



# FIGHTING CANCER FROM SPACE

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00:00:00,030 --> 00:00:02,250

Space represents a fairly harsh environment. Any piece of equipment

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00:00:03,360 --> 00:00:08,010

that's exposed to it over a long period of time will require maintenance.

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00:00:08,010 --> 00:00:10,260

So every time we have to do maintenance on the outside of the space

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00:00:10,260 --> 00:00:13,830

station, that means a crew member has to suit up and go outside. That introduces

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00:00:13,830 --> 00:00:18,119

that crew member to risk, and puts that person in harm's way. The other issue is

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00:00:18,119 --> 00:00:20,970

that now they're spending the time doing the maintenance work and they're not

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00:00:20,970 --> 00:00:23,720

doing the science which is really what their purpose is.

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00:00:23,720 --> 00:00:26,620

So with the maintenance challenges that we're going to have with the International Space Station what we

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00:00:30,020 --> 00:00:30,520

found ourselves was Canada being in the position to provide a solution to that

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00:00:33,200 --> 00:00:36,280

problem, and Dexter was going to be that solution.

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00:00:36,280 --> 00:00:39,672

Dexter is a two-armed robotic manipulator system

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00:00:39,672 --> 00:00:43,672

capable of performing  
fine motion tasks to replace what an

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00:00:43,680 --> 00:00:47,100

astronaut would need to do on the  
exterior part of the space station

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00:00:47,100 --> 00:00:50,309

Dexter is essentially a handyman.  
It operates on the outside of the

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00:00:50,309 --> 00:00:53,789

International Space Station. It allows us  
to do maintenance operations.

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00:00:53,789 --> 00:00:56,789

One of the advantages with Dexter is that we're  
able to control it from the ground and

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00:00:56,789 --> 00:01:00,690

so the ground crew could actually  
operate these robotic systems and free

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00:01:00,690 --> 00:01:04,769

the astronaut up from from that task as  
well. So now the Dexter is on line on the

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00:01:04,769 --> 00:01:08,729

space station and operating on a regular  
basis, what we've got is we've got a crew

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00:01:08,729 --> 00:01:12,600

who's spending more time doing science  
and this is important because this was

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00:01:12,600 --> 00:01:15,450

really the whole idea of building the

International Space Station was to be

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00:01:15,450 --> 00:01:19,040

able to do science in low-earth orbit

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00:01:28,480 --> 00:01:35,040

Unfortunately, only about 40% of women who should be getting annual MRI as part of

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00:01:35,040 --> 00:01:40,350

a screening, undergo MR screening. Part of the reason why women were are not

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00:01:40,350 --> 00:01:48,008

undertaking MRI screening was because of lack of access to the best radiologist locally.

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00:01:48,008 --> 00:01:52,188

Some women have to try very long distances, like 7 or 8 hours in a car,

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00:01:52,259 --> 00:01:57,299

in snowstorms during the winter, some times risking their lives just to get

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00:01:57,299 --> 00:02:00,860

the MRI-guided breast biopsies.

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00:02:05,030 --> 00:02:09,530

When we started to do the research with the Canadian Space Agency and NASA on the

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00:02:09,530 --> 00:02:15,950

whole remote telesurgery, we started to get involved with MDA. MDA is a Canadian

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00:02:15,950 --> 00:02:20,540

company which has been involved in manufacture of all the robotic systems

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00:02:20,540 --> 00:02:22,980  
which is currently use on the space station.

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00:02:22,980 --> 00:02:25,012  
So we develop a system called IGAR.

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00:02:25,012 --> 00:02:29,909  
Which stands for image guided  
automated robot.

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00:02:29,909 --> 00:02:31,932  
IGAR is a tele-operated robot

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00:02:31,940 --> 00:02:40,160  
that performs breast  
biopsies under MRI guidance.

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00:02:40,160 --> 00:02:45,350  
One of the capabilities IGAR is to be controlled  
by radiologists from any distance and

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00:02:45,350 --> 00:02:50,959  
that allows basicly a radiologist to  
supervise MR breast biopsy on a

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00:02:50,959 --> 00:02:55,070  
patient who may be hundreds of  
kilometers or thousands of kilometers

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00:02:55,070 --> 00:02:59,000  
away from them. It means that the patient  
can undergo their breast biopsy in their

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00:02:59,000 --> 00:03:03,770  
own local hospital without having the  
need to travel to another city or

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00:03:03,770 --> 00:03:07,920  
another hospitals in order to get access to

the expertise.

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00:03:07,920 --> 00:03:09,290

And the results are very

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00:03:09,290 --> 00:03:15,530

very encouraging. So we've demonstrated that IGAR is safe. Extremely accurate

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00:03:15,530 --> 00:03:18,240

as accurate as a human.

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00:03:18,240 --> 00:03:21,500

And this will allow us to hopefully increase the

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00:03:21,500 --> 00:03:25,968

number of people undergoing screening close to a hundred percent where it should be.

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00:03:25,968 --> 00:03:29,508

IGAR is built on many of the

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00:03:29,510 --> 00:03:33,739

know-how which was developed for the space program as well as the software

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00:03:33,739 --> 00:03:39,110

which is also used to control the robotics of the space station.

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00:03:39,110 --> 00:03:42,220

We can actually see some of these technologies we worked with for a long time

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00:03:42,220 --> 00:03:48,079

becoming available. You know we have a lot of insight on how to apply them.

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00:03:48,079 --> 00:03:51,230

Not just in medicine but in a number of other fields which is what we're doing.

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00:03:51,230 --> 00:03:54,080

So without the space station, would any of that have happened?

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00:03:54,080 --> 00:03:57,260

No, not really.