

In-Depth: Hardware Proves Visionary's Bright Ideas

By Aaron Halabe
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Go back in time eight years. You're looking in on an engineering lab at the University of Washington. Two researchers are playing with a toy car. But this isn't some late afternoon diversion from "real" work, and it's no ordinary toy. Look closely and you'll see that the car is tethered, by electrodes, to a moth. When the insect moves, the electrodes read the electrical signals from the moth's muscles and send them to a microprocessor in the car, which controls its motor.

Arthropod torture is not the goal; the intent is to show how to harness neuromuscular reactions in order to control mechanical devices, a process that could someday allow a quadriplegic to move a wheelchair with the twitch of a cheek muscle.



Steven Bathiche, right, demonstrates his work to Billg at Science Fair, an event that showcases the Hardware group's innovative technologies.

Weird science? No. In fact, it's the serious work of Steven Bathiche, now a Research and Development Program Manager in the Hardware group. For years, he devised new and unique electro-mechanical devices that combine his passion for computing, bio- and electrical engineering and human factors design.

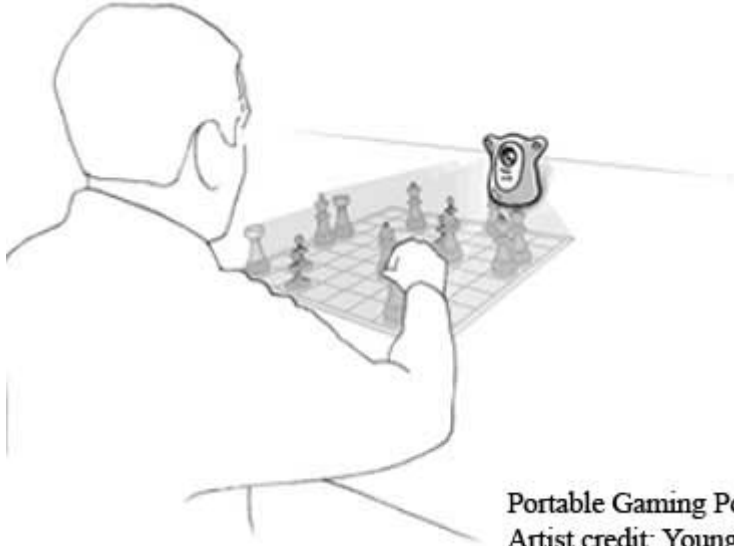
He began his Microsoft career with a bang during the second of three internships. In a mere three months he developed the concept for the Sidewinder Freestyle Pro game controller. A year later, he said, the Hardware group was "deep into getting the product shipped."

Computing Comes to the Surface

Bathiche and his colleague, Andy Wilson of Microsoft Research (MSR), hope for the same success in a new research area called Surface Computing, which has the seemingly incongruous goals of making displays larger, but not physically larger, and making the input richer, yet occupying less space.

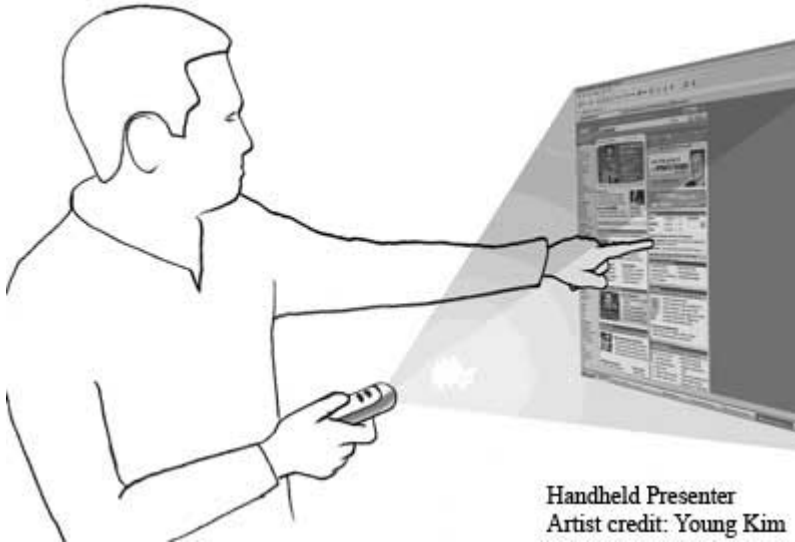
Surface computing involves three technologies: an ultra-compact, low-power projection system, a mobile handheld computer and a touch-input system using computer vision techniques. Bathiche and Wilson are exploring the following form factors.

A portable gaming pod: Place it on a surface and a projected game appears in front of it, along with an interactive touch surface that also can use physical items such as game pieces.



Portable Gaming Pod
Artist credit: Young Kim

A handheld presenter: A pocket device much like a flashlight, it's used to share information and pictures quickly and interactively. Users can touch the projected image to input commands. The integrated pointer on the handheld also can be used to move the mouse cursor.



Handheld Presenter
Artist credit: Young Kim

An ultra mobile desktop computer: Allows users to project a computer screen, mouse and keyboard display on a wall or other surface. Feedback is given in the form of visually highlighted keys and audio clicks.



Ultra mobile desktop computing
Artist credit: Young Kim

A Career is Launched

After receiving his master's degree in bioengineering from the University of Washington, Bathiche returned to Microsoft in 1999 as a full-time employee. Since then, he has worked on projects in which he was solely or partly responsible for such Microsoft innovations as the Office keyboard, the high-resolution tilt wheel on Microsoft mice and keyboard products, Windows XP pointer ballistics and a unique home remote system, called Astro, which offers computer-control of home lighting and electronic equipment.

He has eight patents to his credit, six of which are incorporated in Microsoft products that currently ship. Todd Holmdahl, Corporate Vice President of the Xbox product group, was Bathiche's hiring manager. He expected Bathiche to look at a broad range of technologies and use them to develop experiences that would delight Microsoft customers. Holmdahl said he got that and a lot more.

"Steven was one of the most passionate people I'd ever interviewed. He had incredible passion for many different areas of technology, the intellectual horsepower to dive deep into those different areas and a history of delivering results. That's a great combination.

"With Steven's drive and work ethic," Holmdahl added, "you give him some rough guidelines, but primarily you let him go and know that he'll end up with something amazing."

And let him go, they did. Bathiche, who is known for his high energy and rapid-fire communication style, has a unique role at Microsoft. Although he is part of the Hardware group, he's also an itinerant visionary who is free to roam the company in search of fellow thinkers and tinkerers. His goal: to set up collaborative teams of experts who can innovate with technology.

Early in his career, Bathiche teamed with Ken Hinckley and Mike Sinclair from MSR to develop a variety of concepts. "We tried so many things, but the ending application was a wireless mouse that completely powers down when you're not touching the device," Bathiche said. "With this technique we took the battery life from one month to three months."

To do this, the team devised a novel algorithm using just two pins on a microprocessor, a capacitor and a wire. "For basically the cost of about ten cents, you have this touch sensor to figure out if a person's hand is on the mouse. We combined those elements and shipped a very successful product."

Bathiche said his work at Microsoft is his "dream job." He's able to put shape to his technological vision by creating something tangible. But the freedom to create often requires Bathiche and his colleagues to convince others that ideas are worthy.

The Innovator's Dilemma

"You're always fighting the innovator's dilemma; you have a given organization that has finite resources, and the organization can't or doesn't think it can afford to have people work on future stuff. But we've often convinced people to be somewhat visionary" so the company won't miss a technological shift or a significant product marketing opportunity.

Bathiche said he's worked on a number of projects where he's been told: "'This is a waste of time.' ... But there have been many examples when I have gone against the grain and worked on things that have turned into very successful projects."

One such example is the high-resolution scroll wheel, which allows smoother, less-jumpy mouse scrolling. He found a senior Office developer who saw value in the idea, and they went to work. "In about an afternoon, he and I made Word compatible with this feature."

Later, the Hardware organization formed a virtual team that added pan-tilt (left-right scrolling) to the high-resolution capability. The combined technologies were developed into a drop-in module for most of Microsoft's mouse products.

"At first blush people also doubted the worthiness of such a technological effort," Bathiche said, "but now it's ubiquitous. That feels pretty good. Working with my colleagues, we're able to innovate, put projects together, build prototypes and come up with what we hope are some pretty interesting things."

The Wow! Factor is a Micronews feature that looks at innovative Microsoft technologies on the horizon.

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