ice surface elevation is

526
00:24:48,039 --> 00:24:46,159
actually located in absolute reference

527
00:24:50,649 --> 00:24:48,049
frame is you need you need to determine

528
00:24:55,539 --> 00:24:50,659
exactly where your aircraft dispositions

529
00:24:59,259 --> 00:24:55,549
so we need very precise GPS trajectory

530
00:25:02,649 --> 00:24:59,269
from the aircraft which is a big

531
00:25:04,180 --> 00:25:02,659
challenge and are also kind of a a piece

532
00:25:07,550 --> 00:25:04,190
of art

533
00:25:10,340 --> 00:25:07,560
to do this and once we know precisely

534
00:25:13,400 --> 00:25:10,350
where the aircraft has been flying at

535
00:25:16,220 --> 00:25:13,410
what elevation and know the range

536
00:25:18,890 --> 00:25:16,230
between the aircraft in the ice surface

537
00:25:24,470 --> 00:25:18,900
from the laser altimeter measurements we

538
00:25:26,600 --> 00:25:24,480

can pretty much determine the change in

539
00:25:29,690 --> 00:25:26,610
the ice surface elevation from year in

540
00:25:36,440 --> 00:25:29,700
year within a few centimetres of

541
00:25:38,090 --> 00:25:36,450
position great thanks Michael and we

542
00:25:41,000 --> 00:25:38,100
have another question from Stephanie

543
00:25:42,980 --> 00:25:41,010
Auburn at climate wire and she wants to

544
00:25:44,960 --> 00:25:42,990
know if Michael if you could talk a

545
00:25:46,850 --> 00:25:44,970
little bit about the data and how it

546
00:25:49,010 --> 00:25:46,860
will be used by climate scientists I

547
00:25:51,310 --> 00:25:49,020
know you mentioned I she models earlier

548
00:25:55,250 --> 00:25:51,320
but could you maybe elaborate on that

549
00:25:59,030 --> 00:25:55,260
yeah um so ice purchase a NASA mission

550
00:26:02,030 --> 00:25:59,040
and that means all our data are publicly

551
00:26:05,390 --> 00:26:02,040
available after six months of the data

552
00:26:08,060 --> 00:26:05,400
collection people can go to the National

553
00:26:11,840 --> 00:26:08,070
snow and ice data center website and

554
00:26:15,700 --> 00:26:11,850
download the data and for free and the

555
00:26:18,800 --> 00:26:15,710
jobs you mentioned one of the important

556
00:26:24,620 --> 00:26:18,810
pieces of data that we collect that are

557
00:26:27,320 --> 00:26:24,630
used by people who determine how or

558
00:26:30,650 --> 00:26:27,330
project how ice sheets may change over

559
00:26:35,330 --> 00:26:30,660
time our ice sheet model us and one of

560
00:26:38,330 --> 00:26:35,340
the very critical require is the

561
00:26:43,700 --> 00:26:38,340
elevation of the bedrock topography

562
00:26:48,430 --> 00:26:43,710
below the ice sheets so it is critical

563
00:26:51,260 --> 00:26:48,440

to having a reliable ice sheet model

564
00:26:55,370 --> 00:26:51,270
really the the bedrock structure and

565
00:26:58,670 --> 00:26:55,380
below the ice sheet in the inner precise

566
00:27:00,530 --> 00:26:58,680
we're way and with a fairly high

567
00:27:03,950 --> 00:27:00,540
resolution because this is what's

568
00:27:07,300 --> 00:27:03,960
essentially driving a lot of the dynamic

569
00:27:10,610 --> 00:27:07,310
flow of the ice from the interior to the

570
00:27:12,860 --> 00:27:10,620
to the Arctic over to the into the ocean

571
00:27:17,390 --> 00:27:12,870
where contributes to sea level rise so

572
00:27:20,230 --> 00:27:17,400
in addition to on ice surface elevation

573
00:27:23,690 --> 00:27:20,240
from laser altimetry we are collecting a

574
00:27:27,340 --> 00:27:23,700
many many different additional data sets

575
00:27:31,340 --> 00:27:27,350
that I used by ice sheet model us and

576
00:27:35,120 --> 00:27:31,350
other scientists and for answering

577
00:27:38,120 --> 00:27:35,130
important questions how I sheets evolved

578
00:27:43,990 --> 00:27:38,130
over time what the parameters are they

579
00:27:49,430 --> 00:27:46,880
great thanks Michael okay we have

580
00:27:51,320 --> 00:27:49,440
another question for Christy a ice

581
00:27:53,960 --> 00:27:51,330
bridge during the greenland campaign

582
00:27:56,570 --> 00:27:53,970
earlier this year we had a few teachers

583
00:27:58,130 --> 00:27:56,580
aboard could you talk about what it was

584
00:28:00,620 --> 00:27:58,140
like to work with some of those teachers

585
00:28:02,120 --> 00:28:00,630
during those campaign flights yeah

586
00:28:05,000 --> 00:28:02,130
that's a really good question George um

587
00:28:06,950 --> 00:28:05,010
this this recent year in Greenland was

588
00:28:10,460 --> 00:28:06,960

particularly an amazing one I thought in

589
00:28:13,400 --> 00:28:10,470
terms of having a education and outreach

590
00:28:16,580 --> 00:28:13,410
project in the field um way to teacher

591
00:28:18,320 --> 00:28:16,590
from polar Trek actually a program from

592
00:28:20,540 --> 00:28:18,330
the National Science Foundation you know

593
00:28:22,040 --> 00:28:20,550
he and George Hale obviously you were

594
00:28:23,750 --> 00:28:22,050
involved in helping pick and select his

595
00:28:27,050 --> 00:28:23,760
teachers coming in the field his name

596
00:28:28,490 --> 00:28:27,060
was marked using and to this day I was

597
00:28:30,650 --> 00:28:28,500
amazed and impressed with his

598
00:28:32,300 --> 00:28:30,660
performance in the in the field not only

599
00:28:34,220 --> 00:28:32,310
how he acted in the field but the

600
00:28:36,680 --> 00:28:34,230
products that he built during real time

601
00:28:38,630 --> 00:28:36,690
operations that he shared directly with

602
00:28:41,000 --> 00:28:38,640
his classroom and jiri so many students

603
00:28:42,650 --> 00:28:41,010
so for the public out there who doesn't

604
00:28:44,300 --> 00:28:42,660
know what that program is we bring a

605
00:28:45,860 --> 00:28:44,310
teacher in the field with us when we go

606
00:28:48,230 --> 00:28:45,870
to Greenland they fly on some of the

607
00:28:49,760 --> 00:28:48,240
flights they meet with each of our team

608
00:28:51,860 --> 00:28:49,770
members to learn about the instruments

609
00:28:53,900 --> 00:28:51,870
how they work a lot of it is science and

610
00:28:55,250 --> 00:28:53,910
math based and some of them will

611
00:28:56,720 --> 00:28:55,260
actually create lesson plans while

612
00:28:59,240 --> 00:28:56,730
they're in the field they'll get video

613
00:29:01,130 --> 00:28:59,250

clips or they'll do math problems mark

614
00:29:03,980 --> 00:29:01,140
was really good almost every night he he

615
00:29:06,350 --> 00:29:03,990
put out a new lesson plan um so he took

616
00:29:07,820 --> 00:29:06,360
everything he learned from our active

617
00:29:10,730 --> 00:29:07,830
research in the field and turned it into

618
00:29:12,700 --> 00:29:10,740
a lesson plan for his students and we

619
00:29:14,600 --> 00:29:12,710
were able to see the end result of that

620
00:29:16,910 --> 00:29:14,610
another thing that some of the teachers

621
00:29:18,890 --> 00:29:16,920
in the field do like mark would do video

622
00:29:21,140 --> 00:29:18,900
blog so sort of a career-focused

623
00:29:22,940 --> 00:29:21,150
teaching the kids out there today what

624
00:29:24,020 --> 00:29:22,950
kind of careers can you have you don't

625
00:29:25,790 --> 00:29:24,030
just have to be at your desk all day

626
00:29:27,410 --> 00:29:25,800
there's all these exciting careers you

627
00:29:30,890 --> 00:29:27,420
can do in math research science

628
00:29:31,549 --> 00:29:30,900
engineering more exploration based so he

629
00:29:33,320 --> 00:29:31,559
kind of took the

630
00:29:36,430 --> 00:29:33,330
video clips of the flight crew of our

631
00:29:39,710 --> 00:29:36,440
scientists of me of Michael and he

632
00:29:41,749 --> 00:29:39,720
actually put those out on a video feed

633
00:29:43,159 --> 00:29:41,759
and all the students could learn about

634
00:29:46,100 --> 00:29:43,169
it and comment on the different job

635
00:29:47,749 --> 00:29:46,110
position so I felt that he really did an

636
00:29:49,369 --> 00:29:47,759
amazing amount of work and send a lot of

637
00:29:51,230 --> 00:29:49,379
really positive messages about how

638
00:29:53,269 --> 00:29:51,240

exciting math engineering these stem

639
00:29:54,560 --> 00:29:53,279
technologies could be so both Michael

640
00:29:57,080 --> 00:29:54,570
and I were very pleased with his

641
00:30:02,600 --> 00:29:57,090
performance and felt that having him in

642
00:30:04,399 --> 00:30:02,610
the field was an asset oh that's great

643
00:30:06,529 --> 00:30:04,409
and it was wonderful working with mark

644
00:30:09,560 --> 00:30:06,539
he had a lot of great material that he

645
00:30:10,730 --> 00:30:09,570
put together on his blog Christie we

646
00:30:13,820 --> 00:30:10,740
have another question this one from

647
00:30:15,769 --> 00:30:13,830
Twitter from at poly Pete and Peter

648
00:30:17,269 --> 00:30:15,779
wants to know how many seasons ice

649
00:30:19,999 --> 00:30:17,279
bridge will work out of McMurdo weather

650
00:30:21,499 --> 00:30:20,009
it's a one-off thing or a recurring

651
00:30:24,289 --> 00:30:21,509
thing yeah that's a really good question

652
00:30:25,789 --> 00:30:24,299
so we're pretty excited that you know it

653
00:30:27,200 --> 00:30:25,799
took us about a year and a half to plan

654
00:30:29,450 --> 00:30:27,210
this very first employment we're going

655
00:30:32,450 --> 00:30:29,460
to do but this will not be our only

656
00:30:34,039 --> 00:30:32,460
deployment we plan to at least perform

657
00:30:35,840 --> 00:30:34,049
one more deployment in the field that's

658
00:30:38,899 --> 00:30:35,850
at least one more probably more than

659
00:30:41,480 --> 00:30:38,909
that the challenge is that this time

660
00:30:43,279 --> 00:30:41,490
next year r p3 aircraft that we use is

661
00:30:45,200 --> 00:30:43,289
going through some major maintenance

662
00:30:48,259 --> 00:30:45,210
it's going to have new wings put on it

663
00:30:50,239 --> 00:30:48,269

so unfortunately next year you know for

664
00:30:52,129 --> 00:30:50,249
this season we won't be able to be based

665
00:30:54,409 --> 00:30:52,139
in McMurdo but the following year our

666
00:30:56,720 --> 00:30:54,419
plans to be back down there for the

667
00:30:58,700 --> 00:30:56,730
entire season collecting data so what I

668
00:31:01,070 --> 00:30:58,710
can tell you is at least two seasons but

669
00:31:04,310 --> 00:31:01,080
it is highly likely that we will pursue

670
00:31:09,379 --> 00:31:04,320
more than that hope that answers your

671
00:31:11,269 --> 00:31:09,389
question that was a great answer once

672
00:31:14,869 --> 00:31:11,279
again this is a NASA Google+ Hangout

673
00:31:16,999 --> 00:31:14,879
picking off the operation IceBridge 2013

674
00:31:18,409 --> 00:31:17,009
Antarctic campaign I'm George Hale at

675
00:31:20,210 --> 00:31:18,419
NASA Goddard we're answering your

676
00:31:23,749 --> 00:31:20,220
questions you can send questions to us

677
00:31:26,330 --> 00:31:23,759
from the Google+ page youtube comments

678
00:31:28,489 --> 00:31:26,340
box the ice bridge facebook page or on

679
00:31:30,619 --> 00:31:28,499
twitter using the hashtag ice bridge I

680
00:31:33,619 --> 00:31:30,629
have another question for Michael from

681
00:31:37,399 --> 00:31:33,629
YouTube this is from Austin really also

682
00:31:38,600 --> 00:31:37,409
wants to know yeah also understands that

683
00:31:40,279 --> 00:31:38,610
the research is significant to

684
00:31:44,760 --> 00:31:40,289
scientific modelling why should the

685
00:31:50,350 --> 00:31:47,620
very simple answer because if the

686
00:31:52,900 --> 00:31:50,360
thickness of ice changes it's going to

687
00:31:56,800 --> 00:31:52,910
end up at the wall s water in the ocean

688
00:31:59,740 --> 00:31:56,810

which means it will dry sea level and if

689
00:32:02,290 --> 00:31:59,750
you are in a place like here at the

690
00:32:05,050 --> 00:32:02,300
Wallops Flight Facility that's very

691
00:32:07,660 --> 00:32:05,060
close to sea level they are very

692
00:32:11,290 --> 00:32:07,670
concerned about the sum of their runways

693
00:32:14,770 --> 00:32:11,300
you just barely above sea level and if

694
00:32:17,800 --> 00:32:14,780
the sea level continues to rise you will

695
00:32:21,790 --> 00:32:17,810
see more and more flooding and together

696
00:32:25,210 --> 00:32:21,800
with the big storms tropical depressions

697
00:32:28,630 --> 00:32:25,220
arrogance so you will kind of see a lot

698
00:32:31,120 --> 00:32:28,640
of damage to property and economic loss

699
00:32:33,850 --> 00:32:31,130
and that's these are all not doing

700
00:32:36,100 --> 00:32:33,860
things that we want so it really what

701
00:32:38,850 --> 00:32:36,110
matters in Antarctica what happens in

702
00:32:45,430 --> 00:32:38,860
Antarctica really met us at the places

703
00:32:47,980 --> 00:32:45,440
around people worldwide great thanks

704
00:32:50,380 --> 00:32:47,990
Michael we have another question from

705
00:32:52,510 --> 00:32:50,390
Twitter for Christie Cyril wants to know

706
00:32:55,810 --> 00:32:52,520
how the future for ice bridge mission to

707
00:32:58,530 --> 00:32:55,820
look I think the future is positive for

708
00:33:01,530 --> 00:32:58,540
IceBridge missions I'm pleased to say so

709
00:33:04,780 --> 00:33:01,540
we have it we have an amazing team

710
00:33:07,960 --> 00:33:04,790
top-notch team who performed very well

711
00:33:09,400 --> 00:33:07,970
and when I say that I mean instrument

712
00:33:13,120 --> 00:33:09,410
operators in the field the flight crew

713
00:33:14,500 --> 00:33:13,130

our science team our logistics teams we

714
00:33:15,640 --> 00:33:14,510
deployed twice a year generally and

715
00:33:18,220 --> 00:33:15,650
actually this year it's three times a

716
00:33:21,190 --> 00:33:18,230
year we collect data and then about six

717
00:33:22,570 --> 00:33:21,200
months after that our teen processes all

718
00:33:23,950 --> 00:33:22,580
their data and they get all their data

719
00:33:27,010 --> 00:33:23,960
products out and Michael talked about

720
00:33:28,990 --> 00:33:27,020
that those datasets being free and each

721
00:33:31,900 --> 00:33:29,000
year we continue to collect 8 in the

722
00:33:34,360 --> 00:33:31,910
field I think our data sets are known to

723
00:33:36,760 --> 00:33:34,370
more and more communities across the

724
00:33:38,020 --> 00:33:36,770
world so we're just now on this exciting

725
00:33:39,130 --> 00:33:38,030
phase where we're starting to get a lot

726
00:33:42,160 --> 00:33:39,140
of feedback we're starting to seeing

727
00:33:43,600 --> 00:33:42,170
more and more papers being written for

728
00:33:46,600 --> 00:33:43,610
people who have used our i spritz

729
00:33:47,950 --> 00:33:46,610
datasets which is very exciting and so

730
00:33:49,480 --> 00:33:47,960
right now what I can say is that we

731
00:33:53,680 --> 00:33:49,490
expect that icebridge will continue

732
00:33:55,540 --> 00:33:53,690
going till at least 2017 as we see that

733
00:33:56,499 --> 00:33:55,550
the again the community is very excited

734
00:33:59,739 --> 00:33:56,509
about our data sets were due

735
00:34:03,099 --> 00:33:59,749
well as well as using a lot of our data

736
00:34:04,719 --> 00:34:03,109
sets to help with I set to Cal Val

737
00:34:07,980 --> 00:34:04,729
procedures and stuff that Michael talked

738
00:34:10,599 --> 00:34:07,990

about earlier so again at least 2017 I

739
00:34:12,129 --> 00:34:10,609
feel positive there that maybe there's a

740
00:34:16,809 --> 00:34:12,139
chance it can go longer than that but

741
00:34:18,460 --> 00:34:16,819
it's hard to say that right now great

742
00:34:20,349 --> 00:34:18,470
thanks chrissy and i just want to remind

743
00:34:22,269 --> 00:34:20,359
everyone this is a nasa google+ hangout

744
00:34:25,210 --> 00:34:22,279
kicking off the operation ice bridge

745
00:34:27,009 --> 00:34:25,220
2013 Antarctic campaign and I'm George

746
00:34:29,049 --> 00:34:27,019
Hale at NASA Goddard you can ask

747
00:34:32,289 --> 00:34:29,059
questions via YouTube in the comments

748
00:34:34,029 --> 00:34:32,299
box on the Google+ page through the ice

749
00:34:36,849 --> 00:34:34,039
bridge facebook page or tweet to us

750
00:34:39,819 --> 00:34:36,859
using the hashtag ice bridge and we have

751
00:34:42,849 --> 00:34:39,829
another question from Twitter from cyril

752
00:34:44,710 --> 00:34:42,859
again and cheryl wants to know Michael

753
00:34:51,819 --> 00:34:44,720
are their plan or their flight planned

754
00:34:55,200 --> 00:34:51,829
to go over the South Pole we we have a

755
00:34:59,670 --> 00:34:55,210
plan to go close to South Pole and the

756
00:35:02,680 --> 00:34:59,680
reason for that is as I mentioned the

757
00:35:07,150 --> 00:35:02,690
calibration and validation of I stood

758
00:35:11,289 --> 00:35:07,160
and tricep too and I so too are a major

759
00:35:15,370 --> 00:35:11,299
parts of our work and twice that too has

760
00:35:19,509 --> 00:35:15,380
a inflection point where all the orbits

761
00:35:22,930 --> 00:35:19,519
come close together that is that the 88

762
00:35:27,579 --> 00:35:22,940
degrees selves and so has I said to so

763
00:35:31,390 --> 00:35:27,589

if we collect data along a circle along

764
00:35:36,370 --> 00:35:31,400
88 degrees south we can actually collect

765
00:35:38,620 --> 00:35:36,380
data overall ice-sub to and price that

766
00:35:42,190 --> 00:35:38,630
have ever been flown so this is a

767
00:35:46,720 --> 00:35:42,200
tremendous data set for validation and

768
00:35:48,670 --> 00:35:46,730
calibration and we probably have to go

769
00:35:52,029 --> 00:35:48,680
we have to break this up into multiple

770
00:35:54,460 --> 00:35:52,039
flights so we will be heading on a

771
00:35:57,039 --> 00:35:54,470
transit back to McMurdo closer to South

772
00:36:00,849 --> 00:35:57,049
Pole Station and also collecting data in

773
00:36:04,900 --> 00:36:00,859
what we call the polar gap because south

774
00:36:08,470 --> 00:36:04,910
of 86 degrees in 88 degree which are the

775
00:36:10,420 --> 00:36:08,480
inflection points of a certain price at

776
00:36:13,270 --> 00:36:10,430
two we don't really have any

777
00:36:19,960 --> 00:36:13,280
any reliable data about ice surface

778
00:36:23,250 --> 00:36:19,970
elevation or anything thank you Michael

779
00:36:26,109 --> 00:36:23,260
our next question comes from Google+

780
00:36:28,349 --> 00:36:26,119
Christie giorno wants to know if NASA

781
00:36:31,599 --> 00:36:28,359
will allow the plane to be tracked by

782
00:36:34,089 --> 00:36:31,609
flightradar24 dot-com this will be a

783
00:36:36,790 --> 00:36:34,099
great for aircraft spotters as well as

784
00:36:38,650 --> 00:36:36,800
anyone interested in science yeah so

785
00:36:40,390 --> 00:36:38,660
that's a good question we definitely are

786
00:36:41,890 --> 00:36:40,400
advocates of sharing our flight lines

787
00:36:44,170 --> 00:36:41,900
and with the community so people can

788
00:36:46,359 --> 00:36:44,180

follow us along in real time I'm not

789
00:36:48,640 --> 00:36:46,369
familiar with that website you gave but

790
00:36:51,040 --> 00:36:48,650
what I can tell you is that our airborne

791
00:36:54,190 --> 00:36:51,050
science program the airborne science

792
00:36:56,170 --> 00:36:54,200
program website for NASA has a flight

793
00:36:57,490 --> 00:36:56,180
has its own flight tracker so when we

794
00:36:59,349 --> 00:36:57,500
take off and land we turn on our flight

795
00:37:01,180 --> 00:36:59,359
tracker and we can show where we're

796
00:37:03,460 --> 00:37:01,190
flying on the airborne science programs

797
00:37:05,589 --> 00:37:03,470
website so you can google that look that

798
00:37:08,309 --> 00:37:05,599
up and you can follow us at least using

799
00:37:11,260 --> 00:37:08,319
that bat program to see where we go

800
00:37:12,819 --> 00:37:11,270
another kind of exciting thing we do for

801
00:37:14,620 --> 00:37:12,829
education and outreach kind of in

802
00:37:17,109 --> 00:37:14,630
addition to showing where we're flying

803
00:37:19,270 --> 00:37:17,119
what flight lines we do is we will post

804
00:37:21,059 --> 00:37:19,280
to our Facebook page where we're going

805
00:37:23,020 --> 00:37:21,069
each day and we'll try and actually post

806
00:37:24,730 --> 00:37:23,030
photos that we've taken during the

807
00:37:26,230 --> 00:37:24,740
mission anything that comes up we can

808
00:37:27,460 --> 00:37:26,240
share that with the community you can

809
00:37:31,180 --> 00:37:27,470
check that out at the operation

810
00:37:33,370 --> 00:37:31,190
IceBridge Facebook page as well as a we

811
00:37:35,349 --> 00:37:33,380
can do real time chatting while we're

812
00:37:37,660 --> 00:37:35,359
flying it's a pretty basic limited

813
00:37:39,339 --> 00:37:37,670

capability but we can share text with

814
00:37:41,440 --> 00:37:39,349
classrooms on the ground who want to get

815
00:37:42,760 --> 00:37:41,450
involved in follow us along while we're

816
00:37:45,270 --> 00:37:42,770
flying to figure out what we're doing

817
00:37:47,470 --> 00:37:45,280
why are we going where we are

818
00:37:48,730 --> 00:37:47,480
interpersonal questions as well to like

819
00:37:51,190 --> 00:37:48,740
what does it feel like how high are you

820
00:37:52,990 --> 00:37:51,200
what do you eat so we do try to share

821
00:37:55,180 --> 00:37:53,000
the whole experience with with students

822
00:37:56,289 --> 00:37:55,190
on the ground when we're flying and you

823
00:37:57,940 --> 00:37:56,299
could actually talk to George Hale in

824
00:37:59,950 --> 00:37:57,950
the future about that if you wanted a

825
00:38:01,420 --> 00:37:59,960
classroom to get involved to kind of see

826
00:38:04,150 --> 00:38:01,430
where we're flying in real time and then

827
00:38:06,250 --> 00:38:04,160
having a classroom communicate with us

828
00:38:10,180 --> 00:38:06,260
while we're flying I hope that answers

829
00:38:12,789 --> 00:38:10,190
your question that's a great answer okay

830
00:38:14,530 --> 00:38:12,799
and uh Chad following up on something

831
00:38:17,109 --> 00:38:14,540
that Christy said earlier she said that

832
00:38:20,230 --> 00:38:17,119
it was a year and a half planning this

833
00:38:21,849 --> 00:38:20,240
mission could you maybe let us know in

834
00:38:23,770 --> 00:38:21,859
your work with the u.s. analytic program

835
00:38:26,110 --> 00:38:23,780
how that fits in with

836
00:38:30,280 --> 00:38:26,120
others is at less time or more time than

837
00:38:33,760 --> 00:38:30,290
other projects take right so the NSF

838
00:38:37,360 --> 00:38:33,770

funds projects they the annual

839
00:38:39,730 --> 00:38:37,370
submission for grants at NSF the

840
00:38:42,460 --> 00:38:39,740
solicitation opens up i think around May

841
00:38:46,870 --> 00:38:42,470
or June so that's when proposals come in

842
00:38:48,760 --> 00:38:46,880
in this round with NASA they didn't

843
00:38:50,590 --> 00:38:48,770
submit a proposal so what we do is we

844
00:38:53,170 --> 00:38:50,600
incorporated them into our normal round

845
00:38:54,970 --> 00:38:53,180
of all the other proposals and fit them

846
00:38:56,470 --> 00:38:54,980
in you know in the year that they want

847
00:38:59,470 --> 00:38:56,480
to go so we start looking at all

848
00:39:04,270 --> 00:38:59,480
projects a minimum of a year in advance

849
00:39:06,520 --> 00:39:04,280
on so if a project gets funded or you

850
00:39:08,200 --> 00:39:06,530
know submitted in June it actually won't

851
00:39:11,560 --> 00:39:08,210
get fun until the following about

852
00:39:13,120 --> 00:39:11,570
februari timeframe is about average then

853
00:39:16,380 --> 00:39:13,130
they'll plan to go down to Antarctica

854
00:39:19,450 --> 00:39:16,390
that following year so most projects

855
00:39:22,240 --> 00:39:19,460
require a year to a year and a half of

856
00:39:24,340 --> 00:39:22,250
planning now the question specifically

857
00:39:26,080 --> 00:39:24,350
is how IceBridge fits into that ice

858
00:39:28,780 --> 00:39:26,090
bridge is a complicated project with a

859
00:39:31,720 --> 00:39:28,790
lot of resources so it takes a little

860
00:39:33,250 --> 00:39:31,730
bit longer because now so was so

861
00:39:34,930 --> 00:39:33,260
organized and because they've done their

862
00:39:38,050 --> 00:39:34,940
deployments to before to Greenland and

863
00:39:40,110 --> 00:39:38,060

on the peninsula side of Antarctica they

864
00:39:43,660 --> 00:39:40,120
came well prepared and they knew exactly

865
00:39:45,310 --> 00:39:43,670
their requirements and capabilities so

866
00:39:47,380 --> 00:39:45,320
Christy and I have spent the last year

867
00:39:49,510 --> 00:39:47,390
and a half figuring out how that how

868
00:39:52,330 --> 00:39:49,520
that fits into our little shoebox of

869
00:39:56,320 --> 00:39:52,340
resources how does that fit in the other

870
00:39:59,410 --> 00:39:56,330
projects some projects are quite simple

871
00:40:01,420 --> 00:39:59,420
in a sense that they don't require a

872
00:40:03,340 --> 00:40:01,430
full year of planning other projects we

873
00:40:06,060 --> 00:40:03,350
might plan for three to five years

874
00:40:08,560 --> 00:40:06,070
before they even deploy maybe there's a

875
00:40:10,600 --> 00:40:08,570
technological advances that need to be

876
00:40:12,580 --> 00:40:10,610
made maybe there's testing that needs to

877
00:40:14,620 --> 00:40:12,590
happen in similar regions may be in

878
00:40:16,510 --> 00:40:14,630
Canada there's all sorts there there's a

879
00:40:18,310 --> 00:40:16,520
wide variety ice bridges somewhere right

880
00:40:21,430 --> 00:40:18,320
in the middle you know it's very

881
00:40:23,920 --> 00:40:21,440
complicated very complex but again

882
00:40:26,560 --> 00:40:23,930
because NASA was so organized that

883
00:40:28,780 --> 00:40:26,570
that's really helpful to know exactly

884
00:40:31,870 --> 00:40:28,790
what you need and I hope that answers

885
00:40:34,480 --> 00:40:31,880
the question that's great thanks chat

886
00:40:37,350 --> 00:40:34,490
and going back NSF stands for National

887
00:40:39,480 --> 00:40:37,360
Science Foundation our next

888
00:40:42,180 --> 00:40:39,490

comes from YouTube and this will be for

889
00:40:46,860 --> 00:40:42,190
Michael this user wants to know who had

890
00:40:49,140 --> 00:40:46,870
the original idea for ice bridge um I

891
00:40:52,020 --> 00:40:49,150
don't think there was a single person

892
00:40:56,010 --> 00:40:52,030
behind this and it actually predates my

893
00:40:59,250 --> 00:40:56,020
involvement in I spectrum there was a

894
00:41:02,670 --> 00:40:59,260
team of scientists in the price where

895
00:41:05,840 --> 00:41:02,680
community and within NASA living project

896
00:41:09,780 --> 00:41:05,850
managers at NASA headquarters that

897
00:41:12,300 --> 00:41:09,790
realized that the end of I said one was

898
00:41:16,010 --> 00:41:12,310
coming in 2009 and they were sitting

899
00:41:18,330 --> 00:41:16,020
down and looking into possibilities of

900
00:41:21,660 --> 00:41:18,340
continuing the the measurements that

901
00:41:24,240 --> 00:41:21,670
have been begun by I said one and so

902
00:41:27,270 --> 00:41:24,250
people are looking into various

903
00:41:30,120 --> 00:41:27,280
different kinds of airborne campaigns or

904
00:41:33,810 --> 00:41:30,130
mini satellites that could be launched

905
00:41:36,630 --> 00:41:33,820
on a small budget to collect them the

906
00:41:40,050 --> 00:41:36,640
data the kind of data sets that I sector

907
00:41:43,440 --> 00:41:40,060
was collecting and after several studies

908
00:41:46,700 --> 00:41:43,450
and a lot of work in teams and

909
00:41:50,430 --> 00:41:46,710
communities NASA made the decision to

910
00:41:55,230 --> 00:41:50,440
launch a airborne science project called

911
00:41:58,110 --> 00:41:55,240
I switch in 2009 to continue acquisition

912
00:42:00,930 --> 00:41:58,120
of data until I said to really launch in

913
00:42:06,390 --> 00:42:00,940

2016 and that's exactly what we are

914
00:42:09,120 --> 00:42:06,400
doing great thanks Michael we have

915
00:42:11,430 --> 00:42:09,130
another question from Twitter from de

916
00:42:14,190 --> 00:42:11,440
Mara Mara wants to know if we collect

917
00:42:15,660 --> 00:42:14,200
audio data from Aurora and space weather

918
00:42:17,970 --> 00:42:15,670
and I know that IceBridge doesn't

919
00:42:19,740 --> 00:42:17,980
collect data like that but Chad maybe

920
00:42:21,000 --> 00:42:19,750
you can give us a sense of all the

921
00:42:25,380 --> 00:42:21,010
different sorts of scientific

922
00:42:28,710 --> 00:42:25,390
experiments going on in Antarctica sure

923
00:42:30,300 --> 00:42:28,720
specifically a rana me and astrophysics

924
00:42:32,640 --> 00:42:30,310
were popular at South Pole because the

925
00:42:35,010 --> 00:42:32,650
atmosphere is clear and it's not a lot

926
00:42:37,530 --> 00:42:35,020
of light pollution so there are a lot of

927
00:42:40,710 --> 00:42:37,540
instruments at South Pole to monitor the

928
00:42:43,140 --> 00:42:40,720
mesosphere as well as deep space as well

929
00:42:45,540 --> 00:42:43,150
as the you know neutrino array that was

930
00:42:48,510 --> 00:42:45,550
called ice cube that was built over the

931
00:42:50,400 --> 00:42:48,520
last decade simultaneously with the new

932
00:42:51,990 --> 00:42:50,410
south pole station

933
00:42:53,960 --> 00:42:52,000
there's a wide variety of science

934
00:42:58,289 --> 00:42:53,970
projects that occur on the comment

935
00:43:00,720 --> 00:42:58,299
biology glaciology again astrophysics in

936
00:43:03,420 --> 00:43:00,730
tirana me and then you have people

937
00:43:06,059 --> 00:43:03,430
studying paleontology to there's a lot

938
00:43:07,890 --> 00:43:06,069

of fossils in Antarctica that are buried

939
00:43:09,480 --> 00:43:07,900
in snow and on these mountaintops you've

940
00:43:11,130 --> 00:43:09,490
seen some of the graphics going down on

941
00:43:12,690 --> 00:43:11,140
the screen there you can see those

942
00:43:14,849 --> 00:43:12,700
little brown mountaintops some of the

943
00:43:16,770 --> 00:43:14,859
you know the content is exposed and

944
00:43:18,539 --> 00:43:16,780
where it's exposed is very valuable to a

945
00:43:22,410 --> 00:43:18,549
lot of scientists to gain invaluable

946
00:43:23,760 --> 00:43:22,420
data sets on anything from like what

947
00:43:26,609 --> 00:43:23,770
Michael was talking about earlier about

948
00:43:30,270 --> 00:43:26,619
38 million years ago and we've got ice

949
00:43:32,490 --> 00:43:30,280
cores out in the the higher depths of

950
00:43:34,200 --> 00:43:32,500
the ice on the continent we're drilling

951
00:43:36,000 --> 00:43:34,210
down getting cores looking back at the

952
00:43:38,279 --> 00:43:36,010
atmosphere for two hundred two hundred

953
00:43:39,720 --> 00:43:38,289
six hundred thousand years ago to get an

954
00:43:41,940 --> 00:43:39,730
understanding what the continent was

955
00:43:44,460 --> 00:43:41,950
like then there there's a wide variety

956
00:43:46,559 --> 00:43:44,470
we have divers looking you know that are

957
00:43:49,740 --> 00:43:46,569
going down and collecting organisms for

958
00:43:52,289 --> 00:43:49,750
scientists there's a lot of Sealand

959
00:43:54,839 --> 00:43:52,299
penguin study groups locally around the

960
00:43:57,720 --> 00:43:54,849
coast all over the coast of antarctica

961
00:44:01,549 --> 00:43:57,730
by all different types of antarctic

962
00:44:03,720 --> 00:44:01,559
international antarctic programs so

963
00:44:06,510 --> 00:44:03,730

there's a there's there's a lot of

964
00:44:08,730 --> 00:44:06,520
science going on down there and it's

965
00:44:11,430 --> 00:44:08,740
it's it's good to be a part of it

966
00:44:16,370 --> 00:44:11,440
actually actually love this stuff so

967
00:44:23,039 --> 00:44:21,000
that's great thanks Chad so Cyril on

968
00:44:25,200 --> 00:44:23,049
Twitter wants to know Michael you can

969
00:44:31,500 --> 00:44:25,210
help with this question how exactly does

970
00:44:33,779 --> 00:44:31,510
I set help in our mission um I think

971
00:44:36,510 --> 00:44:33,789
it's probably more the other way around

972
00:44:44,700 --> 00:44:36,520
that ice which is helping I sudden I

973
00:44:47,220 --> 00:44:44,710
said to but in order to answer the

974
00:44:49,859 --> 00:44:47,230
designs questions that we are interested

975
00:44:51,930 --> 00:44:49,869
in how ice sheets are changing all the

976
00:44:53,940 --> 00:44:51,940
time meaning all sorts of different

977
00:44:56,130 --> 00:44:53,950
kinds of measurements and I SAT is

978
00:44:59,160 --> 00:44:56,140
contributing to this I said to will be

979
00:45:04,250 --> 00:44:59,170
contributing to this and also and sodas

980
00:45:07,650 --> 00:45:04,260
iceberg so what we do in addition to

981
00:45:10,589 --> 00:45:07,660
black king ice surface elevation data we

982
00:45:14,220 --> 00:45:10,599
also collect ice thickness data it's no

983
00:45:16,790 --> 00:45:14,230
thickness data over sea ice skin

984
00:45:21,240 --> 00:45:16,800
temperature data all sorts of

985
00:45:23,550 --> 00:45:21,250
measurements and they all will help to

986
00:45:27,000 --> 00:45:23,560
better interpret the signal that we will

987
00:45:30,870 --> 00:45:27,010
see in I sucked and I suck too so I

988
00:45:34,770 --> 00:45:30,880

think it's it's just them ice which is

989
00:45:38,520 --> 00:45:34,780
one part of a big puzzle that makes a

990
00:45:40,950 --> 00:45:38,530
contribution in a specific field that

991
00:45:44,069 --> 00:45:40,960
helps a worldwide community of

992
00:45:48,960 --> 00:45:44,079
scientists them answering bigger

993
00:45:53,910 --> 00:45:48,970
questions about how how will the climate

994
00:45:59,630 --> 00:45:53,920
change change the behavior of ice sheets

995
00:46:02,579 --> 00:45:59,640
and change the world thank you Michael

996
00:46:05,329 --> 00:46:02,589
another question for kristy from Peter

997
00:46:08,490 --> 00:46:05,339
on Twitter Peter wants to know how many

998
00:46:10,740 --> 00:46:08,500
flights we have planned for the campaign

999
00:46:14,059 --> 00:46:10,750
versus how many were originally planned

1000
00:46:16,680 --> 00:46:14,069
and what some of our field targets are

1001
00:46:19,109 --> 00:46:16,690
okay well uh that's a good question

1002
00:46:21,710 --> 00:46:19,119
multi-part question so I think our

1003
00:46:24,180 --> 00:46:21,720
current number that we have planned is

1004
00:46:27,470 --> 00:46:24,190
things about thirty seven flights this

1005
00:46:30,359 --> 00:46:27,480
year between 37 and 41 different planned

1006
00:46:32,700 --> 00:46:30,369
missions so typically what we do just to

1007
00:46:35,309 --> 00:46:32,710
maintain flexibility in the field is we

1008
00:46:37,740 --> 00:46:35,319
we plan a lot more missions than we ever

1009
00:46:41,040 --> 00:46:37,750
intend to fly so we plan landice

1010
00:46:43,650 --> 00:46:41,050
missions sea ice missions depending on

1011
00:46:45,150 --> 00:46:43,660
what what science we're looking at and

1012
00:46:46,500 --> 00:46:45,160
usually what we do is to help us with

1013
00:46:48,030 --> 00:46:46,510

planning the field is would take all

1014
00:46:49,710 --> 00:46:48,040
those missions and we prioritize them

1015
00:46:51,599 --> 00:46:49,720
you know these are the top priority

1016
00:46:54,150 --> 00:46:51,609
these are medium these are low so we

1017
00:46:55,530 --> 00:46:54,160
have a nice big book that we can go to

1018
00:46:57,300 --> 00:46:55,540
the weather office with in the morning

1019
00:46:59,490 --> 00:46:57,310
and then we take a look and we think

1020
00:47:01,890 --> 00:46:59,500
okay how's the how's the weather in this

1021
00:47:04,290 --> 00:47:01,900
region versus that region if the weather

1022
00:47:05,700 --> 00:47:04,300
looks bad on the east side maybe we'll

1023
00:47:08,490 --> 00:47:05,710
fly on the west side so we'll pull out

1024
00:47:09,809 --> 00:47:08,500
missions that reflect targets on the

1025
00:47:11,130 --> 00:47:09,819
west side of the continent for example

1026
00:47:12,809 --> 00:47:11,140
and then we'll look for our priorities

1027
00:47:15,450 --> 00:47:12,819
and always try and fly our top

1028
00:47:17,130 --> 00:47:15,460
priorities when the government shutdown

1029
00:47:18,900 --> 00:47:17,140
we didn't actually change

1030
00:47:20,190 --> 00:47:18,910
or remove any of our flights we still

1031
00:47:21,779 --> 00:47:20,200
have the same number of flight

1032
00:47:24,870 --> 00:47:21,789
Opportunities or flight plans that we

1033
00:47:26,609 --> 00:47:24,880
can fly it just did actually reduce the

1034
00:47:29,339 --> 00:47:26,619
number of days that we could fly in the

1035
00:47:31,259 --> 00:47:29,349
field so so are what we call potential

1036
00:47:33,329 --> 00:47:31,269
science flight numbers have gone down a

1037
00:47:35,400 --> 00:47:33,339
little bit but we're still going to work

1038
00:47:36,750 --> 00:47:35,410

through the list that we've already come

1039
00:47:40,859 --> 00:47:36,760
up with and try and get as many as we

1040
00:47:42,150 --> 00:47:40,869
can off the ground so you know reasons

1041
00:47:44,940 --> 00:47:42,160
that we look at I talked a little bit of

1042
00:47:46,829 --> 00:47:44,950
the high-level sea ice so we'll be

1043
00:47:49,529 --> 00:47:46,839
looking at the Rossi targets over the

1044
00:47:52,759 --> 00:47:49,539
Rossi on the ross ice shelf we have some

1045
00:47:56,460 --> 00:47:52,769
stuff in the transit our mountain range

1046
00:47:58,319 --> 00:47:56,470
we have a targets uh so the differences

1047
00:48:00,170 --> 00:47:58,329
I guess with puntarenas is we can't

1048
00:48:02,759 --> 00:48:00,180
reach on the targets that we did before

1049
00:48:03,839 --> 00:48:02,769
because we're working out you know some

1050
00:48:05,640 --> 00:48:03,849
of our new characteristics and

1051
00:48:07,410 --> 00:48:05,650
capabilities with the p3 aircraft and

1052
00:48:10,349 --> 00:48:07,420
you know looking at our times with how

1053
00:48:11,490 --> 00:48:10,359
far we can get from McMurdo how far we

1054
00:48:13,559 --> 00:48:11,500
can get with the range of the plane and

1055
00:48:15,930 --> 00:48:13,569
come back so things like pine island

1056
00:48:17,640 --> 00:48:15,940
glacier that we would have gotten using

1057
00:48:18,990 --> 00:48:17,650
the dc-8 deployment we don't we won't

1058
00:48:20,160 --> 00:48:19,000
necessarily get on this deployment so

1059
00:48:22,349 --> 00:48:20,170
some of the targets has changed a little

1060
00:48:28,499 --> 00:48:22,359
bit but um we're still excited about

1061
00:48:30,269 --> 00:48:28,509
reaching some of the new regions I hope

1062
00:48:32,579 --> 00:48:30,279
that answers your question thanks for

1063
00:48:35,339 --> 00:48:32,589

see that was a good answer we have a

1064
00:48:37,920 --> 00:48:35,349
another question here from google plus

1065
00:48:40,380 --> 00:48:37,930
and for Michael we see the p3 there

1066
00:48:42,420 --> 00:48:40,390
behind you and the question is why NASA

1067
00:48:47,670 --> 00:48:42,430
that shows an old crop aircraft instead

1068
00:48:51,390 --> 00:48:47,680
of a new claim um I think the p free has

1069
00:48:52,799 --> 00:48:51,400
been flying off kind of collecting and

1070
00:48:57,660 --> 00:48:52,809
flying these kind of missions for NASA

1071
00:49:00,180 --> 00:48:57,670
for more than two decades and I

1072
00:49:03,329 --> 00:49:00,190
screeches not be on the mission that is

1073
00:49:05,999 --> 00:49:03,339
using the p3 aircraft and in fact it's

1074
00:49:10,140 --> 00:49:06,009
um there's a high demand on having a

1075
00:49:12,839 --> 00:49:10,150
capability like a p3 for doing

1076
00:49:18,089 --> 00:49:12,849
atmospheric sciences all sorts of

1077
00:49:20,940 --> 00:49:18,099
experiments so it has a great the load

1078
00:49:24,029 --> 00:49:20,950
carrying capability it has a lot of

1079
00:49:26,400 --> 00:49:24,039
space in interior and it has a lot of

1080
00:49:29,420 --> 00:49:26,410
range and that makes it an ideal

1081
00:49:30,540 --> 00:49:29,430
aircraft to fly in places like Greenland

1082
00:49:33,830 --> 00:49:30,550
there

1083
00:49:36,810 --> 00:49:33,840
no over the surface of the ice

1084
00:49:41,100 --> 00:49:36,820
specifically at 1,500 feet above the ice

1085
00:49:44,850 --> 00:49:41,110
sheet so it's it's a pretty uniquely

1086
00:49:47,940 --> 00:49:44,860
it's uniquely suited for the type of

1087
00:49:50,730 --> 00:49:47,950
work that we are doing i scratch in

1088
00:49:55,410 --> 00:49:50,740

Greenland and also as well in Antarctica

1089
00:49:59,160 --> 00:49:55,420
and but beyond that it is also a great

1090
00:50:02,300 --> 00:49:59,170
capability to have for Avon chemistry

1091
00:50:04,920 --> 00:50:02,310
and all sorts of airborne science so

1092
00:50:07,800 --> 00:50:04,930
it's it's an airplane that has been

1093
00:50:10,410 --> 00:50:07,810
around for for more than 20 years at

1094
00:50:14,310 --> 00:50:10,420
NASA and before this it was used by the

1095
00:50:17,580 --> 00:50:14,320
Navy and the the decision has just been

1096
00:50:20,790 --> 00:50:17,590
made that this is worth keeping and the

1097
00:50:22,830 --> 00:50:20,800
Christie has mentioned replacing the

1098
00:50:24,870 --> 00:50:22,840
wings neck next year putting new wings

1099
00:50:29,780 --> 00:50:24,880
on the aircraft so that we can keep the

1100
00:50:35,010 --> 00:50:32,850
great thank you Michael and a follow-up

1101
00:50:37,410 --> 00:50:35,020
question on that one from Stephanie

1102
00:50:39,690 --> 00:50:37,420
ogburn at climate wire and I think

1103
00:50:42,090 --> 00:50:39,700
Christie you can handle this one when is

1104
00:50:43,950 --> 00:50:42,100
the p3 arriving in Antartica when does

1105
00:50:48,420 --> 00:50:43,960
it start collecting data and when does

1106
00:50:50,070 --> 00:50:48,430
that end yeah all good questions putting

1107
00:50:51,780 --> 00:50:50,080
the count under together was always an

1108
00:50:54,210 --> 00:50:51,790
exciting task to do with the changing

1109
00:50:55,920 --> 00:50:54,220
schedules trying to coordinate with you

1110
00:50:57,510 --> 00:50:55,930
know when we can get down to McMurdo

1111
00:50:59,340 --> 00:50:57,520
based on when the sea ice runway would

1112
00:51:01,080 --> 00:50:59,350
be ready for us and when does the sea

1113
00:51:03,300 --> 00:51:01,090

ice runway clothes no because that's

1114
00:51:05,280 --> 00:51:03,310
whether an environmental permitting how

1115
00:51:06,960 --> 00:51:05,290
long that room I can say open so we

1116
00:51:09,240 --> 00:51:06,970
definitely have to work in inside a set

1117
00:51:11,220 --> 00:51:09,250
of unique challenges that help us

1118
00:51:15,300 --> 00:51:11,230
outline our deployment length and time

1119
00:51:17,490 --> 00:51:15,310
frame so right now the p3 is scheduled

1120
00:51:21,120 --> 00:51:17,500
to leave Wallops on November 11th and

1121
00:51:22,560 --> 00:51:21,130
arrive in McMurdo on November 16 there's

1122
00:51:25,470 --> 00:51:22,570
a plane flying by overhead right now you

1123
00:51:28,140 --> 00:51:25,480
right here so um November 16th is when

1124
00:51:30,570 --> 00:51:28,150
it should arrive in McMurdo the

1125
00:51:32,760 --> 00:51:30,580
following day the 17th is what we call a

1126
00:51:35,220 --> 00:51:32,770
hard day a hard down day and assess

1127
00:51:37,860 --> 00:51:35,230
dictates the hard down day in McMurdo

1128
00:51:40,020 --> 00:51:37,870
and then the following Monday which is

1129
00:51:41,640 --> 00:51:40,030
the 18th we do our very first what were

1130
00:51:42,960 --> 00:51:41,650
caught what we call a test flight so

1131
00:51:44,160 --> 00:51:42,970
we're going to take our p3 up and

1132
00:51:45,030 --> 00:51:44,170
perform some tests

1133
00:51:46,500 --> 00:51:45,040
Jack gives because it's a different

1134
00:51:48,329 --> 00:51:46,510
environment trying to characterize

1135
00:51:49,559 --> 00:51:48,339
understanding the weather I'm get

1136
00:51:51,210 --> 00:51:49,569
familiar with the environment around us

1137
00:51:52,980 --> 00:51:51,220
and some of the flying so our flight

1138
00:51:55,950 --> 00:51:52,990

crew will do that check some things out

1139
00:51:58,710 --> 00:51:55,960
and that'll be the 18th and then the

1140
00:52:01,980 --> 00:51:58,720
19th is when we start our first science

1141
00:52:02,819 --> 00:52:01,990
flight so the 19th is one will we'll get

1142
00:52:09,480 --> 00:52:02,829
into our first chance to actually

1143
00:52:12,000 --> 00:52:09,490
collect hardcore science data great

1144
00:52:13,829 --> 00:52:12,010
thanks Kristi I I've been told we have a

1145
00:52:16,440 --> 00:52:13,839
lot of questions people coming in and

1146
00:52:18,000 --> 00:52:16,450
asking about the movie the thing and I

1147
00:52:20,370 --> 00:52:18,010
have to say that with ice bridge one of

1148
00:52:22,470 --> 00:52:20,380
our favorite movies is airplane we like

1149
00:52:24,240 --> 00:52:22,480
to quote that one a lot we have just a

1150
00:52:38,940 --> 00:52:24,250
few minutes left so is there anything

1151
00:52:47,250 --> 00:52:41,760
oh not from my end alright Donna go

1152
00:52:49,290 --> 00:52:47,260
nagai not gonna get anger oh great Chad

1153
00:52:53,880 --> 00:52:49,300
other than ice bridge what missions are

1154
00:52:58,010 --> 00:52:53,890
coming up in McMurdo as far as science

1155
00:53:00,839 --> 00:52:58,020
groups deploying you know there are

1156
00:53:03,060 --> 00:53:00,849
there are some concerted efforts from

1157
00:53:05,400 --> 00:53:03,070
Croesus the center remote sensing

1158
00:53:07,440 --> 00:53:05,410
University of Kansas they're coming down

1159
00:53:08,730 --> 00:53:07,450
they they had a skip year last year they

1160
00:53:11,550 --> 00:53:08,740
come down about every other year and

1161
00:53:14,329 --> 00:53:11,560
they're flying some a u-visa round as

1162
00:53:19,650 --> 00:53:14,339
well gathering a lot of snow nice data

1163
00:53:21,750 --> 00:53:19,660

the wizard group which was last year I

1164
00:53:25,109 --> 00:53:21,760
don't know if anyone remembers but they

1165
00:53:27,510 --> 00:53:25,119
drilled down through Lake Whillans into

1166
00:53:31,319 --> 00:53:27,520
Lake will ensue about a thousand meters

1167
00:53:32,670 --> 00:53:31,329
of ice and recovered some organisms and

1168
00:53:35,420 --> 00:53:32,680
they've taken those back to the labs and

1169
00:53:37,620 --> 00:53:35,430
I think it you can go look at Wizards a

1170
00:53:39,690 --> 00:53:37,630
webpage and they have some of their in

1171
00:53:41,190 --> 00:53:39,700
exciting science going on there they're

1172
00:53:43,859 --> 00:53:41,200
coming back they've been reduced in

1173
00:53:45,720 --> 00:53:43,869
scope a little bit but they're still

1174
00:53:47,970 --> 00:53:45,730
meeting some of their priorities and

1175
00:53:50,790 --> 00:53:47,980
objectives those are those are the two

1176
00:53:53,280 --> 00:53:50,800
big deep field efforts that are going on

1177
00:53:54,990 --> 00:53:53,290
and then there's lots of science groups

1178
00:53:56,670 --> 00:53:55,000
that come to McMurdo and come to South

1179
00:53:58,559 --> 00:53:56,680
Pole and come to Palmer Station on the

1180
00:54:00,660 --> 00:53:58,569
peninsula side that are doing their

1181
00:54:02,579 --> 00:54:00,670
annual science events you know a typical

1182
00:54:05,460 --> 00:54:02,589
science events is funded for about three

1183
00:54:10,230 --> 00:54:05,470
years so it'll come down and do a lot of

1184
00:54:11,849 --> 00:54:10,240
the same science it's always fun the the

1185
00:54:14,250 --> 00:54:11,859
seal groups that come through McMurdo

1186
00:54:16,680 --> 00:54:14,260
they go out and you know they weigh

1187
00:54:19,170 --> 00:54:16,690
seals and they look at some of them have

1188
00:54:20,700 --> 00:54:19,180

been tagged for 20 year plus years and

1189
00:54:23,010 --> 00:54:20,710
they put cameras on their heads

1190
00:54:25,230 --> 00:54:23,020
sometimes and they can see the profile

1191
00:54:26,640 --> 00:54:25,240
of their dives and what they're chasing

1192
00:54:30,329 --> 00:54:26,650
and fish so there's a lot of exciting

1193
00:54:32,220 --> 00:54:30,339
science out there if you go to wwu sap

1194
00:54:34,829 --> 00:54:32,230
and that's United States Antarctic

1195
00:54:37,260 --> 00:54:34,839
Program gov you can see some of the

1196
00:54:39,930 --> 00:54:37,270
links as well as the NSF's website at

1197
00:54:44,970 --> 00:54:39,940
NSF gov if you want to learn a lot more

1198
00:54:47,550 --> 00:54:44,980
about the science great thanks Chad

1199
00:54:50,520 --> 00:54:47,560
though wrapping up here we'd like to

1200
00:54:52,470 --> 00:54:50,530
thank our panelists Christine Hansen ice

1201
00:54:53,880 --> 00:54:52,480
bridge project manager Michael

1202
00:54:55,800 --> 00:54:53,890
shooting your ice bridge project

1203
00:54:57,300 --> 00:54:55,810
scientist and Chad Naughton science

1204
00:54:59,580 --> 00:54:57,310
project manager for the u.s. fine Arctic

1205
00:55:01,260 --> 00:54:59,590
program we'd like to remind everybody

1206
00:55:02,910 --> 00:55:01,270
that we'd like to thank everybody for

1207
00:55:04,859 --> 00:55:02,920
participating in this hangout and remind

1208
00:55:06,840 --> 00:55:04,869
you that this hangout will be archived

1209
00:55:11,040 --> 00:55:06,850
on YouTube for more information about

1210
00:55:14,790 --> 00:55:11,050
ice bridge you can go to ww nico / ice