
NASA
SPACESTATION
LIVE

1
00:00:08,950 --> 00:00:07,190
it was 10 years ago today that spheres

2
00:00:11,270 --> 00:00:08,960
those bowling ball sized experimental

3
00:00:12,629 --> 00:00:11,280
satellites were first tested on orbit

4
00:00:15,030 --> 00:00:12,639
since then they've tested everything

5
00:00:16,870 --> 00:00:15,040
from rendezvous and docking to sloshing

6
00:00:19,750 --> 00:00:16,880
liquids to even student robotics

7
00:00:21,590 --> 00:00:19,760
competitions now to add to that legacy

8
00:00:24,150 --> 00:00:21,600
is the next generation robotic free

9
00:00:26,390 --> 00:00:24,160
flyer called astrobee set to fly to the

10
00:00:28,630 --> 00:00:26,400
station in 2017. i spoke with the

11
00:00:31,990 --> 00:00:28,640
project manager chris provencher at ames

12
00:00:34,549 --> 00:00:32,000
research center to get the buzz on the b

13
00:00:36,549 --> 00:00:34,559

master b is a free-flying robot that

14
00:00:38,310 --> 00:00:36,559
we're developing for inside the space

15
00:00:40,709 --> 00:00:38,320
station it's like a b

16
00:00:42,950 --> 00:00:40,719
like a b actually yes busy as a b and

17
00:00:45,029 --> 00:00:42,960
buzzing around like a b wow

18
00:00:46,389 --> 00:00:45,039
this this robot we have three main

19
00:00:47,110 --> 00:00:46,399
things that we want to accomplish with

20
00:00:50,310 --> 00:00:47,120
it

21
00:00:51,350 --> 00:00:50,320
free-flying camera inside the space

22
00:00:52,950 --> 00:00:51,360
station

23
00:00:54,389 --> 00:00:52,960
to help flight controllers and payload

24
00:00:56,069 --> 00:00:54,399
controllers on the ground have better

25
00:00:58,069 --> 00:00:56,079
situational awareness into what's

26
00:00:59,510 --> 00:00:58,079
happening inside the vehicle right now

27
00:01:02,150 --> 00:00:59,520
when they want to see inside the space

28
00:01:04,390 --> 00:01:02,160
station there are some camcorders set up

29
00:01:05,990 --> 00:01:04,400
but those are in fixed locations so this

30
00:01:08,070 --> 00:01:06,000
would really empower them to get the

31
00:01:10,390 --> 00:01:08,080
view that they want by being able to fly

32
00:01:13,030 --> 00:01:10,400
this robot around with an hd camera and

33
00:01:15,030 --> 00:01:13,040
to see what they need to see

34
00:01:17,109 --> 00:01:15,040
so what does it look like

35
00:01:18,070 --> 00:01:17,119
so is it like the sphere stuff or are we

36
00:01:20,550 --> 00:01:18,080
talking about something totally

37
00:01:22,710 --> 00:01:20,560
different uh it's it's about the size of

38
00:01:23,670 --> 00:01:22,720

spheres so spheres is is more rounded

39
00:01:25,910 --> 00:01:23,680
we're looking at something that's

40
00:01:27,670 --> 00:01:25,920
actually cube shape about 12 inches per

41
00:01:29,030 --> 00:01:27,680
side so right now we're still in the

42
00:01:31,109 --> 00:01:29,040
design phase

43
00:01:32,950 --> 00:01:31,119
we've identified all the capabilities

44
00:01:35,109 --> 00:01:32,960
that we wanted to have and we're working

45
00:01:36,870 --> 00:01:35,119
on a design to meet those capabilities

46
00:01:39,030 --> 00:01:36,880
and we've been doing prototyping along

47
00:01:41,429 --> 00:01:39,040
the way as well

48
00:01:43,590 --> 00:01:41,439
where'd the idea come from

49
00:01:46,550 --> 00:01:43,600
the idea is to really help with with

50
00:01:48,710 --> 00:01:46,560
humans uh on their missions so we're not

51
00:01:51,510 --> 00:01:48,720
developing a robot to perform robotic

52
00:01:53,910 --> 00:01:51,520
missions we want a robot that can help

53
00:01:56,709 --> 00:01:53,920
crews on their human exploration the

54
00:01:59,109 --> 00:01:56,719
most limiting resource is crew time

55
00:02:01,190 --> 00:01:59,119
and so the idea is to take over some of

56
00:02:03,990 --> 00:02:01,200
the tasks that the crew do to let them

57
00:02:06,550 --> 00:02:04,000
focus on science and experiments and the

58
00:02:09,270 --> 00:02:06,560
research and put over some of the more

59
00:02:11,750 --> 00:02:09,280
tedious tasks onto robots

60
00:02:13,190 --> 00:02:11,760
so in theory they could be performing an

61
00:02:14,470 --> 00:02:13,200
experiment and this little astro b could

62
00:02:16,070 --> 00:02:14,480
be over their shoulder

63
00:02:17,510 --> 00:02:16,080

filming what they're doing right exactly

64
00:02:19,510 --> 00:02:17,520
one of the things that we wanted to do

65
00:02:21,430 --> 00:02:19,520
is mobile sensor tasks on the space

66
00:02:23,110 --> 00:02:21,440
station right now the crew has to do a

67
00:02:24,470 --> 00:02:23,120
lot of things to survey the environment

68
00:02:25,430 --> 00:02:24,480
inside the space station to see if it's

69
00:02:27,270 --> 00:02:25,440
safe

70
00:02:29,270 --> 00:02:27,280
for example they have a

71
00:02:30,550 --> 00:02:29,280
sound level meter a handheld meter that

72
00:02:31,910 --> 00:02:30,560
they measure sound levels to make sure

73
00:02:33,430 --> 00:02:31,920
it's not getting too noisy and dangerous

74
00:02:34,949 --> 00:02:33,440
for their hearing so that's something

75
00:02:36,470 --> 00:02:34,959
that the robot could do

76
00:02:38,070 --> 00:02:36,480
they measure air quality to make sure

77
00:02:40,710 --> 00:02:38,080
that the co2 is getting scrubbed out of

78
00:02:42,229 --> 00:02:40,720
the out of the air properly so if we put

79
00:02:44,390 --> 00:02:42,239
that sensor on the robot that's another

80
00:02:46,470 --> 00:02:44,400
thing that the robot could do

81
00:02:49,190 --> 00:02:46,480
another example is we're working with a

82
00:02:50,790 --> 00:02:49,200
group on automated inventory management

83
00:02:52,229 --> 00:02:50,800
so there are thousands of pieces of

84
00:02:53,589 --> 00:02:52,239
equipment on the space station that have

85
00:02:54,470 --> 00:02:53,599
to be tracked and you have to know where

86
00:02:55,910 --> 00:02:54,480
it is

87
00:02:57,589 --> 00:02:55,920
um so right now we're working with a

88
00:03:00,070 --> 00:02:57,599

group to uh they're looking at putting

89
00:03:01,990 --> 00:03:00,080
smart tags on pieces of equipment and

90
00:03:03,750 --> 00:03:02,000
then having readers that can track where

91
00:03:04,790 --> 00:03:03,760
those pieces of equipment are and part

92
00:03:07,270 --> 00:03:04,800
of their solution is to have a

93
00:03:08,630 --> 00:03:07,280
free-flying robot with an rfid reader

94
00:03:10,309 --> 00:03:08,640
that can look for lost pieces of

95
00:03:12,149 --> 00:03:10,319
equipment so we're working with them on

96
00:03:13,910 --> 00:03:12,159
that as well you guys control it from

97
00:03:15,509 --> 00:03:13,920
the ground or how to control we do

98
00:03:16,949 --> 00:03:15,519
control it from the ground or can be

99
00:03:19,589 --> 00:03:16,959
controlled by the crew

100
00:03:21,110 --> 00:03:19,599
either way it's remotely controlled and

101
00:03:22,949 --> 00:03:21,120
one thing that we're trying to do is

102
00:03:25,110 --> 00:03:22,959
make this robot as autonomous as

103
00:03:26,949 --> 00:03:25,120
possible we don't want the crew to have

104
00:03:28,229 --> 00:03:26,959
to pull this robot out of a locker and

105
00:03:29,750 --> 00:03:28,239
set it up

106
00:03:31,350 --> 00:03:29,760
it kind of defeats the purpose so we

107
00:03:33,110 --> 00:03:31,360
want this thing to be able to fly around

108
00:03:34,949 --> 00:03:33,120
inside the space station without the

109
00:03:37,190 --> 00:03:34,959
crew having to supervise it to

110
00:03:40,470 --> 00:03:37,200
accomplish its tasks so as part of that

111
00:03:41,670 --> 00:03:40,480
that goal we are also building a dock so

112
00:03:44,229 --> 00:03:41,680
you know sometimes we call it the room

113
00:03:45,830 --> 00:03:44,239

buffer space right so we'll have a dock

114
00:03:48,149 --> 00:03:45,840
inside the space station where recharges

115
00:03:50,470 --> 00:03:48,159
its batteries and then is able to undock

116
00:03:51,830 --> 00:03:50,480
via remote control and perform the task

117
00:03:53,830 --> 00:03:51,840
all under the supervision of ground

118
00:03:55,509 --> 00:03:53,840
controllers and not having to interrupt

119
00:03:57,830 --> 00:03:55,519
the crew

120
00:04:00,229 --> 00:03:57,840
and this plays on a rich heritage from

121
00:04:02,470 --> 00:04:00,239
you guys at ames in the robotic

122
00:04:04,710 --> 00:04:02,480
capabilities yes so actually for the

123
00:04:06,949 --> 00:04:04,720
past few years we've been doing tests uh

124
00:04:09,509 --> 00:04:06,959
with spheres which is another

125
00:04:11,190 --> 00:04:09,519
free-floating object on space station

126
00:04:13,350 --> 00:04:11,200
we connected smartphones to it so that

127
00:04:15,190 --> 00:04:13,360
we could establish a link to the ground

128
00:04:16,789 --> 00:04:15,200
and we tested a remote control from the

129
00:04:18,710 --> 00:04:16,799
ground so yeah we do have some

130
00:04:19,509 --> 00:04:18,720
experience with this we've been working

131
00:04:23,990 --> 00:04:19,519
with

132
00:04:25,590 --> 00:04:24,000
jpl on this project and we've also

133
00:04:27,749 --> 00:04:25,600
you know nasa has mechanisms for

134
00:04:29,189 --> 00:04:27,759
engaging small businesses so right now

135
00:04:31,270 --> 00:04:29,199
there are three small businesses that

136
00:04:33,510 --> 00:04:31,280
are working on developing appendages

137
00:04:35,670 --> 00:04:33,520
that would attach uh to the robot uh

138
00:04:37,430 --> 00:04:35,680

which is pretty neat and so we're also

139
00:04:40,070 --> 00:04:37,440
starting to do the same thing with

140
00:04:42,629 --> 00:04:40,080
academia have universities propose what

141
00:04:44,070 --> 00:04:42,639
they would attach to the robot

142
00:04:46,150 --> 00:04:44,080
when this project started one of the

143
00:04:48,390 --> 00:04:46,160
first things we had to do was name it

144
00:04:50,310 --> 00:04:48,400
and so we held a public competition to

145
00:04:52,230 --> 00:04:50,320
to name the robot and come up with a

146
00:04:54,150 --> 00:04:52,240
mission patch for it and it was really

147
00:04:55,510 --> 00:04:54,160
inspiring to see all the creative ideas

148
00:04:57,030 --> 00:04:55,520
that were submitted

149
00:04:58,230 --> 00:04:57,040
and that's how we got the name astro b

150
00:05:00,469 --> 00:04:58,240
because when we described what it would

151
00:05:01,990 --> 00:05:00,479
be like people thought of a bee buzzing

152
00:05:03,830 --> 00:05:02,000
around inside the space station staying

153
00:05:06,790 --> 00:05:03,840
busy so that's where the name astro b

154
00:05:09,189 --> 00:05:06,800
came from and it was just a really great