The first robotic device to assist surgeons in the operating room was Computer Motion’s ZEUS, which received clearance from the US Food and Drug Administration in 1994. ZEUS had three robotic arms, which were controlled remotely by the surgeon. Two of them acted like extensions of the surgeon’s arms – following the surgeon’s movements whilst allowing for more precise executions by scaling down movements and eliminating tremors resulting from fatigue.

The third arm was a voice-activated endoscope named AESOP (automated endoscopic system for optimal positioning). AESOP’s function was to manipulate a video camera inside the patient according to voice controls provided by the surgeon. AESOP eliminated the need for a member of the surgical team to hold the endoscope and allowed the surgeon to directly and precisely control their operative field of view, providing a steady picture during minimally invasive surgery.

In 2000, Computer Motion sued its competitor Intuitive Surgical for infringement of several patents on the former’s robotic technology. Intuitive and IBM retaliated by filing a patent infringement suit against Computer Motion in reference to the voice-controlled technology patented by IBM and licensed by Intuitive Surgical. Following these patent legal disputes between Computer Motion and Intuitive Surgical, the two companies merged in 2003 and Computer Motion’s products were discontinued in favour of Intuitive’s daVinci robotic system.

NASA-funded research determined that voice-controlled commands are preferred in the operating room – rather than alternatives such as eye tracking and head tracking. However, patents on voice-controlled robotic devices forced competitors to develop other ways for a surgeon to control endoscopic equipment. For example, with the FreeHand device and the previous Prosurgics EndoAssist, the surgeon has hands-free control of the endoscope position through a headband attached to a surgical cap, and an activation pedal.

Now that the original IBM patents are reaching the end of their life, will we see a surge of voice-controlled devices in the operating room? EndoControl already has one – the ViKY EP system is a motorised endoscope positioner for keyhole and thoracic surgery. The system holds and moves the endoscope under direct surgeon control in one of two modes – voice activated or with a foot control.

If voice is the best means of interacting with surgical equipment, when will we see virtual assistants in operating rooms that can interpret higher-level instructions than a simple ‘up’ or ‘down’ command? With medical devices adopting technologies developed for the consumer market, we can expect to see the medical industry develop interfaces similar to Siri on iPhone 4S. This would allow surgeons to control equipment in a less prescriptive way by talking in free speech and also allow the equipment to talk back, providing warnings and information relative to the patient and the procedure status.

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