1
00:00:07,240 --> 00:00:04,360
earthcam is a program one of many

2
00:00:09,459 --> 00:00:07,250
educational outreach programs from NASA

3
00:00:11,170 --> 00:00:09,469
this one is run out of the Johnson Space

4
00:00:12,670 --> 00:00:11,180
Center and utilizes some of the cameras

5
00:00:15,039 --> 00:00:12,680
already installed on the International

6
00:00:18,279 --> 00:00:15,049
Space Station student and students and

7
00:00:20,169 --> 00:00:18,289
educators are invited to apply online to

8
00:00:22,659 --> 00:00:20,179
be a part of that program where they can

9
00:00:24,640 --> 00:00:22,669
request specific photo opportunities

10
00:00:26,560 --> 00:00:24,650
based on the forecasted ground track of

11
00:00:27,939 --> 00:00:26,570
the space station and they could request

12
00:00:30,130 --> 00:00:27,949
those photos and use them for different

13
00:00:32,290 --> 00:00:30,140

research opportunities that the students

14
00:00:33,700 --> 00:00:32,300
themselves might be participating in you

15
00:00:43,360 --> 00:00:33,710
can find out more information about the

16
00:00:49,270 --> 00:00:45,930
they're accepting applications now and

17
00:00:51,520 --> 00:00:49,280
we'll be having a session kind of

18
00:00:53,350 --> 00:00:51,530
collecting those photo opportunities

19
00:00:56,049 --> 00:00:53,360
coming up in the next couple of weeks

20
00:00:58,360 --> 00:00:56,059
that deadline coming up shortly and the

21
00:01:01,500 --> 00:00:58,370
next photo opportunity session begins

22
00:01:03,549 --> 00:01:01,510
April 23rd running through the 26 though

23
00:01:05,049 --> 00:01:03,559
you're encouraged to participate in that

24
00:01:07,710 --> 00:01:05,059
program or spread the word to any

25
00:01:10,899 --> 00:01:07,720
teachers and educators in your community

26
00:01:13,570 --> 00:01:10,909
we have Ken ramsley a student with brown

27
00:01:15,010 --> 00:01:13,580
university joining us to talk about the

28
00:01:17,230 --> 00:01:15,020
earth camp program thanks so much Ken

29
00:01:19,090 --> 00:01:17,240
for joining us hi Nicole glad to be here

30
00:01:20,469 --> 00:01:19,100
why don't you start by telling us a

31
00:01:23,620 --> 00:01:20,479
little bit about yourself what you're

32
00:01:26,080 --> 00:01:23,630
studying there at Brown University I'm a

33
00:01:29,440 --> 00:01:26,090
graduate student at Brown I'm in the

34
00:01:32,590 --> 00:01:29,450
planetary geosciences group studying

35
00:01:34,749 --> 00:01:32,600
under James head my particular interest

36
00:01:37,570 --> 00:01:34,759
is something we call natural

37
00:01:41,609 --> 00:01:37,580
trajectories which would be things like

38
00:01:46,930 --> 00:01:41,619

impact ejecta from large craters I'm a

39
00:01:49,180 --> 00:01:46,940
mid-career type person and I'm previous

40
00:01:52,150 --> 00:01:49,190
to this I was a spacecraft systems

41
00:01:54,130 --> 00:01:52,160
engineer and I'm currently also a

42
00:01:56,380 --> 00:01:54,140
visiting investigator at Brown and I

43
00:02:00,369 --> 00:01:56,390
teach orbital mechanics and a few other

44
00:02:03,070 --> 00:02:00,379
things so my interest is centered around

45
00:02:05,320 --> 00:02:03,080
orbital mechanics and those sorts of

46
00:02:08,499 --> 00:02:05,330
things but applied now nowadays to

47
00:02:10,150 --> 00:02:08,509
planetary science well tell us how did

48
00:02:11,440 --> 00:02:10,160
you hear about earthcam you certainly

49
00:02:13,180 --> 00:02:11,450
had a diverse background and you

50
00:02:15,010 --> 00:02:13,190
mentioned spacecraft systems is it

51
00:02:15,970 --> 00:02:15,020
through those channels or was there a

52
00:02:18,160 --> 00:02:15,980
different way that you heard about the

53
00:02:21,940 --> 00:02:18,170
program initially I heard about the

54
00:02:24,750 --> 00:02:21,950
program at Brown our coordinator at

55
00:02:28,030 --> 00:02:24,760
Brown is test Caswell and she was

56
00:02:31,839 --> 00:02:28,040
publicizing the earth cam the program

57
00:02:34,809 --> 00:02:31,849
last fall so we all heard about it and

58
00:02:38,619 --> 00:02:34,819
it turns out that commander Dave Scott

59
00:02:41,320 --> 00:02:38,629
of Apollo 15 is a visiting professor at

60
00:02:44,890 --> 00:02:41,330
Brown and he was also included in that

61
00:02:48,040 --> 00:02:44,900
email so it's a bit of a convoluted

62
00:02:50,860 --> 00:02:48,050
story but I found out about it because

63
00:02:53,770 --> 00:02:50,870

dave was interested in some images from

64
00:02:54,849 --> 00:02:53,780
an earth cam system well tell us a

65
00:02:56,110 --> 00:02:54,859
little bit more about that that is

66
00:02:58,420 --> 00:02:56,120
that's a

67
00:03:00,130 --> 00:02:58,430
a really unique part of your story this

68
00:03:01,270 --> 00:03:00,140
this project that you wanted to pursue

69
00:03:04,000 --> 00:03:01,280
so why don't you walk us through how

70
00:03:06,610 --> 00:03:04,010
that evolved sure sure well it turned

71
00:03:09,100 --> 00:03:06,620
out that that we we specifically asked

72
00:03:12,220 --> 00:03:09,110
Dave if there was any part of a mission

73
00:03:14,110 --> 00:03:12,230
a space mission maybe not just Apollo 15

74
00:03:17,170 --> 00:03:14,120
because of course it was around the moon

75
00:03:20,470 --> 00:03:17,180
and but he was on previous missions

76
00:03:22,899 --> 00:03:20,480
Apollo 9 and Gemini 8 and he had a vivid

77
00:03:25,360 --> 00:03:22,909
recollection during his Gemini 8 mission

78
00:03:28,780 --> 00:03:25,370
that that that came to mind and it

79
00:03:30,490 --> 00:03:28,790
turned out that it was an image of an

80
00:03:33,550 --> 00:03:30,500
experience passing over the Himalaya

81
00:03:35,110 --> 00:03:33,560
Mountains now it you know all the

82
00:03:37,569 --> 00:03:35,120
spacecraft would pass over the Himalayas

83
00:03:40,270 --> 00:03:37,579
quite often but at this particular time

84
00:03:42,940 --> 00:03:40,280
it was what we've called sort of a lull

85
00:03:46,899 --> 00:03:42,950
between storms it was during just prior

86
00:03:50,589 --> 00:03:46,909
to re-entry and it was after a rather

87
00:03:54,550 --> 00:03:50,599
serious emergency on the Gemini 8 flight

88
00:03:57,580 --> 00:03:54,560

this this was the first orbital docking

89
00:03:59,440 --> 00:03:57,590
flight the the first mission where a

90
00:04:03,280 --> 00:03:59,450
spacecraft would dock with another

91
00:04:04,780 --> 00:04:03,290
spacecraft so an Agena target vehicle

92
00:04:06,670 --> 00:04:04,790
had been launched ahead of the the

93
00:04:10,210 --> 00:04:06,680
Gemini and the geminal was launched one

94
00:04:12,460 --> 00:04:10,220
orbit later rendezvous docked no problem

95
00:04:15,430 --> 00:04:12,470
and everything was nominal for about 25

96
00:04:18,490 --> 00:04:15,440
minutes and it turned out after about 25

97
00:04:21,879 --> 00:04:18,500
minutes the combined spacecraft began to

98
00:04:24,969 --> 00:04:21,889
pitch and roll slowly and the command

99
00:04:28,330 --> 00:04:24,979
pilot of Gemini 8 was Neil Armstrong and

100
00:04:30,040 --> 00:04:28,340
Neil managed to maintain stability by

101
00:04:32,170 --> 00:04:30,050
adding thrust but they were using up

102
00:04:33,790 --> 00:04:32,180
fuel and they were out of contact with

103
00:04:35,350 --> 00:04:33,800
Mission Control this was the Gemini

104
00:04:37,540 --> 00:04:35,360
program they weren't as many ground

105
00:04:40,260 --> 00:04:37,550
stations and methods for connecting as

106
00:04:42,790 --> 00:04:40,270
there are today and so the two

107
00:04:44,620 --> 00:04:42,800
astronauts worked out that that the only

108
00:04:46,900 --> 00:04:44,630
solution was to undock to find out

109
00:04:48,550 --> 00:04:46,910
whether or not it was the Agena or the

110
00:04:49,900 --> 00:04:48,560
the Gemini spacecraft that was having

111
00:04:51,550 --> 00:04:49,910
problems and it turned out it was the

112
00:04:53,740 --> 00:04:51,560
Gemini spacecraft that had a stuck

113
00:04:55,570 --> 00:04:53,750

thruster and very quickly within a

114
00:04:58,150 --> 00:04:55,580
minute or so they were spinning up to a

115
00:05:02,650 --> 00:04:58,160
rate of about one revolution per second

116
00:05:04,510 --> 00:05:02,660
which was extremely dangerous so Neil

117
00:05:06,730 --> 00:05:04,520
Armstrong with one hand was controlling

118
00:05:09,190 --> 00:05:06,740
the the geminii trying to keep the thing

119
00:05:09,940 --> 00:05:09,200
from spinning too fast when with another

120
00:05:12,550 --> 00:05:09,950
hand he was shutting

121
00:05:14,980 --> 00:05:12,560
down the the reaction control system the

122
00:05:16,570 --> 00:05:14,990
the the thrusters system that was that

123
00:05:18,520 --> 00:05:16,580
was causing the problem and shut the

124
00:05:20,080 --> 00:05:18,530
entire system down and now they're

125
00:05:22,120 --> 00:05:20,090
spinning at about one revolution per

126
00:05:24,270 --> 00:05:22,130
second and the only way to save the

127
00:05:26,740 --> 00:05:24,280
mission at that point was to switch to a

128
00:05:29,020 --> 00:05:26,750
does the system that that's used during

129
00:05:32,530 --> 00:05:29,030
reentry the thrusters are used during

130
00:05:35,890 --> 00:05:32,540
re-entry and with that Neil was able to

131
00:05:37,720 --> 00:05:35,900
regain control over the spacecraft but

132
00:05:39,930 --> 00:05:37,730
the mission rules were once that system

133
00:05:43,150 --> 00:05:39,940
was turned on they they were required to

134
00:05:46,210 --> 00:05:43,160
return to Earth as soon as possible so

135
00:05:48,490 --> 00:05:46,220
it was during the the the return to

136
00:05:50,350 --> 00:05:48,500
Earth after this particular emergency

137
00:05:52,660 --> 00:05:50,360
when everything was all settled they had

138
00:05:55,120 --> 00:05:52,670

fired their retro rockets they were in

139
00:05:57,370 --> 00:05:55,130
the proper orientation for reentry that

140
00:05:59,590 --> 00:05:57,380
Dave Scott and was looking out the

141
00:06:01,540 --> 00:05:59,600
window watching the Himalayas passing

142
00:06:04,210 --> 00:06:01,550
overhead so you can imagine why and

143
00:06:06,070 --> 00:06:04,220
perhaps that particular time passing

144
00:06:10,630 --> 00:06:06,080
over the Himalayas might be special to

145
00:06:12,190 --> 00:06:10,640
him that's an amazing story and it's

146
00:06:13,810 --> 00:06:12,200
amazing that you had this opportunity to

147
00:06:15,970 --> 00:06:13,820
talk with him and work with him and and

148
00:06:18,250 --> 00:06:15,980
use earthcam to get this you know

149
00:06:20,850 --> 00:06:18,260
capture this image that was so important

150
00:06:24,880 --> 00:06:20,860
as you said to him and into that mission

151
00:06:27,280 --> 00:06:24,890
yes so my involvement was rather than

152
00:06:29,230 --> 00:06:27,290
just taking images of the Himalayas we

153
00:06:31,690 --> 00:06:29,240
we thought perhaps we could work out the

154
00:06:33,670 --> 00:06:31,700
exact ground track passing over the

155
00:06:36,820 --> 00:06:33,680
Himalayas that they saw out the window

156
00:06:39,460 --> 00:06:36,830
and so it turns out that that nASA has a

157
00:06:43,120 --> 00:06:39,470
terrific historical archive of mission

158
00:06:45,310 --> 00:06:43,130
records you know debriefing and mission

159
00:06:47,200 --> 00:06:45,320
reports and so forth and that included

160
00:06:49,420 --> 00:06:47,210
the orbital information that I needed to

161
00:06:52,840 --> 00:06:49,430
to figure out exactly what that ground

162
00:06:54,730 --> 00:06:52,850
track was so it turns out that the the

163
00:06:56,440 --> 00:06:54,740

gemenese spacecraft had to perform nine

164
00:06:57,730 --> 00:06:56,450
maneuvers in order to rendezvous and

165
00:06:59,800 --> 00:06:57,740
that was very complicated to work

166
00:07:01,450 --> 00:06:59,810
through but the target vehicle went into

167
00:07:03,850 --> 00:07:01,460
orbit that would that establish the

168
00:07:06,310 --> 00:07:03,860
ground track and so by tracing that

169
00:07:08,290 --> 00:07:06,320
ground track across the Himalayas at the

170
00:07:12,610 --> 00:07:08,300
proper time I was able to use that to

171
00:07:14,740 --> 00:07:12,620
select coordinates for the earth cam so

172
00:07:16,960 --> 00:07:14,750
we thought this was last fall and we

173
00:07:21,160 --> 00:07:16,970
selected approximately eight targets and

174
00:07:22,570 --> 00:07:21,170
so far we've received two images this is

175
00:07:23,740 --> 00:07:22,580
fascinating I was just going to ask how

176
00:07:25,810 --> 00:07:23,750
long this whole process

177
00:07:28,110 --> 00:07:25,820
took from when you conceived the idea

178
00:07:30,850 --> 00:07:28,120
that you want to participate in earth km

179
00:07:33,930 --> 00:07:30,860
working with him to identify a possible

180
00:07:36,640 --> 00:07:33,940
opportunity that I'll start in the fall

181
00:07:38,260 --> 00:07:36,650
that was all in the fall yeah it was

182
00:07:40,540 --> 00:07:38,270
probably over the course of the weekend

183
00:07:41,860 --> 00:07:40,550
a little bit of back and forth you know

184
00:07:44,110 --> 00:07:41,870
once I understood what what the

185
00:07:46,750 --> 00:07:44,120
objective was it was mostly homework

186
00:07:48,610 --> 00:07:46,760
hunt my part these these documents are

187
00:07:52,450 --> 00:07:48,620
500 pages long and the table of contents

188
00:07:54,940 --> 00:07:52,460

alone or three or 30 pages long but it's

189
00:07:56,470 --> 00:07:54,950
my specialty i really enjoy orbital

190
00:07:58,570 --> 00:07:56,480
mechanics and i enjoy working through

191
00:08:01,030 --> 00:07:58,580
the details and so providing that

192
00:08:03,040 --> 00:08:01,040
simulation was a lot of fun i really

193
00:08:05,500 --> 00:08:03,050
enjoyed it and i was really happy to be

194
00:08:08,050 --> 00:08:05,510
able to participate so what is the plan

195
00:08:09,520 --> 00:08:08,060
now how do you plan on is there do you

196
00:08:12,550 --> 00:08:09,530
have any plans for those images that

197
00:08:16,000 --> 00:08:12,560
you've gotten we're holding on to them

198
00:08:17,830 --> 00:08:16,010
right now that the the program for

199
00:08:19,840 --> 00:08:17,840
various reasons I don't remember at last

200
00:08:22,090 --> 00:08:19,850
fall but it terminated a couple of days

201
00:08:24,070 --> 00:08:22,100
early so there's still we still have

202
00:08:26,230 --> 00:08:24,080
about six more images to acquire so

203
00:08:28,210 --> 00:08:26,240
we'll be resubmitting those four in the

204
00:08:30,370 --> 00:08:28,220
next program run I believe that's at the

205
00:08:33,310 --> 00:08:30,380
end of this month and then when we have

206
00:08:36,610 --> 00:08:33,320
that that complete series we'll put

207
00:08:39,300 --> 00:08:36,620
together some sort of a composition that

208
00:08:41,440 --> 00:08:39,310
that shows the entire ground track

209
00:08:43,300 --> 00:08:41,450
that's wonderful and do you have any

210
00:08:44,740 --> 00:08:43,310
thoughts or advice for other students

211
00:08:48,430 --> 00:08:44,750
may be considering participating in

212
00:08:49,990 --> 00:08:48,440
earthcam um I I think it's you know a

213
00:08:52,150 --> 00:08:50,000

lot of people who are interested in

214
00:08:53,500 --> 00:08:52,160
where they live and their home city or

215
00:08:55,870 --> 00:08:53,510
whatever but you know there's also

216
00:08:58,660 --> 00:08:55,880
there's history there are things that

217
00:09:00,010 --> 00:08:58,670
have happened there's places that may

218
00:09:02,920 --> 00:09:00,020
you know if you're interested in

219
00:09:05,140 --> 00:09:02,930
volcanoes or if you're interested in in

220
00:09:07,450 --> 00:09:05,150
islands of the Pacific or whatever

221
00:09:09,579 --> 00:09:07,460
whatever you're interested you can you

222
00:09:11,710 --> 00:09:09,589
can figure that out so I guess my point

223
00:09:13,300 --> 00:09:11,720
is that it's not just you know pick the

224
00:09:15,370 --> 00:09:13,310
first thing that comes to mind but maybe

225
00:09:17,590 --> 00:09:15,380
there's more of a story you know more of

226
00:09:18,910 --> 00:09:17,600
a personal connection and I think that

227
00:09:22,000 --> 00:09:18,920
makes it a lot more interesting and a

228
00:09:23,470 --> 00:09:22,010
lot more satisfying absolutely you're

229
00:09:24,700 --> 00:09:23,480
sounds like a really unique story

230
00:09:26,950 --> 00:09:24,710
attached with this and hopefully it'll

231
00:09:28,360 --> 00:09:26,960
inspire others to take take advantage of

232
00:09:29,890 --> 00:09:28,370
this really unique opportunity to be

233
00:09:31,329 --> 00:09:29,900
part of the space station program and

234
00:09:33,220 --> 00:09:31,339
part of the science and research that's

235
00:09:35,050 --> 00:09:33,230
being done so thank you so much for

236
00:09:36,329 --> 00:09:35,060
sharing this with us and we wish you the