



Canadian company's new technology makes history by bridging continents for international authors and their fans

Quanser control technology at the core of LongPen™ virtual book-signing device has far-reaching implications

Markham, Ontario - October 16, 2006

A Toronto-based control engineering company, Quanser Consulting Inc, whose groundbreaking robotic technology is drawing international attention, is making history by bringing to life a virtual autographing device that allows authors to sign books for fans in other cities around the world.

Quanser's cutting-edge control technology plays an integral role in the revolutionary LongPen™ book-signing device, which was unveiled last month at an historic transatlantic author signing event in Toronto. The new and improved Writing System designed and developed by Quanser, which beats at the heart of the LongPen™, represents a complex control solution. The revolutionary robotic device encompasses a variety of technologies that were seamlessly merged to produce human-like writing performance.

The Freehand Script Reproduction Robot performed flawlessly in its highly-anticipated international debut at a Canadian literary festival, allowing world-renowned author's – the UK's Kate Mosse and Canada's own Margaret Atwood – to sign books for fans in Toronto, from London and Edinburgh respectively. Atwood originally conceived the idea for LongPen™ and founded a company called Unotchit to turn her idea into a reality.

From London, Kate Mosse was the first to interact with fans in Toronto and sign copies of her international bestseller *Labyrinth*. "It's a science-fiction dream come true – to sign in real time in London and, less than a minute later, see the robotic arm signing a copy of the book in Toronto," said Mosse. "I wasn't expecting the signature to be so convincing, to look totally like my signature – but it did."

Working with Unotchit, Quanser's team of highly qualified engineers, with extensive experience in robotics, mechatronics and control, took on the challenge of creating a real-time robotic signing device that would smoothly and accurately replicate the actual signature of an author writing on a tablet computer – in this real-life case, located overseas. Quanser not only rose to the challenge, but managed to develop a fully-deployable finished product within a remarkable eight-week timeframe.

The device incorporates a robotic mechanism that accurately controls the position of a pen holder, which in turn lifts the pen up and down to make contact with the writing surface. The robot itself is controlled via communication with a pc-based controller through the Quanser-designed data acquisition and control board. Quanser used its own WinCon real-time control software to generate the code that allows these layers to function smoothly, accurately, and in real time, as required for the task.

The Freehand Script Reproduction Robot is integrated into the LongPen™ kiosk – which also performs video-conferencing, audio-streaming and internet functions – and was designed to seamlessly interface with the LongPen™ system. At the other end of the internet connection, the author writes on a custom-designed application on a tablet computer, which captures and transmits the digital signature to the LongPen™ kiosk, and into the Quanser control software.



This is where Quanser's magic begins. The digital information passes through the Quanser software and control board to command the position of the pen – the precise direction that it moves, up, down, left and right – to exactly replicate the author's actual signature or written words. The end result is an exact duplication of what the author has written on the tablet. The software controlling the robotic pen effectively mimics the author's brain which is sending the appropriate messages to control the movement of the author's arm/hand.

In making this device work, challenges included controlling the accuracy and speed of the robot, as well as ensuring real-time data-streaming from the tablet. "The human hand writes quickly with high and unpredictable acceleration and deceleration," says Quanser CTO Dr. Jacob Apkarian, who led the Quanser team on this project. "We had to ensure the data could be interpolated (translated) to provide the information to the robot in such a way that it does not exceed the performance specifications of the robot, while at the same time maintaining the integrity of the signature." Quanser developed a custom interpolator to provide smooth trajectory between given points, a very complex mathematical problem that, once solved, ensured the author's signature via the LongPen™ would be smooth and able to be repeated.

"The speed, accuracy and repeatability are incredible," says Matthew Gibson, Unotchit's VP Technology. "To accomplish this in such a short timeframe is remarkable."

Quanser's cutting-edge techniques for the development of electromechanical robotic devices (hardware) and the development of their controllers (software) sets them apart from companies that employ traditional processes that are very time-consuming and costly. Quanser has invested in Rapid Prototyping equipment which allows each mechanical part to be quickly produced directly from its computer-aided design software, a process that effectively cut the prototype development cycle of the Freehand Script Reproduction Robot by at least six weeks. This process reduced development costs, and allowed the engineering team to iterate through design revisions very quickly. In addition, Quanser's WinCon real-time control software cuts weeks or months from controller development as compared to traditional techniques, by automatically generating the real-time code from a commercially available graphical design tool.

Development of technology solutions like the Freehand Script Reproduction Robot requires broad and detailed knowledge in the area of mechatronics – the symbiotic design of mechanisms and control systems – a field in which Quanser is a global leader. The Quanser robotic technology utilized in the Long Pen™ has far-reaching implications for a variety of other applications, from large-scale manufacturing to surgery.

About Quanser

Quanser Consulting Inc is a world leader in the innovation and development of advanced control systems for industry, education and research. Founded in 1990, Quanser provides flexible, real-time solutions for complex control problems – from design to manufacture to implementation – bringing concepts, products and research to life. Quanser's state-of-the-art control technology is currently employed worldwide in a diverse range of applications, including aerospace, robotics, medical assistive devices and the emerging field of haptics.

For further information:

Zuzana Fabusova, 1-905-940-3575 ext. 252 zuzana.fabusova@quanser.com