

'Sketch' the User Experience to Ensure an RFID Project's Success

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RFID might involve changing the way workers do their jobs, or the manner in which customers interact with your company. Learn how sketching the user experience can increase the chances that a project that looks good on paper delivers the desired results.

By John Edwards

Aug. 16, 2010—There are a lot of things that can go wrong with any deployment of a new technology, including radio frequency identification. Many companies test the hardware and software, work out the business case, and conduct pilots to determine if the expected benefits are realized. You can do all of these things, but if people don't use the new technology in expected ways, the entire project can fail.

That was something that concerned Keith Sheardown, the general manager of [Bombardier Transportation's](#) technology solutions unit, as he developed an RFID solution to protect subway track workers from speeding trains. Bombardier, a Montreal-based rail-transit system developer, envisioned an RFID-based system that it dubbed TrackSafe. The system would require track workers to wear vests containing RFID tags that automatically linked to readers installed approximately every 500 feet along the track. The readers would, in turn, connect to a warning light and speaker cluster designed to activate whenever a train approached a construction or maintenance area. Train conductors, alerted to the workers' presence, would instantly know that it was time to slow down and proceed with caution. And the speakers would alert workers to oncoming trains.



The team created a simulated rail environment in a parking lot.

The system sounded ideal in concept, Sheardown notes, and looked great on the drawing board. But would it work in practice? "We could design and build a system that would do exactly what we wanted it to do," he says. "But if track workers tossed the tags in the toilet because they didn't want to be monitored, it would all be for nothing."

To answer this crucial question, Bombardier's managers turned to a technique known as "sketching the user experience." Developed by Bill Buxton, a [Microsoft](#) principal researcher and technology visionary whose roots stretch back to the late 1970s and the legendary [Xerox PARC](#) design think tank, sketching offers a unique way to conduct research projects. The process is based on the idea that complex product and system designs can be more fully explored by developers and management without straining either budgets or schedules.

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To help organizations develop products, services and systems that work as perfectly as possible, Buxton developed sketching as a way to obtain accurate answers to key operational and usability questions, and to incorporate customer and end-user needs and preferences into the final design. "To be able to explore multiple alternatives simultaneously, economically and still [be able to] finish the project, you need to have really lightweight, cheap ways to explore these ideas," Buxton explained during a [Stanford University](#) presentation. "Sketching is not putting pen to paper—it's the activity and the mindset you bring to it."

For most people, the word "sketching" conjures images of a series of intricate drawings, or perhaps a formal technical blueprint. But a sketch can be nearly anything—from a few scribbles on a cocktail napkin to a Lego model. Sketches should be developed quickly and contain only enough detail to communicate a design's operational elements.

Here's a step-by-step look at how sketching can be used to create RFID deployments that meet your company's operational, financial and usability goals.

1. Determine how sketching will help your RFID project.

For design inspiration, organizations typically look to previous RFID deployments. But when an enterprise is breaking new ground, as in the case of Bombardier's track-safety system—or when a development team needs to prove a project's value to upper management—sketching can provide a clear view into design structure and purpose.



The lights used during the parking-lot trial were the same type of LEDs that the final system would employ to alert train operators to nearby track workers.

Sheardown says he learned about sketching while attending a training and development conference. He immediately realized that the approach had the potential to help his team design a track-safety system with which the customer—subway operator [Toronto Transit Commission](#) and its employees—would be pleased.

Sheardown began the sketching process by first determining what he hoped to get out of the approach. "We clearly knew what we were trying to do: create improved location awareness to reduce the hazards that the track workers face in subway environments." But how could this be accomplished, he wondered, and to what degree of accuracy? Those were questions that sketching would help the organization answer, he says, mainly by providing its engineers with a cheap, yet highly effective way of presenting their concept to future customers and end users, soliciting their opinions and insight. "Why not ask questions of the people that are going to be using it?" Sheardown asks. "Why not see if you can find a cheap way to simulate it?"

2. Learn all you can about sketching.

To better understand how sketching might be applied in your project, and how you can get the greatest value out of the process, it's important to fully understand how the process works. One excellent source of sketching information is Buxton's book, *Sketching User Experiences: Getting the Design Right and the Right Design* (Morgan Kaufmann, 2007).

Sheardown says he also relied on support he received from outside advisors who were familiar with both identification technologies and the sketching concept—particularly the McMaster RFID Application Lab at [McMaster University](#), located in Hamilton, Ontario, Canada. "They're well suited to help us understand what technologies can help us solve problems," he says. "They don't have a personal attachment or a financial attachment to any particular technology or vendor."

Pankaj Sood, the lab's founder and advisor, says sketching allows organizations developing RFID systems to cost-effectively fine-tune system designs in increments, based on input provided by future end users. "You can see what the reactions are, what the feedback is, before implementing those changes," he states.

In addition, Bombardier sought real-world operational input from the Toronto Transit Commission, which was also a potential customer. The agency agreed to help the firm, much to Sheardown's relief. "Our team was made up of more wireless engineers than it was with people with vast experience working in subway tunnel environments," he says.



Once the team set up the model train set at the meeting, there was a change in the level of participation.

3. Create the sketch.

In Bombardier's case, the "sketch" turned out to be a toy. "In our industry, when I thought of doing a sketch and how it might apply, I immediately thought of a model train set," Sheardown says. "Could we take a model train set and effectively sketch—simulate—what a solution might look like?"

Investing \$200 in the experiment—a minuscule amount, Sheardown notes, considering the millions of dollars the overall project would eventually require—the team set about designing a model that would present TrackSafe's basic concepts and layout in a 3-D, interactive format. While working on the sketch, the developers periodically reminded themselves of Buxton's fundamental principle: "Sketching is not about the sketch... it's about the process." In other words, they needed to focus on the goal, not on the tool.

4. Present the sketch.

Feeling more than a little apprehension, Sheardown and his associates carried their model-train layout

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to a meeting with Toronto officials. But their concerns rapidly evaporated, he says, for upon seeing the model, the Toronto representatives quickly became animated and engaged. "As soon as we brought the model train set to the meeting and threw it on the table, there was an amazing change in the level of participation," Sheardown recalls. "It wasn't that they weren't interested in participating before, but we didn't have the right stage from which to ask questions, and simulate various things."

Suddenly, Sheardown says, questions and ideas flowed like an express locomotive headed down the mainline. Simply moving the train around, and using the props to simulate various elements of the proposed design, created a catalyst for discussion. "Now we knew we could come up with a great solution," he states.

5. Modify the sketch.

Sheardown says he and his colleagues were encouraged by the meetings, noting, "We loved the discussions with all the people. We learned so much." Upon returning home, they quickly decided to build on their success by creating an even larger and grander model—and the next time they presented the sketch, the meeting venue wasn't a conference room.

"We created a simulated rail environment in a parking lot—we had 800 feet, two sets of tracks made out of gray duct tape," Sheardown says. "Our RFID readers were simply wooden boxes with a white board on them." The lights, however, were real LEDs—the same type that the final system would employ to alert train operators to nearby track workers. The "trains" were a pair of golf carts and the "control center" was simply a folding table with three blank white boards mounted on easels. "At least they were blank when we started," he notes.



According to Sheardown, the ideas and advice collected via sketching helped his team design a better system in a shorter length of time, potentially shaving off months of research work.

"The life-size layout," Sheardown explains, "simulated how someone would go to the track level, how they would move and do their walking inspection, and what would happen as a train approached their position." An accompanying presentation was minimalist at best. "At the start, we gave them a bit of an overview on the basic design concept, but there was just one slide on the screen on a projector in the tent." Thereafter, he notes, everything was a blank canvas. "That way, we felt we wouldn't fall into the trap of defending anything we did," he says. "We were simply interested in asking more and more questions of the more than 35 people from the Toronto Transit Commission." The participants included subway system managers, supervisors, train drivers, track inspectors and signal-maintenance personnel. "These are the people we are trying to protect, and these are the people who know best what actually happens down there."

6. Apply the results.

According to Sheardown, the ideas and advice collected via sketching helped his team design a better system in a shorter length of time, potentially shaving off months of research work. "It's just a really

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powerful way of facilitating an exchange of ideas," he says, "one that ends up solving problems so much better and so much faster."

Buxton's process is a technique that can be used by any organization planning an RFID deployment, Sheardown says. "I always thought that expensive, smart, crafty, creative people did this sort of thing," he observes. "But we're not artists—I couldn't draw a sketch to save my life—but we can set up a train set and ask questions."