
PAO

1
00:00:01,534 --> 00:00:02,902
>> Pat Ryan: Since the
International Space Station's

2
00:00:02,902 --> 00:00:06,806
Expedition 2, some 11 years
ago, actually before that,

3
00:00:06,806 --> 00:00:09,675
on shuttle missions
dating back to 1996,

4
00:00:09,675 --> 00:00:11,977
there have been middle
school and college students

5
00:00:11,977 --> 00:00:14,580
that have gotten a chance to
participate in space flight

6
00:00:14,580 --> 00:00:17,349
by taking pictures from orbit.

7
00:00:17,349 --> 00:00:20,019
The program is called
Earth Knowledge Acquired

8
00:00:20,019 --> 00:00:22,421
by Middle School Students
and that translates

9
00:00:22,421 --> 00:00:24,523
in NASA into EarthKAM.

10
00:00:24,523 --> 00:00:26,892
It was developed by
former astronaut Sally Ride

11
00:00:26,892 --> 00:00:28,661

and the project is
still administered

12
00:00:28,661 --> 00:00:31,864
by her science education
company, Sally Ride Science.

13
00:00:31,864 --> 00:00:35,101
EarthKAM is in operation onboard
the International Space Station

14
00:00:35,101 --> 00:00:36,969
this week, Earth Week.

15
00:00:36,969 --> 00:00:39,572
We've decided to get
students more involved

16
00:00:39,572 --> 00:00:40,773
in the current mission.

17
00:00:40,773 --> 00:00:43,109
They even have a special
challenge that we're going

18
00:00:43,109 --> 00:00:44,777
to learn about this
week from Brion Au,

19
00:00:44,777 --> 00:00:47,279
the EarthKAM Payload Developer.

20
00:00:47,279 --> 00:00:48,280
Brion, welcome back.

21
00:00:48,280 --> 00:00:51,283
EarthKAM, just to
get this straight,

22

00:00:51,283 --> 00:00:53,853
EarthKAM doesn't operate
continuously onboard the

23
00:00:53,853 --> 00:00:54,920
station, does it?

24
00:00:54,920 --> 00:00:57,490
>> Brion Au: No, it doesn't.

25
00:00:57,490 --> 00:00:58,491
It's a, it does not.

26
00:00:58,491 --> 00:01:01,293
It's set up for a
week long mission,

27
00:01:01,293 --> 00:01:04,663
they call them missions, and
we do that five times a year.

28
00:01:04,663 --> 00:01:08,334
We'll set up around the end
of January, again in April

29
00:01:08,334 --> 00:01:11,103
for the Spring mission,
we'll run in July

30
00:01:11,103 --> 00:01:15,274
for the Summer mission, again
in the end of September,

31
00:01:15,274 --> 00:01:19,912
beginning of October and then
another mission in November.

32
00:01:19,912 --> 00:01:22,414
So it'll give the teachers
and folks that want

33
00:01:22,414 --> 00:01:25,818
to participate a chance to
get into one of the five,

34
00:01:25,818 --> 00:01:29,355
if not all of those
sessions for that week.

35
00:01:29,355 --> 00:01:32,024
>> Pat Ryan: And you can click
that and it'll hold its position

36
00:01:32,024 --> 00:01:33,492
so you don't have
to hold it there.

37
00:01:33,492 --> 00:01:37,530
Now, EarthKAM right now
is set up inside node 2.

38
00:01:37,530 --> 00:01:39,165
It's usually node 1, right?

39
00:01:39,165 --> 00:01:39,932
>> Brion Au: That's correct.

40
00:01:39,932 --> 00:01:41,000
[inaudible]

41
00:01:41,000 --> 00:01:41,834
>> Pat Ryan: Because
usually in the lab.

42
00:01:41,834 --> 00:01:43,169
>> Brion Au: In the U.S. lab,

43
00:01:43,169 --> 00:01:45,671
in the Window Observational

Research Facility, or WORF,

44
00:01:45,671 --> 00:01:48,674
as we call it, because
there's a larger payload

45
00:01:48,674 --> 00:01:52,745
in there right now, it's a
huge telescope called ISERV.

46
00:01:52,745 --> 00:01:56,248
We have an alternate
location in node 2 and that's

47
00:01:56,248 --> 00:01:58,083
where we're set up
for this week.

48
00:01:58,083 --> 00:02:01,320
>> Pat Ryan: Now, I've, we've
talked about this enough to know

49
00:02:01,320 --> 00:02:05,157
that people are taking pictures,
but I asked you specifically,

50
00:02:05,157 --> 00:02:07,159
what kind of camera
are they using?

51
00:02:07,159 --> 00:02:09,395
What kind of camera is
up there taking pictures?

52
00:02:09,395 --> 00:02:12,565
>> Brion Au: It's actually
a digital still camera,

53
00:02:12,565 --> 00:02:13,499
not a Nikon.

54
00:02:13,499 --> 00:02:14,567
>> Pat Ryan: So unusual.

55
00:02:14,567 --> 00:02:16,268
>> Brion Au: D2SX,
no, it's a commercial,

56
00:02:16,268 --> 00:02:17,903
off the shelf product.

57
00:02:17,903 --> 00:02:21,674
We have several onboard
and the only thing unique

58
00:02:21,674 --> 00:02:25,644
about the whole EarthKAM
system is the suite of software

59
00:02:25,644 --> 00:02:28,714
that we run on a laptop
that's tethered to the camera

60
00:02:28,714 --> 00:02:32,718
by a USB cable and that allows
us to command the camera

61
00:02:32,718 --> 00:02:36,188
to take the picture and then
it automatically downloads

62
00:02:36,188 --> 00:02:38,991
that image from the camera to
the laptop so we can bring them

63
00:02:38,991 --> 00:02:42,194
down to the ground and get them
posted for the students to see.

64

00:02:42,194 --> 00:02:45,164
>> Pat Ryan: Let me take you
back a step further and talk

65
00:02:45,164 --> 00:02:46,799
about how the students
are involved.

66
00:02:46,799 --> 00:02:48,634
Give me the thumbnail sketch

67
00:02:48,634 --> 00:02:52,071
of how kids are taking
pictures from space.

68
00:02:52,071 --> 00:02:57,042
>> Brion Au: Ok, what we
do is take an orbit track

69
00:02:57,042 --> 00:02:59,078
of the space station,
we know where it's going

70
00:02:59,078 --> 00:03:05,217
to be flying overhead and we
superimpose that orbit track

71
00:03:05,217 --> 00:03:09,255
on Google maps so that the
kids can literally zoom

72
00:03:09,255 --> 00:03:13,926
in to the target that
they're trying to acquire.

73
00:03:13,926 --> 00:03:17,096
And what that does is return
data so that they can fill

74
00:03:17,096 --> 00:03:22,268

out a camera image
request and if the image is

75
00:03:22,268 --> 00:03:26,205
within the footprint of the
camera as it flies overhead,

76
00:03:26,205 --> 00:03:29,141
the software will check
that and accept the image.

77
00:03:29,141 --> 00:03:32,845
If it's outside that
footprint it will reject it

78
00:03:32,845 --> 00:03:36,081
and that puts together
a camera control file

79
00:03:36,081 --> 00:03:38,450
that we uplink to the camera.

80
00:03:38,450 --> 00:03:41,654
It's a series of time hacks
when the station's crossing

81
00:03:41,654 --> 00:03:43,789
over that point on the earth,

82
00:03:43,789 --> 00:03:46,358
the software tells the
camera to take a picture.

83
00:03:46,358 --> 00:03:48,894
And it will at that instant

84
00:03:48,894 --> 00:03:53,065
and the image process just
flows the image to that laptop

85
00:03:53,065 --> 00:03:54,466
so we can get it on the ground.

86
00:03:54,466 --> 00:03:56,168
>> Pat Ryan: These are
middle school students

87
00:03:56,168 --> 00:03:58,337
who are doing this
work and are figuring

88
00:03:58,337 --> 00:04:00,306
out what target they
want to shoot.

89
00:04:00,306 --> 00:04:03,876
>> Brion Au: Yes, there
is Geometry and Physics

90
00:04:03,876 --> 00:04:09,481
and the whole suite
of Mathematics types

91
00:04:09,481 --> 00:04:14,420
of activities involved in
actually acquiring an image.

92
00:04:14,420 --> 00:04:15,821
Yes.

93
00:04:15,821 --> 00:04:18,524
>> Pat Ryan: They're figuring
out the target but then they,

94
00:04:18,524 --> 00:04:20,392
they're just the first
step in a process then,

95
00:04:20,392 --> 00:04:23,395

to get that camera
control file onboard.

96
00:04:23,395 --> 00:04:24,463
>> Brion Au: Yes, yes.

97
00:04:24,463 --> 00:04:26,632
That process works
out at the University

98
00:04:26,632 --> 00:04:28,334
of California at San Diego.

99
00:04:28,334 --> 00:04:30,302
There's a team of
undergrad students

100
00:04:30,302 --> 00:04:32,738
who will receive all
these image requests

101
00:04:32,738 --> 00:04:35,040
from the students
around the world.

102
00:04:35,040 --> 00:04:38,243
Currently we have 411 schools.

103
00:04:38,243 --> 00:04:41,613
Over 29,000 students signed up
to participate in this mission.

104
00:04:41,613 --> 00:04:42,414
>> Pat Ryan: This week.

105
00:04:42,414 --> 00:04:43,682
>> Brion Au: This week, yes.

106
00:04:43,682 --> 00:04:46,785

That number is almost
double what we did

107
00:04:46,785 --> 00:04:51,523
in our February mission
which is significantly higher

108
00:04:51,523 --> 00:04:53,158
than we've seen in the past.

109
00:04:53,158 --> 00:04:57,863
So EarthKAM is starting to
get the exposure and the use

110
00:04:57,863 --> 00:04:59,765
that we're trying to build.

111
00:04:59,765 --> 00:05:02,067
>> Pat Ryan: And
we're talking about,

112
00:05:02,067 --> 00:05:04,603
there's a mission
control in San Diego.

113
00:05:04,603 --> 00:05:05,871
>> Brion Au: We call
it the MOC, yes,

114
00:05:05,871 --> 00:05:07,439
the Missions Operations Center.

115
00:05:07,439 --> 00:05:09,408
The undergrad students
out at the University

116
00:05:09,408 --> 00:05:13,846
of California San Diego
staff this MOC and they bring

117
00:05:13,846 --> 00:05:16,582
in the image requests,
process it down into

118
00:05:16,582 --> 00:05:20,386
that camera control file,
send it to us here at UCSD,

119
00:05:20,386 --> 00:05:21,687
they put it on our server.

120
00:05:21,687 --> 00:05:24,857
They have access to it and
then I will error check it ,

121
00:05:24,857 --> 00:05:28,093
virus check it and then hand it
off to the OCA operators who,

122
00:05:28,093 --> 00:05:30,396
in turn, can uplink
it to the station.

123
00:05:30,396 --> 00:05:31,730
>> Pat Ryan: And as
you explained then,

124
00:05:31,730 --> 00:05:35,868
the picture's taken, it comes
back down and the image is

125
00:05:35,868 --> 00:05:36,869
>> Bryon Au: Correct.

126
00:05:36,869 --> 00:05:37,903
>> Pat Ryan: returned
to the students,

127
00:05:37,903 --> 00:05:39,505

but it's available
for anybody to see.

128
00:05:39,505 --> 00:05:43,242
>> Brion Au: Yes, the students
actually indirectly tell

129
00:05:43,242 --> 00:05:44,877
that camera when
to take a picture,

130
00:05:44,877 --> 00:05:47,446
so that's the neat
thing about it.

131
00:05:47,446 --> 00:05:49,448
It's not a direct push
a button on the ground

132
00:05:49,448 --> 00:05:51,950
and it tells the camera
to take a picture,

133
00:05:51,950 --> 00:05:55,154
but it's the only payload
that I know of right now

134
00:05:55,154 --> 00:05:57,990
that allows the students
to control the payload.

135
00:05:57,990 --> 00:06:01,994
It's not a byproduct of
another researcher's efforts.

136
00:06:01,994 --> 00:06:04,129
>> Pat Ryan: I asked you to
bring us a couple of pictures

137
00:06:04,129 --> 00:06:06,398

because the next question is,

138
00:06:06,398 --> 00:06:10,002
what do these kids want
to take pictures of?

139
00:06:10,002 --> 00:06:13,705
And you've provided us
with a couple of images.

140
00:06:13,705 --> 00:06:17,309
This one I wanted to
show first because most

141
00:06:17,309 --> 00:06:19,378
of us can identify what this is.

142
00:06:19,378 --> 00:06:21,180
>> Brion Au: Obviously
this is Massachusetts,

143
00:06:21,180 --> 00:06:23,482
the Cape Cod area.

144
00:06:23,482 --> 00:06:27,085
In this picture, it
needs to be rotated,

145
00:06:27,085 --> 00:06:28,620
it's just kind of rectilinear

146
00:06:28,620 --> 00:06:29,621
[assumed spelling]

147
00:06:29,621 --> 00:06:30,889
location, north is
actually pointing

148
00:06:30,889 --> 00:06:33,492

down to the lower right corner.

149
00:06:33,492 --> 00:06:36,128
You can see different
forms of erosion,

150
00:06:36,128 --> 00:06:38,597
which is the contest
that's coming up.

151
00:06:38,597 --> 00:06:45,437
The landforms are there, you
can also see the transportation

152
00:06:45,437 --> 00:06:48,974
routes in the cities and
so forth that are in there.

153
00:06:48,974 --> 00:06:51,877
Now this was taken with
the 50 millimeter lens

154
00:06:51,877 --> 00:06:58,884
and that image is about 100
by 200 miles length and width.

155
00:06:58,884 --> 00:07:05,524
The detail is not so great,
but it's nice in the respect

156
00:07:05,524 --> 00:07:11,096
that you can actually see major
landforms, the urbanization,

157
00:07:11,096 --> 00:07:15,400
you can see when things
start, are being affected,

158
00:07:15,400 --> 00:07:16,969
you can see how the soil

159
00:07:16,969 --> 00:07:21,106
and so forth actually
wash out into the ocean.

160
00:07:21,106 --> 00:07:25,911
So it's a really, really nice
picture of a larger area.

161
00:07:25,911 --> 00:07:28,747
>> Pat Ryan: The next one is
a little more detail to it,

162
00:07:28,747 --> 00:07:31,283
this was I think
180 millimeter lens.

163
00:07:31,283 --> 00:07:33,051
>> Brion Au: This is a
180 millimeter lens, yeah.

164
00:07:33,051 --> 00:07:36,588
This image is about
60 by 80 miles.

165
00:07:36,588 --> 00:07:42,594
And you can actually see
Waukegan in the urban areas

166
00:07:42,594 --> 00:07:44,663
and you can see the
more detailed,

167
00:07:44,663 --> 00:07:47,966
you can literally see
city blocks in this one.

168
00:07:47,966 --> 00:07:54,373
When we are working
through the node 2 window,

169
00:07:54,373 --> 00:07:58,944
it is not as optically
clear as the US Lab window.

170
00:07:58,944 --> 00:08:00,846
Those pictures that we get

171
00:08:00,846 --> 00:08:06,385
through the US Laboratory
window are absolutely stunning.

172
00:08:06,385 --> 00:08:09,288
The quality and the crispness
of the features that come

173
00:08:09,288 --> 00:08:11,023
through are just amazing.

174
00:08:11,023 --> 00:08:13,292
Again, in this one,
as you get closer

175
00:08:13,292 --> 00:08:18,630
in detail you can see more
of the transportation routes.

176
00:08:18,630 --> 00:08:22,801
You can see how the folks
line up the streets, you know,

177
00:08:22,801 --> 00:08:25,537
make the city blocks
and things like that.

178
00:08:25,537 --> 00:08:30,409
You can also see under the
water, which, unlike the radar

179

00:08:30,409 --> 00:08:34,046
and STS 99, it gets the
radar and it turns black.

180
00:08:34,046 --> 00:08:39,818
We can see underwater, you
can see the beach and how

181
00:08:39,818 --> 00:08:44,423
that tapers off into the
deeper water in Lake Michigan.

182
00:08:44,423 --> 00:08:45,324
>> Pat Ryan: We have
one more picture

183
00:08:45,324 --> 00:08:46,792
that we can show you where,

184
00:08:46,792 --> 00:08:49,962
this is a different
kind of composition.

185
00:08:49,962 --> 00:08:54,733
>> Brion Au: Yes, yeah, this is
actually in Genoa, Torino Italy

186
00:08:54,733 --> 00:08:58,203
and you can see the
mountainous forms,

187
00:08:58,203 --> 00:09:05,944
you can go from the high arid
land areas, the closer you get

188
00:09:05,944 --> 00:09:08,814
to the ocean, you can actually
see the forestation start

189
00:09:08,814 --> 00:09:11,617

in darker green areas, and then

190
00:09:11,617 --> 00:09:16,421
when you have mountains you'll
actually see clouds form

191
00:09:16,421 --> 00:09:18,590
because of the disturbance
in the air that's caused

192
00:09:18,590 --> 00:09:21,994
by the mountains, so that
points that out there also.

193
00:09:21,994 --> 00:09:25,364
It's actually a really neat
picture, kind of hidden

194
00:09:25,364 --> 00:09:30,202
under the clouds and you can see
some of the more developed areas

195
00:09:30,202 --> 00:09:35,207
and it's also, you can see, the
students at UCSD kind of traced

196
00:09:35,207 --> 00:09:38,110
in the border between
France and Italy so yeah,

197
00:09:38,110 --> 00:09:39,244
it's a really neat picture.

198
00:09:39,244 --> 00:09:40,545
We have several.

199
00:09:40,545 --> 00:09:45,350
We've got over 60,000 images
on the ground, I believe,

200
00:09:45,350 --> 00:09:49,988
that are available, open
source to anybody to access

201
00:09:49,988 --> 00:09:53,825
through the website that
we've got for EarthKAM.

202
00:09:53,825 --> 00:09:54,860
>> Pat Ryan: I mentioned
earlier too,

203
00:09:54,860 --> 00:09:56,828
that there's a special
event going

204
00:09:56,828 --> 00:09:58,530
on for the mission this week.

205
00:09:58,530 --> 00:10:00,232
The Erosion Challenge?

206
00:10:00,232 --> 00:10:03,802
>> Brion Au: Yes, because
it's Earth Day, Earth Week.

207
00:10:03,802 --> 00:10:08,206
The team out at UCSD
put together a contest

208
00:10:08,206 --> 00:10:15,547
for the participants in EarthKAM
to capture an image of an area

209
00:10:15,547 --> 00:10:20,185
with some type of erosion and
along with that they're to come

210
00:10:20,185 --> 00:10:24,923

up with a 250 word write
up describing the features

211
00:10:24,923 --> 00:10:30,729
and characteristics of their
picture and submit that to UCSD

212
00:10:30,729 --> 00:10:36,068
and then it will be judged with
the winner selected on May 10th

213
00:10:36,068 --> 00:10:38,036
and the winner will actually get

214
00:10:38,036 --> 00:10:41,339
to teleconference
with an astronaut.

215
00:10:41,339 --> 00:10:44,776
Do a Q and A. For the
rest of the participants,

216
00:10:44,776 --> 00:10:48,046
it will also be a web cast
so they can follow along

217
00:10:48,046 --> 00:10:52,117
with the teleconference
and everybody benefits.

218
00:10:52,117 --> 00:10:53,518
So yeah, it's kind of neat.

219
00:10:53,518 --> 00:10:56,288
>> Pat Ryan: Over 400
schools this week.

220
00:10:56,288 --> 00:10:57,622
>> Brion Au: Correct.

221
00:10:57,622 --> 00:11:00,992
Yeah, 411 and over 29,000
students actively engaged this

222
00:11:00,992 --> 00:11:02,527
week right now.

223
00:11:02,527 --> 00:11:04,596
>> Pat Ryan: And later
on this week we intend

224
00:11:04,596 --> 00:11:08,600
to have another feature that
will tell you more about some

225
00:11:08,600 --> 00:11:12,003
of the students that are
involved in this program.

226
00:11:12,003 --> 00:11:15,073
Brion, appreciate the time
and the look at the pictures.

227
00:11:15,073 --> 00:11:16,007
Enjoyed it.

228
00:11:16,007 --> 00:11:17,142
>> Brion Au: Thank
you very much.

229
00:11:17,142 --> 00:11:17,976
>> Pat Ryan: Brion Au
is the Payload Developer

230
00:11:17,976 --> 00:11:19,711
for the EarthKAM investigation