1
00:00:00,156 --> 00:00:03,546
>> And wrap up his work on
the BATH experiment for today,

2
00:00:03,546 --> 00:00:05,756
while the team on the ground
does some troubleshooting.

3
00:00:05,756 --> 00:00:08,596
So now we're going to head to
Marshall's Space Flight Center

4
00:00:08,596 --> 00:00:11,186
in Hanceville, Alabama,
where Lori Meggs is standing

5
00:00:11,186 --> 00:00:12,606
by to find out more

6
00:00:12,606 --> 00:00:14,906
about solving a fundamental
astrophysics mystery.

7
00:00:15,516 --> 00:00:19,886
[Silence]

8
00:00:20,386 --> 00:00:21,336
>> They're really hot.

9
00:00:21,336 --> 00:00:22,316
The BASS experiment.

10
00:00:22,676 --> 00:00:24,976
We're talking about
something really cool today.

11
00:00:25,076 --> 00:00:25,656
Ice cream.

12
00:00:26,106 --> 00:00:28,076
But it may not be the ice
cream you're thinking of.

13
00:00:28,226 --> 00:00:31,396
This is an upcoming ISS
investigation that is

14
00:00:31,396 --> 00:00:32,736
out of the University
of Maryland.

15
00:00:32,736 --> 00:00:34,306
And here's the principal
investigator

16
00:00:34,306 --> 00:00:36,656
to talk a little bit more
about what this mystery

17
00:00:36,916 --> 00:00:37,976
and this study may unravel.

18
00:00:38,516 --> 00:00:40,946
[Silence]

19
00:00:41,446 --> 00:00:44,606
>> They call this
experiment ice cream.

20
00:00:45,066 --> 00:00:47,626
It started as IS CREAM.

21
00:00:47,826 --> 00:00:49,946
And pronounce it as ice cream.

22
00:00:50,656 --> 00:00:54,476
And so this experiment,
as name indicates,

23
00:00:54,476 --> 00:00:56,596
we do cosmic ray physics.

24
00:00:57,756 --> 00:01:00,206
Cosmic rays, you know
what they are, right?

25
00:01:00,256 --> 00:01:03,556
Is the energetic
particles from outer space.

26
00:01:03,846 --> 00:01:07,106
They are bombarding on us.

27
00:01:07,556 --> 00:01:10,676
And they are the
providing this sample.

28
00:01:10,676 --> 00:01:12,626
I left a sample of marrow

29
00:01:12,626 --> 00:01:15,816
from outer space
outside solar system.

30
00:01:16,406 --> 00:01:21,156
And as this particles enter
this atmosphere, they interact

31
00:01:21,326 --> 00:01:23,066
with the atmosphere
nuclea [phonetic]

32
00:01:23,066 --> 00:01:27,996
and it produce showers
of particles,

33
00:01:28,506 --> 00:01:31,986

and this particles
observed on the ground

34
00:01:32,066 --> 00:01:37,126
with various particle detectors,
experiment like Ojay [phonetic],

35
00:01:37,126 --> 00:01:40,556
HiRes, Fly's Eye, and so on.

36
00:01:40,716 --> 00:01:43,906
This technique has
great advantage

37
00:01:43,906 --> 00:01:48,606
of very logic collecting
tower, but the limitation is

38
00:01:48,776 --> 00:01:54,236
that you cannot tell what
initiated the showers at the top

39
00:01:54,236 --> 00:01:59,246
of atmosphere, so by flying
our instrument in space,

40
00:01:59,776 --> 00:02:04,086
we can measure these
particles before they interact

41
00:02:04,086 --> 00:02:05,136
with atmosphere.

42
00:02:05,656 --> 00:02:08,096
So directly measuring
this cosmic phrase.

43
00:02:08,956 --> 00:02:11,326
What we call primary
cosmic phrase.

44
00:02:11,846 --> 00:02:17,746
The ground-based measurement
have already shown this

45
00:02:17,976 --> 00:02:26,036
particles can have energies as
high as 10 to 20 electron volts.

46
00:02:26,396 --> 00:02:27,536
This is a humongous energy.

47
00:02:27,536 --> 00:02:32,256
This is beyond and above any
energy that can be generated

48
00:02:32,316 --> 00:02:34,726
with man-made accelerators.

49
00:02:35,016 --> 00:02:40,786
And how this particles achieve
this so high energies and,

50
00:02:40,866 --> 00:02:45,356
in other words, how do
cosmic accelerators work,

51
00:02:45,856 --> 00:02:47,976
and is the main question.

52
00:02:48,056 --> 00:02:51,756
One of them is mysteries
in astrophysics standard.

53
00:02:51,756 --> 00:02:53,796
That's what we are
trying to understand.

54
00:02:54,566 --> 00:02:57,816

>> Why is ISS now an easy
progression from the balloons

55
00:02:58,066 --> 00:03:00,216
in an ideal place to
conduct this research?

56
00:03:00,886 --> 00:03:02,306
>> Yes. That's a good question

57
00:03:02,356 --> 00:03:04,876
because then cosmic
rays flux decreases

58
00:03:04,876 --> 00:03:07,106
so rapidly as energy increases.

59
00:03:08,346 --> 00:03:10,746
The higher the energy
you want to measure,

60
00:03:11,246 --> 00:03:13,936
the peptor [phonetic]
has to be larger,

61
00:03:14,366 --> 00:03:16,786
and longer exposure
time is needed.

62
00:03:17,676 --> 00:03:23,656
And this space station
provides merely ideal platform

63
00:03:23,906 --> 00:03:27,316
for this very high energy
cosmic rays more [inaudible].

64
00:03:27,776 --> 00:03:33,416
So every day on station
will reduce our statistical

65
00:03:33,416 --> 00:03:38,786
uncertainties, and extend our
measurements to higher energies

66
00:03:39,456 --> 00:03:41,356
than previously possible.

67
00:03:41,656 --> 00:03:47,406
IS CREAM data would be much
superior to any existing data

68
00:03:47,406 --> 00:03:49,316
at this high energies.

69
00:03:50,216 --> 00:03:52,446
>> And so, let's talk about,
your from the University

70
00:03:52,446 --> 00:03:54,886
of Maryland, you've gotten
this research to NASA,

71
00:03:54,886 --> 00:03:56,726
tell us about your
student involvement

72
00:03:56,726 --> 00:04:00,136
and how you guys really
got this going with NASA.

73
00:04:00,816 --> 00:04:07,456
>> Oh. Students are involved
in all aspects of our mission.

74
00:04:08,986 --> 00:04:14,646
From the development of
instrument via assembly,

75

00:04:15,096 --> 00:04:21,246
testing, integration, data,
taking data off, analysis,

76
00:04:21,296 --> 00:04:23,966
as well as flight operations.

77
00:04:25,516 --> 00:04:28,346
CREAM, as a balloon
experiment which,

78
00:04:28,546 --> 00:04:34,256
despite of it [inaudible],
and produced more

79
00:04:34,256 --> 00:04:39,746
than 10 Ph.D. degrees by
now, and at the moment,

80
00:04:40,156 --> 00:04:42,596
in my lab at Maryland,

81
00:04:43,406 --> 00:04:51,936
I have more about 15 students
CREAM provides really valuable

82
00:04:52,246 --> 00:04:58,856
hands-on training and
experience to both graduate

83
00:04:58,856 --> 00:05:00,466
and undergraduate students,

84
00:05:01,496 --> 00:05:06,106
beyond and above
what can be offered

85
00:05:06,106 --> 00:05:10,386
from the classrooms
or textbooks.

86
00:05:11,236 --> 00:05:12,686
>> Well I'm an astrophysicist
now

87
00:05:12,686 --> 00:05:14,516
and now I think I
need some ice cream.

88
00:05:14,896 --> 00:05:18,426
But the CREAM study will be
held over the next three years,

89
00:05:18,756 --> 00:05:20,196
so if you want to find
out more about that,

90
00:05:20,196 --> 00:05:24,016
there will be a story coming out
next week on nasa.gov/station.

91
00:05:24,366 --> 00:05:25,086
You can check that out.

92
00:05:25,086 --> 00:05:26,486
In the meantime,
let's take a live look

93
00:05:26,486 --> 00:05:29,076
into the Payload Operations
Integration Control Center.

94
00:05:29,526 --> 00:05:31,516
As you mentioned this
morning, they have been working

95
00:05:31,516 --> 00:05:34,476
on the BASS experiment,
working with the crew members

96
00:05:34,476 --> 00:05:35,536
to get that conducted.

97
00:05:35,536 --> 00:05:37,136
That is what they do
there in that room.

98
00:05:37,536 --> 00:05:40,246
And that is a backup control
room as we've mentioned.

99
00:05:40,506 --> 00:05:42,716
They're getting some upgrades
to their full-time rooms,

100
00:05:42,716 --> 00:05:45,606
so they will be getting
back in there, hopefully,

101
00:05:45,606 --> 00:05:47,866
in the next month or so, and
we will be back over there.

102
00:05:47,866 --> 00:05:51,246
That will do it for us from the
Payload Operations Integration

103
00:05:51,246 --> 00:05:53,046
Center at the Marshall
Space Flight Center.