

# BIM software aids Cambridge Innovation Center expansion

By Galen Moore



Sandie Allen  
Studio Troika's Robert Elfer (seated) and Michael Samra used a BIM package to let the Cambridge Innovation Center tweak its expansion plans.

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Startups that rent space at the Cambridge Innovation Center range from lone bootstrappers like Ron Vogl, who is researching a legal documentation startup to Hubspot Inc., a business-to-business inbound marketing software company with more than \$33 million in venture capital funds.

Typically, the CIC's ownership is happy to leave software innovation up to its tenants. But this year the center is faced with a \$6 million expansion into two new floors of its building at One Broadway. So working with a small architecture firm from Malden, the CIC is testing the limits of software that lets clients tweak and mold projects down to the doors, desks, carpets and cabinets.

Known as "building information modeling," or BIM, software, the application organizes the component data of a building project in much the same way databases used in complex engineering projects are used in aircraft design. The result lets architects create 3-D computer models of buildings that can be shared, which allows clients, contractors and other parties to participate in the design process.

Architects Michael Samra and Robert Elfer have been using BIM at Studio Troika Inc. for about five years — but they had never put it through its paces like they have at the CIC, they said. For example, because the innovation center accommodates so many tenants in a tight space, acoustics are important. BIM software has helped Troika plan how to pile several single-person offices into a tight space, and ensure that each one is acoustically isolated from the other. "In most offices, every wall doesn't go to the deck," Samra said. "CIC is not conventional office space."

That means every time the design changes, the project is more likely to run into conflicts, as walls, ducts and columns collide. Where in the past, architects have had to track every change on page after page of drawings, BIM takes care of that problem automatically: "We move the wall once and everything else fixes itself," Elfer said.

"In the past there was an expression, 'We'll work it out in the field,'" he said. "It's a lot better to find a problem in design than in construction."

BIM adoption is growing fast, with just under half of firms reporting they use the software, according to a 2009 survey by McGraw-Hill Construction. That represented a near-doubling of adoption from 2007, when 28 percent of firms reported using BIM.

Erin Rae Hoffer is an architect and industry programs manager with Autodesk Inc., the San Rafael, Calif.-based maker of computer-aided design and BIM software. Hoffer, who is based in the company's Waltham office, said the software has changed the way the parties to a building project think about their roles. "The innovation is really about human interaction, because it's about collaboration among architects, contractors and clients," she said.

For example, when Autodesk built its new Massachusetts office, a 61,000-square-foot building that opened in January 2009, the company used visual models not just with its architects, but with its contractors as well. As a result, construction professionals were able to help make decisions about materials, she said. During construction, Autodesk put screens on the job site showing contractors visual models of what the project was scheduled to look like after that day's work was completed. "There were visualizations not just for the clients but for the subcontractors — this is how this flashing should be installed, for example," she said. "I think they were impressed by that level of guidance."

Elfer said that at the Cambridge Innovation Center, BIM software has saved weeks in design time on a project that has required endless tweaks to design as owner Tim Rowe has sought to maximize every inch of space and make it flexible and useful for companies of variable sizes. At CIC, Troika has worked to ensure line-of-sight down corridors to outside windows — by shifting the angle of corridors and installing glass panels instead of solid walls wherever possible. Architects have moved doors in an attempt to predetermine how tenants will likely place desks and chairs.

They've installed 'phantom doors.' These framed doors, hidden behind drywall, are designed to let the center quickly accommodate future expansion by tenants. "All they have to do is take the RotoZip, open up the Sheetrock and drop in a door," Samra said. To go back to separate offices with individual tenants, the center can drop in a glass panel in place of a door.

As Elfer, Samra and Rowe pored over the 3-D models for the design together, doors were moved, solid walls were made glass, and points were shaved off corners to eke out more space and light. "Because it's designed for entrepreneurs, it has conference rooms and little nooks where you can run into people," Rowe said. "It's a hive of entrepreneurship, instead of feeling like somebody's office floor that you just threw some couches into."

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