When the Building Is a Computer

How will technology shape tomorrow's skyline?

By Sara Malone

To make a real change in architecture, new materials are needed, Gisue Hariri recently asserted in a lecture at the National Building Museum in Washington, D.C.

Hariri, a partner in New York-based architectural firm Hariri & Hariri, is among the designers featured in the museum's exhibit titled "Liquid Stone: New Architecture in Concrete." Yet the material she was advocating in her lecture was not concrete but something so "non-concrete" that most people have a hard time thinking of it as a material at all. For years, Hariri has been arguing that electronics in general – and more specifically computer processing and networking – are the materials that will usher in a new era of architecture, inspiring tomorrow's defining innovations just as glass, steel, and elevators inspired today's skylines.

More than a decade ago, Hariri & Hariri envisioned a construct that the firm called the Digital Block, a computerized, transparent curtain-wall system that could serve as either an exterior or interior enclosure. The firm's first design based on the Digital Block concept was residential – the prototype Digital House Project, which was exhibited at New York's Museum of Modern Art in 1999. But many of the underlying concepts apply to commercial structures as well, and in fact it is the commercial landscape that seems most eager to embrace them.

Hariri says that the flexibility of the digital block enables the physical form of a building to evolve to accommodate our evolving lifestyles. To that end, the Digital House was designed as a module with a steel spine and simple, prefabricated, plug-in parts, like industrial shelving. The walls

"It's disappointing that architecture and the construction industry are so slow in terms of technology."

themselves were composed of Digital Blocks, initially conceived of as a liquid crystal display (LCD) matrix linked to a central computer.

The core consisted of a large room for gatherings, meal preparation, dining, and entertainment, plus a tower of bedrooms and studies. In the studies, an entire eight-foot by eight-foot wall would act as a display panel for teleconferencing, data gathering, entertainment and any other computerized network tasks.

Because the panels open the house to a global network, the actual physical space does not have to be large. Digital Block allows flexibility in architecture without moving things around. In addition, many of the machines we use now become instantly obsolete when the building is the computer, helping to rid our lives and environments of clutter.

Still, Hariri said of the design, "It is not about gadgets and gizmos. It is about creating layers of actual and virtual living. It is about creating environments that are suitable to a generation raised with laptop computers, plasma TVs, the Internet, Ebay, and cell phones."

At the moment, Digital Block does not exist even in a prototype form, and engineers have persuaded the firm that LCD matrices are already outdated. They are now considering plasma technology instead.

"As time is passing, the latest technologies have made some of our ideas obsolete," Hariri acknowledged, "But in a way they have also pushed us and brought us closer to the end product that we want. The pace that technology is developing at has resolved some of our issues – but that then
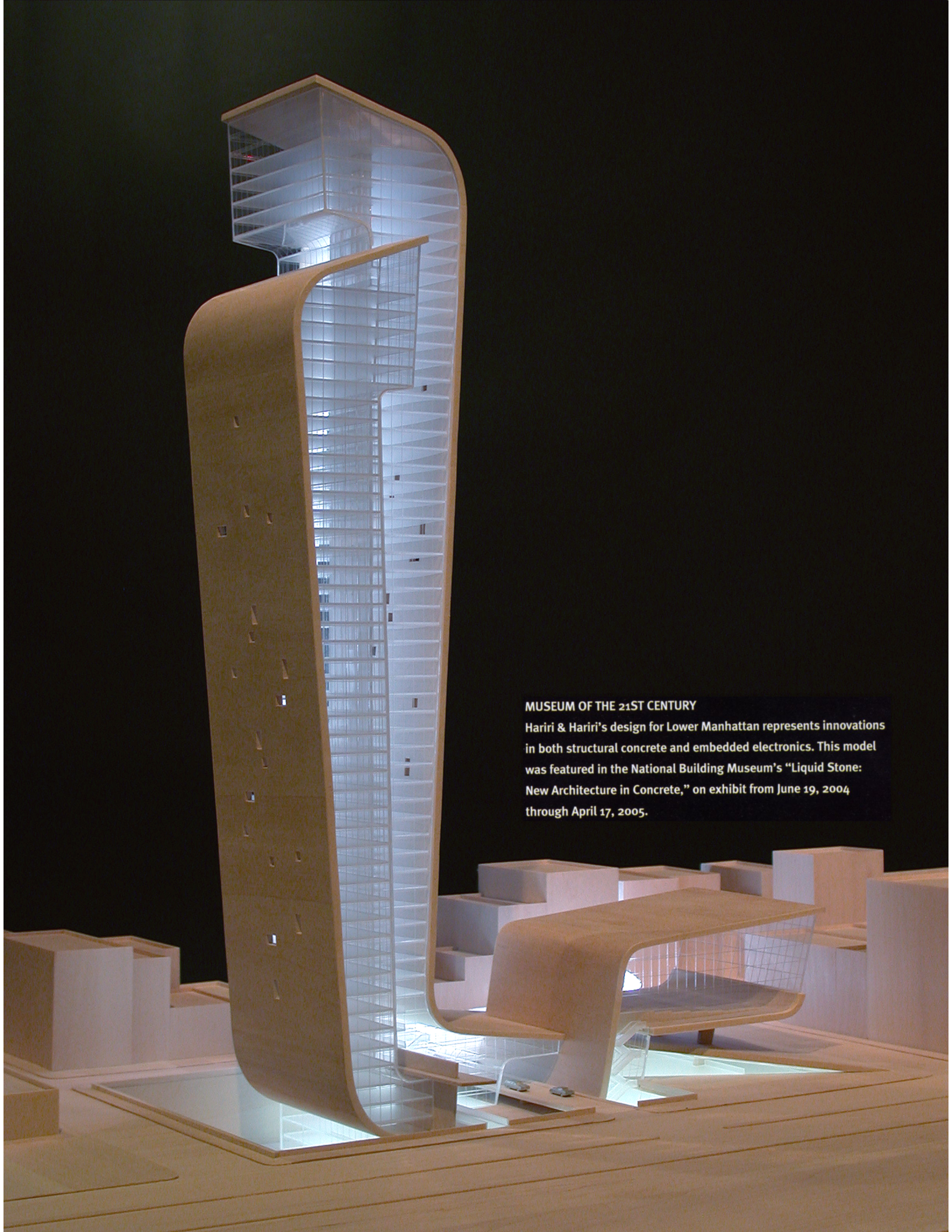
MUSEUM OF THE 21ST CENTURY
Hariri & Hariri's design for Lower Manhattan represents innovations in both structural concrete and embedded electronics. This model was featured in the National Building Museum's "Liquid Stone: New Architecture in Concrete," on exhibit from June 19, 2004 through April 17, 2005.

requires rethinking and repositioning yourself."

One crucial criterion for the success of the Digital Block is that when it is off, the screen/monitor/wall must be transparent. "That's one of the issues that we were trying to address with different companies that came on board and talked to us and sent us engineers," Hariri explained. "How could we actually have a wall that could have information on it, and at the same time be transparent?"

The firm worked with one engineer to create a three-quarter-scale model using LCD panels, and the results were intriguing. "This engineer we were working with made the glass even more clear in transparent form, so you almost couldn't tell there was a glass piece there in the model," Hariri recalled. "The minute you wanted to send information with the computer, it would become a screen that was trans-lucent, and you could see images on it. It was in a constant flux, from something very static to something animated."

The firm has run into a variety of obstacles in develop-ing the Digital Block, most notably a lack of money and anxiety among cli-ents about the cost and invasiveness of the technology. "It's disappointing that architecture and the construction industry are so slow in terms of tech-nology," she said.

Hariri attributes that slowness, in part, to the desire and need for per-manence in architecture.

"We look at technology in a philosophical kind of way instead of a structural way," she said. "We're also very pragmatic architects. We are visionaries, but we're not envisioning when we go to the moon and need antigravity boots. We want to do something now, on the Earth, with applications in our lifetime."

The fastest embrace of technology is occurring in the design of commercial buildings," she said, citing Times Square as an example of information and entertainment totally integrated into building designs: "You get the weath-er, the stocks, news — they're all projected on the build-ings. They have become incorporated into the architecture."

New technologies can change architecture in other ways, even if they do not comprise the building mate-rial itself. In Hariri & Hariri's Epicenter: Retail Prototype from 2001, the firm did not incorporate the Digital Block but instead focused on the use of existing cutting-edge technology. They envisioned a distribution infrastructure that, when used with high-tech devices and displays, reor-ganized customer space and merged traditional retail with online shopping.

"This is the result of imagining a new shopping model," Hariri explained when describing a clothing store. "In addi-tion to clothing, it has exhibitions and art work; it is a labo-ratory and an amusement park. You can have a personal fashion show, and shoppers are the model."

The EpiCenter design scans a shopper's body at the entrance and transmits it throughout the retail complex, which enables shoppers to try things on virtually. Shoppers are given devices that can store such personal information as sizes, preferences, and previous purchases, and they enable people to purchase items digitally. In addition, what you buy can be delivered to your home before you even get there.

"Actually, IBM is developing personal shopping devices now," Hariri said. "All of this kind of technology would lend itself particularly well to airports, where you could buy things and not have to carry them."

Epicenter could be built today, said Hariri, because all the technologies exist and are already being used in various environments – for example, the scanners at airports. She con-cedes it is a complicated project that would involve prodigious amounts of programming.

Hariri & Hariri explored tech-nology in another light at The Cine, an experimental film center to be constructed on a pier near the base of the Brooklyn Bridge. The complex, which explores the relationship between architecture, film, and technology, will not be completed until 2020.

The project was launched by Robert DeNiro and other filmmakers who wanted to avoid always having to go to Los Angeles.

One of the most interesting aspects of Cine is the screens, which can be seen from the street or the river. Composed of Texas Instruments' Digital Micromirror Device (DMD) technology, they can be programmed to display infor-mation, receive and show films via satellites, and serve as a projection screen. Virtual actors, virtual sets, and locations are all stored within and can be reconfigured into a new movie at any time.

Texas Instruments' Digital Light Processing technology enables the world's smallest data and video projectors, HDTVs, and digital cinema. The heart of these solutions is the DMD, a semiconductor-based "light switch" array of thou-sands of individually addressable, tiltable, mirror-pixels.

The Cine complex itself is a pier with a series of struc-tural concrete frames. A digital screen on the Brooklyn side

"Our own imagination and vision are the only limits to our architecture"

— Gisue Hariri, Partner, Hariri & Hariri, NY

previews films being shown and marks the entrance. The school is a rectangular box containing classrooms, screening and editing rooms, and sound studios. The Film Track Gallery is a long tube accessed by a spiral ramp from the street and open to the public. This gallery exhibits film strips on its DMD windows, so that the film strip on exhibit could be viewed both from inside and from benches on the exterior plaza.

In the center of the structure, three theaters with vertical and horizontal digital screens demonstrate the possibilities of new screen dimensions and of changing the format of movies. At the end of the pier is a large indoor/outdoor theater for film festivals with the DMD screen detached from the structure.

The firm's design for the Museum of the 21st Century, which was included as part of the Liquid Stone exhibit, is celebrated for its concrete form, but it also has its eye firmly on the technologies of today and tomorrow. Set along the Hudson River at the site of the World Trade Center complex as part of the memorial, the two-towered museum is designed as a space that will inspire art and enhance experience.

Architect Gisue Hariri cites Times Square a living example of her "Digital Block" concept: "You get the weather, the stocks, news ... they have become incorporated into the architecture." The exterior walls of the NASDAQ building in Times Square, above, alternate between advertising images and a stock ticker reporting activity on the exchange.

"Museums are no longer cabinets of curiosities or temples for art," said Hariri. "Art these days is different. It can be created on the computer, transmitted by the Internet from Brazil. Most installations just need projection and wire connections."

The Museum of the 21st Century, slated for completion in 2007, is not about space and collection of materials.

"It is for the new art that is mainly immaterial (digital art)," Hariri said. "It is liquid, changing and being made all the time. It would be programmed and accessed by the artist from around the globe. The building itself has technology embedded in the walls. Most of the artwork would be exhibited on the exterior walls, and is for everyone who has something to express. The architecture of these institutions will have to turn inside out. It is time for museums to be interactive, inclusive, and about our contemporary culture."

"Our own imagination and vision are the only limits to our architecture," Hariri said. ●

http://www.haririandhariri.com/

gh@haririandhariri.com

SACO TECHNOLOGIES