
PAO
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ISS Program Science Office
Pat Ryan
NASA Commentator

1
00:00:03,980 --> 00:00:02,330
talk about a lot of the science that

2
00:00:05,360 --> 00:00:03,990
crew members onboard the International

3
00:00:08,150 --> 00:00:05,370
Space Station are busy with today

4
00:00:10,610 --> 00:00:08,160
there's a lot of new science experiment

5
00:00:11,900 --> 00:00:10,620
hardware on its way on board the Cygnus

6
00:00:14,570 --> 00:00:11,910
vehicle I'm going to learn more about

7
00:00:16,730 --> 00:00:14,580
that some of it anyway to this morning

8
00:00:18,410 --> 00:00:16,740
dr. Liz Warren with the International

9
00:00:20,689 --> 00:00:18,420
Space Station program science office

10
00:00:22,070 --> 00:00:20,699
joining me thank you absolutely pleasure

11
00:00:25,009 --> 00:00:22,080
to be here we'd like to talk about

12
00:00:27,259 --> 00:00:25,019
numbers a lot 5,000 pounds of cargo on

13
00:00:29,779 --> 00:00:27,269

board that sickness and some 1,600

14
00:00:32,569 --> 00:00:29,789
pounds of it is science cargo yes what

15
00:00:34,700 --> 00:00:32,579
does that really entail what is makes up

16
00:00:36,560 --> 00:00:34,710
that 1,600 pounds well that's roughly a

17
00:00:38,840 --> 00:00:36,570
third of the pressurized volume of that

18
00:00:42,170 --> 00:00:38,850
spacecraft is dedicated for science

19
00:00:44,270 --> 00:00:42,180
utilization a lot of it is resupply for

20
00:00:46,819 --> 00:00:44,280
some experiments that use what we call

21
00:00:49,940 --> 00:00:46,829
consumables such materials that are used

22
00:00:51,680 --> 00:00:49,950
and then later thrown away and a lot of

23
00:00:54,830 --> 00:00:51,690
it is actually some new experiments that

24
00:00:56,709 --> 00:00:54,840
are going up well there's talk about a

25
00:00:59,450 --> 00:00:56,719
few of them there's one human research

26
00:01:01,400 --> 00:00:59,460
experiment that I've found interesting

27
00:01:03,170 --> 00:01:01,410
when I talked to Samantha Christopher

28
00:01:06,620 --> 00:01:03,180
ready about just because of the name of

29
00:01:08,899 --> 00:01:06,630
it's called drain brain what is what's

30
00:01:10,340 --> 00:01:08,909
going on here well it's kind of a fun

31
00:01:12,649 --> 00:01:10,350
name but it's a really interesting

32
00:01:15,249 --> 00:01:12,659
science investigation as you mentioned

33
00:01:17,929 --> 00:01:15,259
it's about human research and

34
00:01:20,030 --> 00:01:17,939
specifically it studies the physiology

35
00:01:23,210 --> 00:01:20,040
of the cardiovascular system that's why

36
00:01:24,230 --> 00:01:23,220
she's ultra sounding herself yes so in

37
00:01:26,510 --> 00:01:24,240
the shot you're seeing right now

38
00:01:29,359 --> 00:01:26,520

Samantha Christopher Eddie is using an

39
00:01:32,510 --> 00:01:29,369
ultrasound probe to measure the diameter

40
00:01:35,600 --> 00:01:32,520
and flow of one of her blood vessels in

41
00:01:38,210 --> 00:01:35,610
her neck now on earth our cardiovascular

42
00:01:40,999 --> 00:01:38,220
system our heart pumps heart pumps blood

43
00:01:43,789 --> 00:01:41,009
up to our brain up to our head and then

44
00:01:46,190 --> 00:01:43,799
it flows down normally thanks due in

45
00:01:49,010 --> 00:01:46,200
part to gravity now when an astronaut is

46
00:01:52,280 --> 00:01:49,020
in space there's no longer any gravity

47
00:01:53,990 --> 00:01:52,290
to basically help drain the brain so

48
00:01:56,660 --> 00:01:54,000
there's no longer a gravitational force

49
00:01:59,450 --> 00:01:56,670
that is pulling that fluid back down it

50
00:02:01,219 --> 00:01:59,460
does return to the to the heart but

51
00:02:02,870 --> 00:02:01,229
we're not exactly sure all of the

52
00:02:04,389 --> 00:02:02,880
mechanisms that are at play we're not

53
00:02:07,550 --> 00:02:04,399
exactly sure how everything is working

54
00:02:09,680 --> 00:02:07,560
and we have had some astronauts report

55
00:02:11,390 --> 00:02:09,690
symptoms such as headaches and some

56
00:02:13,280 --> 00:02:11,400
other neurological if

57
00:02:14,690 --> 00:02:13,290
use that lead us to believe this is

58
00:02:17,899 --> 00:02:14,700
something we want to learn more about

59
00:02:20,149 --> 00:02:17,909
and so this investigation uses the

60
00:02:21,559 --> 00:02:20,159
ultrasound and it uses the pulmonary

61
00:02:24,080 --> 00:02:21,569
function system part of the human

62
00:02:25,670 --> 00:02:24,090
research facility rack and also a new

63
00:02:29,110 --> 00:02:25,680

piece of hardware which is called a

64
00:02:32,330 --> 00:02:29,120
strain gauge plus plasma graph and

65
00:02:34,099 --> 00:02:32,340
receptors please look correct actually

66
00:02:36,619 --> 00:02:34,109
it's puff is magraph and what that does

67
00:02:38,630 --> 00:02:36,629
is it measures very precisely the

68
00:02:40,759 --> 00:02:38,640
circumference of the astronauts neck and

69
00:02:42,679 --> 00:02:40,769
it's really based on how much it

70
00:02:46,099 --> 00:02:42,689
stretches and that will help us

71
00:02:48,649 --> 00:02:46,109
understand the fluids and how they are

72
00:02:50,839 --> 00:02:48,659
moving in and out of the head and that

73
00:02:52,940 --> 00:02:50,849
will hopefully lead us to understand a

74
00:02:54,530 --> 00:02:52,950
little bit more about venous return to

75
00:02:56,449 --> 00:02:54,540
the heart help us understand the

76
00:02:59,599 --> 00:02:56,459
cardiovascular system function in space

77
00:03:02,869 --> 00:02:59,609
good example of things that we take for

78
00:03:05,300 --> 00:03:02,879
granted that we can't when you go to

79
00:03:06,890 --> 00:03:05,310
this environment exactly exactly so this

80
00:03:09,649 --> 00:03:06,900
will be very interesting there's another

81
00:03:11,599 --> 00:03:09,659
interesting piece of hardware flying on

82
00:03:14,330 --> 00:03:11,609
this sickness for an earth and space

83
00:03:16,640 --> 00:03:14,340
science experiment called meteor tell me

84
00:03:19,610 --> 00:03:16,650
about that so meteor is the first

85
00:03:21,949 --> 00:03:19,620
space-based observation of meteorites

86
00:03:23,539 --> 00:03:21,959
that are entering our Earth's atmosphere

87
00:03:25,879 --> 00:03:23,549
and you can see a picture there that was

88
00:03:28,399 --> 00:03:25,889

captured by ron garan during his

89
00:03:30,229 --> 00:03:28,409
increment and in the middle of the shot

90
00:03:32,569 --> 00:03:30,239
there's a little streak of light and

91
00:03:34,039 --> 00:03:32,579
that is actually he happened to get a

92
00:03:36,559 --> 00:03:34,049
really lucky shot that's a meteorite

93
00:03:39,649 --> 00:03:36,569
returning and are coming back to earth

94
00:03:41,539 --> 00:03:39,659
and burning up in the atmosphere now our

95
00:03:44,449 --> 00:03:41,549
incorrect direct television from here

96
00:03:47,059 --> 00:03:44,459
and zoom in you'll see that that little

97
00:03:52,039 --> 00:03:47,069
streak is bigger and you get it looks

98
00:03:55,520 --> 00:03:52,049
kind of meteor ish and your earth is

99
00:03:57,860 --> 00:03:55,530
constantly bombarded by bits of debris

100
00:04:01,099 --> 00:03:57,870
most of it burns up in the atmosphere so

101
00:04:03,080 --> 00:04:01,109
it's totally harmless and but this is

102
00:04:05,330 --> 00:04:03,090
the first space-based observation where

103
00:04:07,460 --> 00:04:05,340
we're going to be able to determine the

104
00:04:09,770 --> 00:04:07,470
composition the size and the density of

105
00:04:12,099 --> 00:04:09,780
those meteorites so there's a camera

106
00:04:13,939 --> 00:04:12,109
that will be mounted in the wharf

107
00:04:16,819 --> 00:04:13,949
observational rack that's the window

108
00:04:19,490 --> 00:04:16,829
observational rack in the Destiny module

109
00:04:21,560 --> 00:04:19,500
that's the window that's looking down to

110
00:04:24,529 --> 00:04:21,570
earth yes this window faces the earth

111
00:04:24,830 --> 00:04:24,539
allows the the camera a great access to

112
00:04:26,780 --> 00:04:24,840
our

113
00:04:29,900 --> 00:04:26,790

spheres it's a beautifully optically

114
00:04:32,150 --> 00:04:29,910
clear window and what you're seeing

115
00:04:34,370 --> 00:04:32,160
right now is actually a practice on the

116
00:04:36,230 --> 00:04:34,380
ground before it goes of course up to up

117
00:04:38,060 --> 00:04:36,240
to space of the sickness that camera

118
00:04:41,629 --> 00:04:38,070
looking through that port down to earth

119
00:04:44,030 --> 00:04:41,639
correct and so the scientists will be

120
00:04:46,850 --> 00:04:44,040
able to study the spectrograph which is

121
00:04:49,129 --> 00:04:46,860
an analysis of the types of light that

122
00:04:50,300 --> 00:04:49,139
are being emitted by the meteorites as

123
00:04:53,570 --> 00:04:50,310
they come back through the atmosphere

124
00:04:56,360 --> 00:04:53,580
and by studying the quality and then in

125
00:04:58,159 --> 00:04:56,370
the wavelength of the light they will be

126
00:05:00,140 --> 00:04:58,169
able to determine as I mentioned the

127
00:05:02,510 --> 00:05:00,150
density and the composition of those

128
00:05:04,820 --> 00:05:02,520
meteorites for example how much iron or

129
00:05:08,570 --> 00:05:04,830
magnesium or sodium is in those

130
00:05:11,360 --> 00:05:08,580
meteorites now what that will give us is

131
00:05:13,460 --> 00:05:11,370
some insight into where those meteorites

132
00:05:17,420 --> 00:05:13,470
came from generally during a meteor

133
00:05:18,710 --> 00:05:17,430
shower we know the origin of meteorites

134
00:05:21,020 --> 00:05:18,720
entering the atmosphere whether it's

135
00:05:23,210 --> 00:05:21,030
from a an asteroid or a comet that is

136
00:05:25,189 --> 00:05:23,220
coming close to Earth and so by

137
00:05:26,900 --> 00:05:25,199
understanding the composition of those

138
00:05:29,000 --> 00:05:26,910

meteorites that gives us some insight

139
00:05:32,270 --> 00:05:29,010
into the composition of the media of the

140
00:05:33,500 --> 00:05:32,280
parent systems if you will and it can

141
00:05:34,969 --> 00:05:33,510
help us understand more about the

142
00:05:36,680 --> 00:05:34,979
universe around us does that have to

143
00:05:38,600 --> 00:05:36,690
operate all the time because you don't

144
00:05:41,029 --> 00:05:38,610
always know when meteorites are coming

145
00:05:42,980 --> 00:05:41,039
exactly so that shot earlier Ron Garan

146
00:05:45,529 --> 00:05:42,990
just happened to catch a great that was

147
00:05:48,920 --> 00:05:45,539
lucky shot really but this is going to

148
00:05:52,010 --> 00:05:48,930
be operating on and off for long

149
00:05:54,379 --> 00:05:52,020
durations and particularly during known

150
00:05:56,779 --> 00:05:54,389
meteor showers but also it will be

151
00:05:58,760 --> 00:05:56,789
operating other times as well may give

152
00:06:03,020 --> 00:05:58,770
us we may even discover some new meteor

153
00:06:05,180 --> 00:06:03,030
showers Cygnus is also carrying up more

154
00:06:07,700 --> 00:06:05,190
than a dozen experiments from students

155
00:06:09,830 --> 00:06:07,710
of a variety of Ages tell me about this

156
00:06:12,170 --> 00:06:09,840
student space flight experiment program

157
00:06:15,800 --> 00:06:12,180
well the student space flight experiment

158
00:06:17,719 --> 00:06:15,810
program or ssep is a wonderful STEM

159
00:06:19,820 --> 00:06:17,729
program stem science technology

160
00:06:22,190 --> 00:06:19,830
engineering and math and as you

161
00:06:23,450 --> 00:06:22,200
mentioned students from grade for all

162
00:06:25,940 --> 00:06:23,460
the way through college have an

163
00:06:27,350 --> 00:06:25,950

opportunity to fly an experiment to the

164
00:06:30,290 --> 00:06:27,360
International Space Station can you

165
00:06:31,969 --> 00:06:30,300
imagine having no fear neither can i how

166
00:06:34,370 --> 00:06:31,979
cool that would have been so this is a

167
00:06:35,610 --> 00:06:34,380
great opportunity to inspire students to

168
00:06:38,159 --> 00:06:35,620
get interested in science and

169
00:06:40,290 --> 00:06:38,169
they proposed the experiment to ask a

170
00:06:42,810 --> 00:06:40,300
question form a hypothesis just like

171
00:06:45,540 --> 00:06:42,820
scientists at universities and academia

172
00:06:48,540 --> 00:06:45,550
and their experiment is chosen through a

173
00:06:50,700 --> 00:06:48,550
through a selection process and gets

174
00:06:54,270 --> 00:06:50,710
loaded onto these Cygnus vehicles and

175
00:06:57,210 --> 00:06:54,280
and this is I believe the sixth example

176
00:06:59,370 --> 00:06:57,220
or the sixth Space Flight opportunity

177
00:07:02,640 --> 00:06:59,380
that ssep has had and of course it's a

178
00:07:05,340 --> 00:07:02,650
it's a program that is in doing

179
00:07:07,020 --> 00:07:05,350
partnership to cases which is the Center

180
00:07:09,540 --> 00:07:07,030
for the Advancement of science and space

181
00:07:12,260 --> 00:07:09,550
NanoRacks and the National Center for

182
00:07:16,320 --> 00:07:12,270
Earth and space science education and

183
00:07:19,680 --> 00:07:16,330
these experiments range in topic from

184
00:07:23,460 --> 00:07:19,690
plant growth and gravitropism to some

185
00:07:26,460 --> 00:07:23,470
bacterial activity even a composting

186
00:07:30,120 --> 00:07:26,470
efficacy experiment and an interesting

187
00:07:33,570 --> 00:07:30,130
one about tin whisker formation in

188
00:07:36,270 --> 00:07:33,580

soldering this is applicable to circuit

189
00:07:37,560 --> 00:07:36,280
board production here on earth so the

190
00:07:39,210 --> 00:07:37,570
tin whiskers can be a little bit of a

191
00:07:41,279 --> 00:07:39,220
problem so these students are asking

192
00:07:43,980 --> 00:07:41,289
well if we do this in weightlessness is

193
00:07:46,260 --> 00:07:43,990
there an advantage so really interesting

194
00:07:47,940 --> 00:07:46,270
experiments great program and I sure

195
00:07:49,230 --> 00:07:47,950
wish that something was around when I

196
00:07:51,060 --> 00:07:49,240
was in high school I would have loved to

197
00:07:52,860 --> 00:07:51,070
have done that it's all very exciting we

198
00:07:54,779 --> 00:07:52,870
will see them coming up on Cygnus

199
00:07:56,850 --> 00:07:54,789
launching later today lisburn thanks

200
00:07:58,740 --> 00:07:56,860
very much absolutely thanks Pat dr. Liz