
NASA
SPACESTATION
LIVE

1
00:00:09,990 --> 00:00:07,510
twelve years ago i

2
00:00:12,230 --> 00:00:10,000
performed a series of remote

3
00:00:14,709 --> 00:00:12,240
tele-robotic surgery

4
00:00:17,430 --> 00:00:14,719
operating on patients in in a remote

5
00:00:19,630 --> 00:00:17,440
city in northern canada as a means of

6
00:00:22,470 --> 00:00:19,640
demonstrating that using robotics and

7
00:00:24,470 --> 00:00:22,480
telecommunication you can provide

8
00:00:25,670 --> 00:00:24,480
surgical care to patients from a

9
00:00:27,750 --> 00:00:25,680
distance

10
00:00:29,750 --> 00:00:27,760
it was a series of quite complex

11
00:00:31,269 --> 00:00:29,760
operations on the stomach and the colon

12
00:00:34,150 --> 00:00:31,279
and spleen

13
00:00:36,389 --> 00:00:34,160

during some of the first series of ex

14
00:00:39,030 --> 00:00:36,399
surgeries we had representatives from

15
00:00:41,190 --> 00:00:39,040
the nasa and kennedy space agency

16
00:00:42,709 --> 00:00:41,200
who after observing a couple of the

17
00:00:45,590 --> 00:00:42,719
surgeries

18
00:00:48,229 --> 00:00:45,600
put a challenge to me can you do this

19
00:00:49,830 --> 00:00:48,239
in such a remote location when there are

20
00:00:51,670 --> 00:00:49,840
no other

21
00:00:54,389 --> 00:00:51,680
it's not a hospital in there

22
00:00:56,069 --> 00:00:54,399
and they offered the aquarius for a

23
00:00:58,310 --> 00:00:56,079
series of nemo missions which was

24
00:01:00,229 --> 00:00:58,320
underwater habitat very much similar to

25
00:01:01,990 --> 00:01:00,239
the international space station where

26
00:01:04,070 --> 00:01:02,000
many of the astronauts including katie

27
00:01:06,950 --> 00:01:04,080
coleman who had flown

28
00:01:08,070 --> 00:01:06,960
in space were being trained for the next

29
00:01:10,870 --> 00:01:08,080
series of

30
00:01:12,950 --> 00:01:10,880
trips up to the space station

31
00:01:15,350 --> 00:01:12,960
and we did a series of experiments to

32
00:01:18,070 --> 00:01:15,360
see how far can we stretch the limit of

33
00:01:20,310 --> 00:01:18,080
telesurgery and we recognize beyond a

34
00:01:21,670 --> 00:01:20,320
certain point of time delay

35
00:01:23,830 --> 00:01:21,680
as you would experience with

36
00:01:25,990 --> 00:01:23,840
international space station a moon base

37
00:01:29,109 --> 00:01:26,000
or a mars mission you are going to

38
00:01:30,789 --> 00:01:29,119

require some degree of automation and

39
00:01:33,190 --> 00:01:30,799
autonomy

40
00:01:35,350 --> 00:01:33,200
and out of those experiments develop a

41
00:01:38,870 --> 00:01:35,360
series of

42
00:01:42,550 --> 00:01:38,880
plans for developing robotic

43
00:01:44,950 --> 00:01:42,560
systems for medical care which can

44
00:01:46,950 --> 00:01:44,960
incorporate some some of that

45
00:01:48,469 --> 00:01:46,960
automation and autonomy

46
00:01:50,310 --> 00:01:48,479
we've been working with the same company

47
00:01:52,469 --> 00:01:50,320
which has made all the canada arm and

48
00:01:54,870 --> 00:01:52,479
the arms the robotic arms currently on

49
00:01:56,709 --> 00:01:54,880
the space station the dexter

50
00:01:58,630 --> 00:01:56,719
and so many of the

51
00:02:02,069 --> 00:01:58,640
engineering and the software which had

52
00:02:04,389 --> 00:02:02,079
gone into developing those arms for nasa

53
00:02:06,630 --> 00:02:04,399
was what was used to develop a series of

54
00:02:08,550 --> 00:02:06,640
robots which can use

55
00:02:09,669 --> 00:02:08,560
imaging modalities

56
00:02:12,630 --> 00:02:09,679
to

57
00:02:14,910 --> 00:02:12,640
perform various surgical tasks in an

58
00:02:17,589 --> 00:02:14,920
automated fashion so it's really

59
00:02:20,150 --> 00:02:17,599
revolutionized the medical industry it

60
00:02:22,390 --> 00:02:20,160
can and in fact the next stage would be

61
00:02:24,630 --> 00:02:22,400
to give it autonomy

62
00:02:25,990 --> 00:02:24,640
and that would really revolutionize but

63
00:02:27,430 --> 00:02:26,000

i don't think at the moment our

64
00:02:29,190 --> 00:02:27,440
regulatory

65
00:02:31,670 --> 00:02:29,200
sort of bodies are yet ready for that

66
00:02:33,750 --> 00:02:31,680
but definitely automation which is what

67
00:02:35,750 --> 00:02:33,760
its capabilities are but really the

68
00:02:38,470 --> 00:02:35,760
robot is designed to be able to also

69
00:02:40,070 --> 00:02:38,480
perform potentially autonomous acts to

70
00:02:42,550 --> 00:02:40,080
make some decisions

71
00:02:45,030 --> 00:02:42,560
as some of the space robotics can

72
00:02:47,030 --> 00:02:45,040
already do so it's i think it's the next

73
00:02:50,150 --> 00:02:47,040
phase in the evolution

74
00:02:52,869 --> 00:02:50,160
from igar can be adapted to a number of

75
00:02:54,630 --> 00:02:52,879
treatments the first application is for

76
00:02:56,790 --> 00:02:54,640
early detection and treatment of

77
00:02:59,830 --> 00:02:56,800
suspicious breast lesions in women with

78
00:03:02,070 --> 00:02:59,840
high risk of developing breast cancer

79
00:03:04,949 --> 00:03:02,080
these women are expected to have mri on

80
00:03:06,630 --> 00:03:04,959
their annual screening and unfortunately

81
00:03:09,270 --> 00:03:06,640
for mri it's so sensitive they can

82
00:03:11,830 --> 00:03:09,280
identify a very tiny lesion which may or

83
00:03:13,830 --> 00:03:11,840
may not be cancerous and then these

84
00:03:16,309 --> 00:03:13,840
women have to go through multiple

85
00:03:18,149 --> 00:03:16,319
biopsies sometimes even lumpectomy to

86
00:03:20,869 --> 00:03:18,159
find out whether it's cancerous or not

87
00:03:23,750 --> 00:03:20,879
and it's a long wait with igar we are

88
00:03:26,550 --> 00:03:23,760

able to immediately inside the bore of

89
00:03:29,350 --> 00:03:26,560
the magnet target the lesion

90
00:03:32,149 --> 00:03:29,360
going and biopsy and in future if

91
00:03:34,710 --> 00:03:32,159
appropriate ablate the lesion so it

92
00:03:36,710 --> 00:03:34,720
really saves a lot of

93
00:03:39,190 --> 00:03:36,720
time for the patient but more

94
00:03:40,869 --> 00:03:39,200
importantly also pain and cosmetic

95
00:03:43,750 --> 00:03:40,879
because it's so minimally invasive and

96
00:03:45,430 --> 00:03:43,760
so accurate it reduces the the pain

97
00:03:47,509 --> 00:03:45,440
discomfort for the patient and the

98
00:03:48,470 --> 00:03:47,519
better cosmetic result for the for for

99
00:03:50,710 --> 00:03:48,480
the women

100
00:03:53,429 --> 00:03:50,720
so what's next

101
00:03:54,630 --> 00:03:53,439
next is actually uh hopefully getting

102
00:03:57,910 --> 00:03:54,640
the system

103
00:04:00,789 --> 00:03:57,920
to a commercial end to sort of this can

104
00:04:03,110 --> 00:04:00,799
go into production and actually to into

105
00:04:05,110 --> 00:04:03,120
impacting patient care and we have a

106
00:04:06,070 --> 00:04:05,120
number of systems for

107
00:04:08,789 --> 00:04:06,080
liver

108
00:04:11,350 --> 00:04:08,799
lung kidney and prostate cancer a

109
00:04:14,390 --> 00:04:11,360
similar type of designs which will be

110
00:04:15,990 --> 00:04:14,400
the next and as i said my my dream is to

111
00:04:18,550 --> 00:04:16,000
actually get

112
00:04:21,110 --> 00:04:18,560
all of these systems into an automation

113
00:04:23,270 --> 00:04:21,120

autonomous mode to be look at how

114
00:04:26,070 --> 00:04:23,280
medical robotics can function in an

115
00:04:28,629 --> 00:04:26,080
autonomous mode still not replacing the

116
00:04:30,710 --> 00:04:28,639
surgeon or the physician but being able