

SII – Sustainability Innovation Inventory

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BIMStorm™ LAX (Open Architecture)



The BIMStorm™ LAX open architecture project was a demonstration of the potential for real-time virtual collaborations in city planning using a central open-source online model. BIMStorm™ LAX brought together over 130 architects, planners, and experts in teams from 11 different countries during a 24-hour period on January 31, 2008, to design buildings and services for a 60-block area of Los Angeles in a shared virtual environment. The project used a variety of different software, virtual imaging, and online meetings to communicate with each other in a central planning system, and the entire process was open to viewing by the public. The ultimate design for Los Angeles included 55 million square feet of new development (Onuma, 2008).

The BIMStorm™ design model is an effort in collaborative architecture that allows different stakeholders to combine building designs, constraints, and analysis in a virtual environment, without having to align different design standards and coordinate systems, or wait for data to be transferred from one organization to another (Onuma, 2008). Onuma, the company responsible for BIMStorm, refers to this kind of open design process as “sustainable data,” based on:

- Open standards based exchanges
- Access to a central online model
- Common data formats

While Onuma acknowledges that “BIMStorm™ LAX was a hyper collaborative effort [and] real project[s] would be more structured,” the company wants to use such projects to change the way city planning collaboration occurs to fully take advantage of existing technologies (Onuma, 2008). BIMStorm projects are currently in the works for a number of other cities around the world.

Why is BIMStorm™ a Sustainable Technology?

BIM stands for “building information modeling,” and the concept of a BIM “storm” is that design information should be available all at once, as soon as its created, to everybody involved. In such an environment, design occurs real-time in a central online model on which everyone is simultaneously working.

Onuma describes BIMStorm™ technology using the metaphor of the travel planning website Expedia. In Expedia, Onuma explains, a traveler doesn’t have to call anyone to check hotel availability or download static Excel files of airline schedules. The information is available in one central location for anyone to manipulate in as many different ways as he or she likes to create his or her optimal travel plans, at the same time as other travelers are using the same data for other individual purposes (Onuma, 2008). Like Expedia does for travelers, BIMStorm™ gives designers and planners the ability to find optimal solutions using comprehensive up-to-date information in a central location.

A shared design platform like the BIMStorm™ central planning system, which allows stakeholders to chart each other’s progress and engage with each other’s ideas in real-time, can contribute to sustainable design in several ways:

- A central forum that facilitates collaboration, transparency, and idea testing reduces the need for frequent in-person meetings, which in turn reduces the amount collaborators need to fly around the world to get work done.
- A central data repository accessible by all stakeholders and project consultants encourages collaborators to view plans and run analyses before designs are finalized, increasing the odds that costly or time-consuming problems will be caught early on in the design process.
- A shared virtual design environment allows planning collaborations to play with alternate building designs and brainstorm innovative solutions (like having a building span a train track or waterway, for example, or adding energy efficiency technology to a building’s infrastructure) in a low-pressure situation



Figure 1: BIMStorm™ LAX development plans, shown in Google Earth, were created by teams from 11 countries collaborating remotely using a central design model (Image from <http://www.onuma.com>)

Current Technology

The BIMStorm™ LAX project was a short-term demonstration of a design model Onuma hopes will catch on in large scale planning projects. BIMStorm™ LAX participants included architects, planners, and a panel of experts with experience in structural, mechanical, electrical, and HVAC systems; energy efficiency; street-level air flow and environmental stewardship; emergency response, including disaster relief; urban impact analysis; building code; and cost estimation. The BIMStorm™ LAX project was additionally supported by an Onuma software team, which was available to rewrite software real-time to meet different teams' needs during the 24-hour project. The project was designed to support many different kinds of design software and tools, including scanned hand-drawn images (see Figure 2).

Preliminary planning for the 24-hour BIMStorm™ LAX event, conducted by Onuma, included researching building codes and soliciting development requests from government and property owners. In BIMStorm™ LAX, teams chose to work on whatever development requests they found most interesting. Teams that chose to focus on the same project shared design tasks remotely through Onuma's central server. Additionally, teams working on a large project would post requests for tasks that needed completing and make their data available to anyone interested in running analyses. The ability of everyone involved to access up-to-date information at the same time allowed analysis activities – such as energy analyses, life-cycle analyses, and building code verifications – to be conducted in parallel by different teams in different locations.

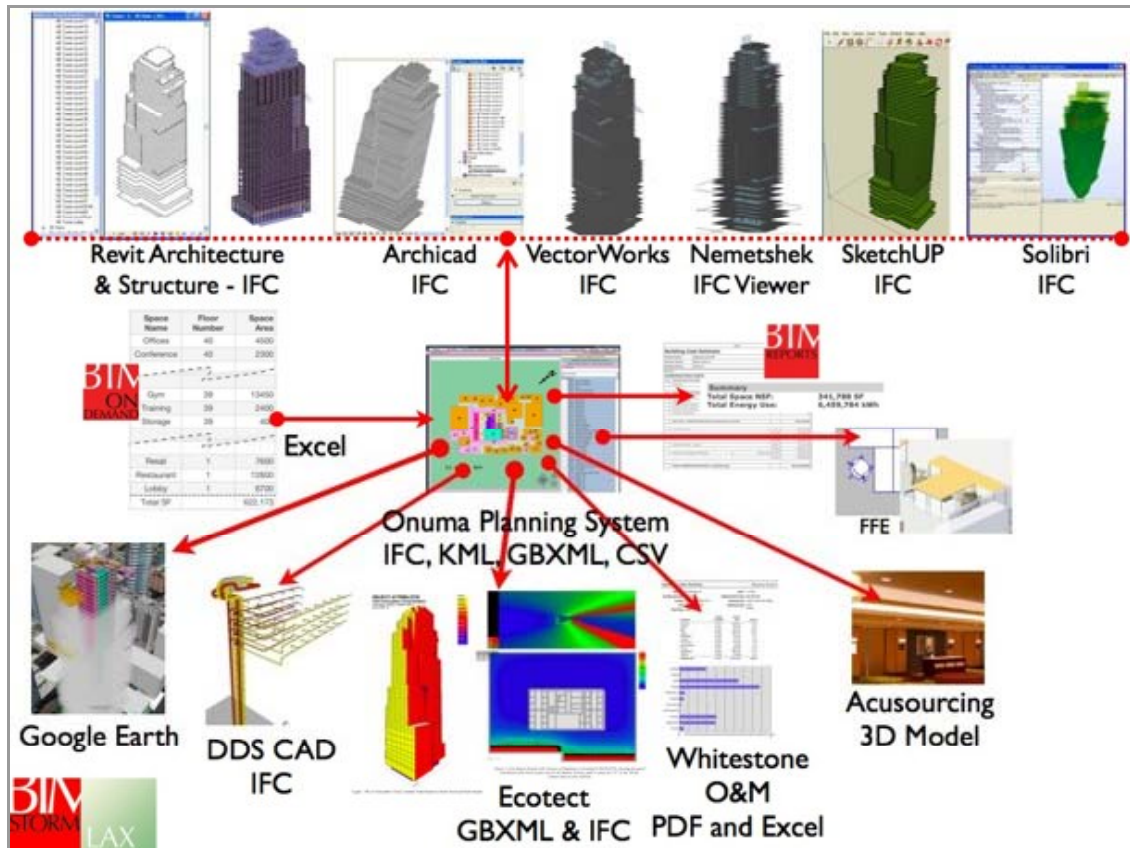


Figure 2: Examples of software programs used by designers and coordinated by the Onuma Planning System (Image from <http://www.onuma.com>)

Some teams contributed in unexpected ways, including:

- A team that took on the task of designing single-family homes actually built a prototype house during the 24-hour period (see Figure 4).
- One team introduced a program that automatically generated buildings to meet development requirements.
- One team focused on adding green roofs to buildings that other teams designed.

Onuma reports that the 24-hour project resulted in the following planning products:

- Floor and site plans
- 3D Building Information Models with data
- How the project fits on the site and in the context of the city, shown in Google Earth
- Facility Square Footage Reports
- Preliminary Cost
- Code Compliance Reports
- Energy calculations
- Carbon Footprint
- LEEDS
- Other Reports



Figure 3: One BIMStorm™ LAX team even collaborated with a charitable organization in Mexico to build a sample house based on the model they proposed for a 40-house development in the virtual BIMStorm™ planning event. (Photo from <http://www.onuma.com>)



Figure 4: A BIMStorm™ team and observers at Penn State's iCON Lab during the BIMStorm LAX event (Photo from <http://www.onuma.com>)

Technology and Experience Roadmap

Tools that encourage interdisciplinary collaboration in city planning efforts add to the process a system of checks and balances, in which many goals can be simultaneously met in an efficient and accessible workspace. Such technology has wide implications for planning projects of all kinds.

Ecocities

Ecocities, such as the [Masdar City](#) project in Abu Dhabi, are very concerned with their carbon footprints, even during design and construction. With its goal of being the first carbon neutral city in the world, one of Masdar's first construction projects was a photovoltaic test site, which is already producing excess solar power to sell to the Abu Dhabi national power grid. Masdar's main designers, however, come from the Foster + Partners architecture firm in London, and Masdar is working with technology companies and research institutions all over the world in its planning process. Having an online central city planning model would help the Masdar project reduce its carbon footprint for the design process, by enabling collaboration between designers around the world in a shared virtual workspace.

Fully collaborative virtual workspaces like BIMStorm™ can also support existing cities' initiatives to reduce traffic congestion through telecommuting programs, such as the [Minneapolis UPA ROWE](#) program.

Planning for Mega-events

Mega-events – the Olympics, for example – stimulate major urban design projects that involve different parts of a city, are often built relatively quickly, and are expected to represent a city's culture and modernity. Such large-scale, meaning-laden design processes could benefit from a central forum for brainstorming appropriate design aesthetics and infrastructure improvements.

Getting Non-technical Stakeholders Involved

The BIMStorm™ project had over 3000 observers in addition to the 133 participating designers (Onuma, 2008). While not every stakeholder should necessarily have direct input in the design process, access to preliminary designs and data can help keep citizen groups informed about city developments and can serve as an educational tool for a variety of disciplines involved in planning. Moreover, design-based brainstorming sessions using centrally available data and visualization tools could be used in socially-motivated development projects and in consensus building exercises related to land or resource use conflicts.

Works Cited and Sources for Additional Information:

BIMStorm™ LAX Website:

<http://www.onuma.com/services/LaStorm.php>

Onuma, Kimon. "Integration Today Using Open Standards: BIMStorm™, Rotterdam to Los Angeles and Beyond." *Journal of Building Information Modeling* April, 2008: 14-18.

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