
PDL

1
00:00:00,550 --> 00:00:04,370
>> We are standing inside the
space vehicle mock-up facility here

2
00:00:04,370 --> 00:00:05,720
at the Johnson Space Center.

3
00:00:05,720 --> 00:00:08,250
This is where the astronauts and
the crews actually training inside

4
00:00:08,250 --> 00:00:12,020
of all these modules you're seeing before they
fly up to the International Space Station.

5
00:00:12,020 --> 00:00:15,550
Not only do they get to practice
inside the laboratories and the nodes,

6
00:00:15,550 --> 00:00:18,850
but they actually get to practice on
some of the experiment racks as well.

7
00:00:18,850 --> 00:00:22,270
Brian Haw [Phonetic] joins us, he's one of the
payload developers for one of those experiments,

8
00:00:22,270 --> 00:00:25,710
which I actually think is one of
the cooler ones which is Earth cam.

9
00:00:25,710 --> 00:00:30,920
Now this is the only student-run experiment
on board the International Space Station,

10
00:00:30,920 --> 00:00:33,870
where they actually have direct
access into this camera system.

11

00:00:33,870 --> 00:00:35,750
Talk a bit about what it is and what they do.

12
00:00:35,750 --> 00:00:36,320
That's correct.

13
00:00:36,320 --> 00:00:39,880
Earth cam is a payload by students for students.

14
00:00:39,880 --> 00:00:44,570
It was initiated by Sally Rideback
when the shuttle was still flying,

15
00:00:44,570 --> 00:00:48,130
and we've since then migrated
over to the space station.

16
00:00:48,130 --> 00:00:54,880
And we've operated about 38
times, and we continue to operate

17
00:00:54,880 --> 00:00:59,900
for about four weeks, about four times per year.

18
00:00:59,900 --> 00:01:02,840
>> Okay. So let's talk a bit about how it works.

19
00:01:02,840 --> 00:01:05,200
Basically, students get to see
a map of the Earth, there's --

20
00:01:05,200 --> 00:01:06,780
like you said, four times a year.

21
00:01:06,780 --> 00:01:08,450
Stretches for about four days a piece.

22
00:01:08,450 --> 00:01:12,090
And they get to take a look at the map of

where the station is going to be flying over,

23
00:01:12,090 --> 00:01:15,380
and say hey, I want a picture
of -- whatever they want --

24
00:01:15,380 --> 00:01:18,920
whether it's their hometown or whatever
city they want to look at, right?

25
00:01:18,920 --> 00:01:19,580
>> That's correct.

26
00:01:19,580 --> 00:01:24,400
They have to ensure that the station's
actually passing over the target they're trying

27
00:01:24,400 --> 00:01:30,520
to acquire through products that
are available via the web pages

28
00:01:30,520 --> 00:01:33,190
out of University of California at San Diego.

29
00:01:33,190 --> 00:01:34,940
We show the orbit tracks.

30
00:01:34,940 --> 00:01:40,110
And what they do is you can auger down
into the map that's directly underneath

31
00:01:40,110 --> 00:01:41,760
that obtain track.

32
00:01:41,760 --> 00:01:45,210
And let's say it does pass
over Johnson Space Center.

33
00:01:45,210 --> 00:01:52,160

The data will provide the time, the instant,
that the station is directly overhead.

34
00:01:52,160 --> 00:01:55,450
And you can take that information and plug it

35
00:01:55,450 --> 00:02:01,550
into an information request
and literally request an image.

36
00:02:01,550 --> 00:02:02,530
>> They're in charge.

37
00:02:02,530 --> 00:02:03,730
>> They are in charge, yes.

38
00:02:03,730 --> 00:02:05,100
>> So let's talk a bit about what the crew does.

39
00:02:05,100 --> 00:02:07,620
Now this rack would actually be in the
floorboard of the space station, right?

40
00:02:07,620 --> 00:02:09,550
It's on the bottom -- obviously
facing the Earth.

41
00:02:09,550 --> 00:02:10,140
>> That's correct.

42
00:02:10,140 --> 00:02:11,400
This is in the deck.

43
00:02:11,400 --> 00:02:13,620
On the deck three position of the US lab.

44
00:02:13,620 --> 00:02:21,870
And the window that's inside actually looks
down over the Earth, and it's actually covered

45
00:02:21,870 --> 00:02:24,960
up by a shutter that we're now opening.

46
00:02:27,090 --> 00:02:33,190
And as the station flies overhead
they can see out the lab window.

47
00:02:33,190 --> 00:02:40,470
It's a 20-inch wide, very, very
high quality glass, very flat,

48
00:02:40,470 --> 00:02:44,810
with a very high transmitted rate
for the light that passes through it.

49
00:02:44,810 --> 00:02:46,050
>> Talk about the importance of that.

50
00:02:46,050 --> 00:02:50,460
Now this is not your regular glass you find
inside your house or your car or something,

51
00:02:50,460 --> 00:02:54,570
I mean, this does not bend wave length,
there's no smudges, there's no --

52
00:02:54,570 --> 00:02:57,520
has to be very, very scientifically clear.

53
00:02:57,520 --> 00:03:01,670
>> It's -- we call it a window, but
in a sense it's a flat lens system.

54
00:03:01,670 --> 00:03:03,900
The wave fronts of the glass are very,

55
00:03:03,900 --> 00:03:08,220
very flat so there is no aberration

caused by the light passing through it.

56
00:03:08,220 --> 00:03:11,510
As I said earlier, the transmitted
rate is extremely high.

57
00:03:11,510 --> 00:03:17,430
So you can place very high quality science
instruments on the payload support shelf

58
00:03:17,430 --> 00:03:20,480
in the WORF, the Windows
Observation Research Facility,

59
00:03:20,480 --> 00:03:23,710
and do some intensive studying of the Earth.

60
00:03:23,710 --> 00:03:24,410
It's terrestrial.

61
00:03:24,410 --> 00:03:26,490
It only looks down at the Earth.

62
00:03:26,490 --> 00:03:32,010
So it is a very, very high
dollar, very high quality window

63
00:03:32,010 --> 00:03:33,660
that looks back down on the Earth.

64
00:03:33,660 --> 00:03:36,500
>> So once the crew gets it set up,
it's kind of autonomous at that point?

65
00:03:36,500 --> 00:03:39,190
You know, basically has the commands
that are sent to this laptop,

66
00:03:39,190 --> 00:03:42,820

one like we've got right here in front of us
which is just on board, just a regular laptop.

67
00:03:42,820 --> 00:03:45,020
And this is what actually
controls the camera, right?

68
00:03:45,020 --> 00:03:45,420
>> Correct.

69
00:03:45,420 --> 00:03:50,900
Yes. The crew will establish the camera
mount, position the camera on board,

70
00:03:50,900 --> 00:03:56,420
they connect it to the laptop via
the USB cable, turn everything on,

71
00:03:56,420 --> 00:03:59,730
and then we'll start the Earth cam
software, which you'll see here.

72
00:03:59,730 --> 00:04:06,440
And then the files, the image requests that
the students will process via the web pages

73
00:04:06,440 --> 00:04:10,560
out at U CS D actually get
up linked to the laptop.

74
00:04:10,560 --> 00:04:13,190
And this is just a station support computer.

75
00:04:13,190 --> 00:04:20,560
And the software will read that camera control
file into memory and then as the station gets

76
00:04:20,560 --> 00:04:25,980
to that particular point in time it
will tell the camera to snap a picture,

77
00:04:25,980 --> 00:04:29,270
and then downloads it to the
laptop and then in reverse,

78
00:04:29,270 --> 00:04:33,670
just the way we put the camera control
file on board, it will bring the image

79
00:04:33,670 --> 00:04:36,160
down to the ground and get
posted on the USCD web page.

80
00:04:36,160 --> 00:04:41,210
>> You guys have been doing this expedition
too, so it's been going for quite a while.

81
00:04:41,210 --> 00:04:44,920
You were telling me that you've taken
40,000 -- almost 40,000 pictures --

82
00:04:44,920 --> 00:04:46,640
>> We're a little over 40,000.

83
00:04:46,640 --> 00:04:47,220
>> That's impressive.

84
00:04:47,220 --> 00:04:50,290
>> Yes. And they were all taken by students.

85
00:04:50,290 --> 00:04:53,160
And we've operated 38 times.

86
00:04:53,160 --> 00:04:58,790
Of course from increment two on, and
we're current at increment 30 right now.

87
00:04:58,790 --> 00:05:06,770
We've had thousands of students,

teachers, home schools, summer camps,

88
00:05:06,770 --> 00:05:09,000
science summer camps participating.

89
00:05:09,000 --> 00:05:14,230
So it's well-used, extremely neat payload.

90
00:05:14,230 --> 00:05:17,100
Only because students are controlling it.

91
00:05:17,100 --> 00:05:22,490
It's not a by product of an
investigator's detail of science.

92
00:05:22,490 --> 00:05:26,530
>> We talked about this a few minutes ago, that,
you know, we look back at Apollo 8 and a lot

93
00:05:26,530 --> 00:05:28,930
of those missions, you know, we're
going to the moon, but we always talk

94
00:05:28,930 --> 00:05:34,560
about the Earth rise picture, the blue marble
picture that Apollo 17 took, those are the ones

95
00:05:34,560 --> 00:05:38,850
that are probably some of the most powerful
images that we've ever taken as NASA.

96
00:05:38,850 --> 00:05:40,800
Why is it that -- and we've
seen it at the station too --

97
00:05:40,800 --> 00:05:44,640
why is it that images of our own planet
are really what capture people's --

98

00:05:44,640 --> 00:05:47,340
people's hearts and minds?

99
00:05:47,340 --> 00:05:49,190
>> I wish I really knew.

100
00:05:49,190 --> 00:05:53,380
But it is almost, it's a
feeling like when I was a kid,

101
00:05:53,380 --> 00:05:56,320
I would climb a tree to look out and look down.

102
00:05:56,320 --> 00:05:59,070
If there's a tall building
near by people want to go

103
00:05:59,070 --> 00:06:01,650
to the top floor and look out and look down.

104
00:06:01,650 --> 00:06:06,040
Well, this system provides a view
point that the astronauts have.

105
00:06:06,040 --> 00:06:08,700
They're extremely high, looking back down.

106
00:06:08,700 --> 00:06:12,860
And it's just awe-inspiring of
what you see in the pictures.

107
00:06:12,860 --> 00:06:14,080
>> Well, and it's our home.

108
00:06:14,080 --> 00:06:15,110
>> That's where we live.

109
00:06:15,110 --> 00:06:17,660
Yes. The astronauts talk about

that, that you know, they look down

110
00:06:17,660 --> 00:06:20,350
and that's their entire lives,
are down on that planet.

111
00:06:20,350 --> 00:06:24,390
And you're sort of looking back at home base.

112
00:06:24,390 --> 00:06:30,170
But this is a fascinating experiment
rack, I know the students are enjoying it.

113
00:06:30,170 --> 00:06:30,890
>> They do.

114
00:06:30,890 --> 00:06:36,500
Of the thousands of students that
have participated they will start --

115
00:06:36,500 --> 00:06:42,590
typically we target junior high, middle
school students, and we actually have a few

116
00:06:42,590 --> 00:06:47,300
of those students who worked at UCSD
actually working at Johnson Space Center now.

117
00:06:47,300 --> 00:06:49,710
>> So they're actually taking part in
this even though they were young students,

118
00:06:49,710 --> 00:06:50,820
actually controlling these cameras --

119
00:06:50,820 --> 00:06:54,750
>> They were undergrad students,
participating, supporting the program.

120

00:06:54,750 --> 00:06:57,870
And now they're actually here at
Johnson Space Center, working.

121
00:06:57,870 --> 00:06:59,020
>> That is fascinating work.

122
00:06:59,020 --> 00:07:00,940
Thank you so much, Brian, for joining us.

123
00:07:00,940 --> 00:07:04,100
It's been -- it's been very cool
to see this actually in person.

124
00:07:04,100 --> 00:07:06,950
We'll put down at the bottom of the screen
here the web site that you can go to,

125
00:07:06,950 --> 00:07:10,300
to take a look at some of the imagery that
the students have captured over the years.

126
00:07:10,300 --> 00:07:12,820
You might be able to see
your own hometown on there.

127
00:07:12,820 --> 00:07:14,970
And of course, if you'd like to
take a look at some of those images,