1
00:00:11,209 --> 00:00:08,480
AET is the human exploration

2
00:00:13,400 --> 00:00:11,219
telerobotics project as a project that's

3
00:00:16,010 --> 00:00:13,410
all about using remotely operated robots

4
00:00:17,599 --> 00:00:16,020
to improve human space exploration the

5
00:00:19,519 --> 00:00:17,609
teller bionics project is really trying

6
00:00:22,370 --> 00:00:19,529
to understand how we can improve the way

7
00:00:25,250 --> 00:00:22,380
that humans live and work in space we

8
00:00:28,009 --> 00:00:25,260
want to remove a lot of the repetitive

9
00:00:30,140 --> 00:00:28,019
redundant chores that humans have to do

10
00:00:31,700 --> 00:00:30,150
on Space Station for example the crew

11
00:00:33,620 --> 00:00:31,710
spends a lot of time doing in-flight

12
00:00:36,139 --> 00:00:33,630
maintenance work and so we're trying to

13
00:00:38,450 --> 00:00:36,149

use Robonaut 2 and the smart spheres to

14
00:00:40,760 --> 00:00:38,460
to basically offload this work for crew

15
00:00:43,160 --> 00:00:40,770
and do these kinds of things routinely

16
00:00:44,869 --> 00:00:43,170
using robots the other thing that we're

17
00:00:47,389 --> 00:00:44,879
trying to do is use remotely operated

18
00:00:49,700 --> 00:00:47,399
robots to extend and enhance the ways

19
00:00:51,529 --> 00:00:49,710
that astronauts can work in space so

20
00:00:53,139 --> 00:00:51,539
part of this has to do with the idea of

21
00:00:55,639 --> 00:00:53,149
having an astronauts in a spacecraft

22
00:00:57,470 --> 00:00:55,649
operate robots on planetary surfaces

23
00:01:00,049 --> 00:00:57,480
this past summer we spent a lot of time

24
00:01:01,760 --> 00:01:00,059
working with crew on space station with

25
00:01:03,889 --> 00:01:01,770
actually three different space station

26
00:01:07,130 --> 00:01:03,899
astronauts controlling a planetary Rover

27
00:01:09,320 --> 00:01:07,140
the k10 at NASA Ames the goal of all

28
00:01:11,899 --> 00:01:09,330
this was to understand how can humans

29
00:01:13,609 --> 00:01:11,909
astronauts in space use planetary Rovers

30
00:01:15,770 --> 00:01:13,619
to do work without having to actually

31
00:01:16,910 --> 00:01:15,780
land on a planetary surface this coming

32
00:01:18,320 --> 00:01:16,920
year we're doing two really exciting

33
00:01:20,810 --> 00:01:18,330
things the first is we're actually

34
00:01:22,730 --> 00:01:20,820
adding a pair of legs to Robonaut 2 on

35
00:01:24,020 --> 00:01:22,740
the space station for the past two years

36
00:01:26,810 --> 00:01:24,030
Robonaut been working but it's really

37
00:01:28,760 --> 00:01:26,820
just been upper body the torso head two

38
00:01:31,760 --> 00:01:28,770

arms and hands and doing a lot of extra

39
00:01:33,499 --> 00:01:31,770
fine manipulation work but this coming

40
00:01:35,240 --> 00:01:33,509
year we're adding a pair of legs and so

41
00:01:37,100 --> 00:01:35,250
now the system once it's all put

42
00:01:38,630 --> 00:01:37,110
together will be fully mobile and then

43
00:01:41,569 --> 00:01:38,640
able to go around the entire space

44
00:01:43,940 --> 00:01:41,579
station inside and do work not just be

45
00:01:45,469 --> 00:01:43,950
located in one fixed location the second

46
00:01:46,940 --> 00:01:45,479
thing we're doing this year is really an

47
00:01:48,800 --> 00:01:46,950
interesting experiment trying to

48
00:01:51,440 --> 00:01:48,810
understand how can we have a free-flying

49
00:01:54,889 --> 00:01:51,450
robot the smart spheres navigate without

50
00:01:56,270 --> 00:01:54,899
any existing other infrastructure up

51
00:01:58,190 --> 00:01:56,280
until now we've been working with a

52
00:01:59,840 --> 00:01:58,200
beacon system so think of it like an

53
00:02:03,139 --> 00:01:59,850
indoor global positioning system where

54
00:02:05,420 --> 00:02:03,149
we have fixed ultrasonic transceivers

55
00:02:07,069 --> 00:02:05,430
beacons that send information to the

56
00:02:08,680 --> 00:02:07,079
robot to figure out where it's located

57
00:02:10,820 --> 00:02:08,690
well this year we're trying to do that

58
00:02:13,070 --> 00:02:10,830
navigation flying around inside a space

59
00:02:13,550 --> 00:02:13,080
station without any of that and so we're

60
00:02:15,979 --> 00:02:13,560
using

61
00:02:18,770 --> 00:02:15,989
basically the same sort of sensors that

62
00:02:20,960 --> 00:02:18,780
you find on a Kinect you know on a

63
00:02:23,089 --> 00:02:20,970

videogame but putting on board the space

64
00:02:24,559 --> 00:02:23,099
station to get a 3d view of what the

65
00:02:26,630 --> 00:02:24,569
interior of the space station looks like

66
00:02:28,699 --> 00:02:26,640
so we can fly around one of the things

67
00:02:30,949 --> 00:02:28,709
that we're really excited about is the

68
00:02:34,009 --> 00:02:30,959
ability for astronauts to do work

69
00:02:36,500 --> 00:02:34,019
without having to put on a spacesuit go

70
00:02:38,210 --> 00:02:36,510
through the process of going outside of

71
00:02:39,410 --> 00:02:38,220
the spacecraft and the of course turn

72
00:02:41,300 --> 00:02:39,420
around doing the same thing coming back

73
00:02:43,699 --> 00:02:41,310
in but being able to use robots that are

74
00:02:46,309 --> 00:02:43,709
already outside of spacecraft to do work

75
00:02:48,140 --> 00:02:46,319
right away our long-term goal is to be

76
00:02:51,080 --> 00:02:48,150
able to have systems like Robonaut 2 or

77
00:02:52,460 --> 00:02:51,090
an external free-flying robot be able to

78
00:02:55,490 --> 00:02:52,470
do inspection on the outside of

79
00:02:58,190 --> 00:02:55,500
spacecraft to do site preparation to do

80
00:03:00,289 --> 00:02:58,200
change out of various payloads resupply

81
00:03:01,820 --> 00:03:00,299
of things on the outside and how office

82
00:03:03,500 --> 00:03:01,830
all be under the control of astronauts

83
00:03:05,030 --> 00:03:03,510
sitting inside the comfort of the

84
00:03:06,380 --> 00:03:05,040
spacecraft this year is actually the

85
00:03:08,000 --> 00:03:06,390
fourth year of the teller robotics

86
00:03:10,039 --> 00:03:08,010
project and we're actually coming to a

87
00:03:12,320 --> 00:03:10,049
close at the end of this year our two

88
00:03:15,289 --> 00:03:12,330

major activities are really integrating

89
00:03:17,259 --> 00:03:15,299
legs to Robonaut 2 and doing a test with

90
00:03:19,370 --> 00:03:17,269
the navigation with the smart spheres

91
00:03:21,440 --> 00:03:19,380
after that we're looking at follow-on

92
00:03:23,390 --> 00:03:21,450
projects that can take the technology