

PURE GENIUS

# INTELLIGENT ELEVATORS ANSWER VERTICAL CHALLENGES



BY MELANIE D.G. KAPLAN

POSTING IN **CITIES**

SMART ELEVATORS KNOW WHERE YOU'RE GOING AND THE QUICKEST WAY TO GET THERE, ELIMINATING ENDLESS WAITS AND

CROWDED CARS THAT STOP AT EVERY FLOOR.

## Special Feature: The Intelligence Issue

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[http://i.bnet.com/blogs/smart\\_elevator\\_pure\\_genius\\_july2012.jpg](http://i.bnet.com/blogs/smart_elevator_pure_genius_july2012.jpg) These days, Mike Stengel can laugh about the old elevators at the Marriott Marquis in Times Square. But it wasn't always that way. For years, as general manager of a hotel known for its unreliable and achingly slow lifts, he was often closer to tears.

"People always exaggerate how long they have to wait for an elevator, but it really was 20 to 30 minutes sometimes," said Stengel, now area vice president for New York City Marriott and Renaissance hotels. "If you worked in the hotel, you learned to take your nametag off in the elevator because otherwise you'd get beat up."

Stengel said Executive Chairman Bill Marriott once suggested, "Why don't you put TVs in the elevator landings, because then people

would have something to watch?" Stengel replied, "Mr. Marriott, if you did that, then people would know how long they were waiting, because they'd be able to watch an entire show."

The problem was that the 49-story hotel, with nearly 2,000 guest rooms, was built largely for meetings. But between the revolving rooftop restaurant and bar, the 1,600-seat theater and a large amount of meeting space, the hotel elevators had to accommodate thousands of unexpected passengers every day.

"No matter what, you always had three times as many people as you should have had, so there were never enough elevators," Stengel said. The building's design exacerbated matters: A dozen glass elevators encircled a giant tube in the atrium, which stretched the height of the hotel. So passengers would often hear an elevator chime, run around the bend to locate the open car, and arrive to find that the doors had already closed. Stengel received about five written complaints a week, although most frustrated guests didn't formally complain, he said; they just never came back. He would regularly offer people dinner or a future stay -- on the house -- to placate angry customers and ease the elevator-induced pain. Thanks to the elevators, the hotel was losing meeting business, and its guest satisfaction score was the lowest in the company.

When Stengel started thinking about solutions, he considered every option, including adding elevator shafts on the outside of the building. But then he met with Schindler Elevator Corp., the North American operation of the Swiss-based Schindler Group. The company advised

Marriott to install the Miconic 10, a smart elevator system that allows users to enter their floor onto a keypad. It calculates the fastest travel time to the destination and then assigns an elevator. Schindler predicted a 15 to 20 percent increase in efficiency.

When the five-year, \$11 million project was completed in 2006 (the second such installation in the city, after Rockefeller Center), the Marquis held a press conference to get the word out that it was safe to return. Stengel says the entire system (which includes the conversion of some baggage elevators to passenger elevators) is 50 percent more efficient today. "I have not gotten one elevator complaint letter since we turned them on," he said. "It was like a shutting off a faucet."

### **An elevator that knows where you're headed**

Most of us don't think much about elevators, unless the wait is dreadful, the ride is jerky or we start losing confidence that an elevator will safely deliver us to our floor. But during a visit to Frankfurt earlier this year, I found myself preoccupied with these vertically-moving cars. Within a couple hours and a few blocks, I rode one of the city's oldest elevators, and then one of the newest.

The former, a wooden elevator at a university, was called a paternoster -- a dying breed of open (and inherently dangerous), continuously moving cars still found scattered across Europe. The latter, installed in the new Jumeirah hotel, was a destination dispatch model introduced by German manufacturer ThyssenKrupp Elevator in 2002. I entered my floor on a touch pad outside the elevators and was directed on the screen to the car that would ferry me upward. When the doors

opened, I entered a cab with no buttons inside. If ever a bank of elevators could rock my world, the Jumeirah's did.

For a vertical transport system, these intelligent elevators are nothing short of revolutionary. Not since we replaced human elevator operators with buttons has there been such a change in the way we ride skyward. As more people move into cities, and building up is often the only option, there is more demand on elevators, according to industry experts. The way to accommodate the increasing traffic is through technology.

Sleek, high-tech speedy, these new, energy-efficient systems ensure that guests will never again have to pile into a crowded car and stop at each floor or wait endlessly in the lobby.

"These elevators bring excitement back to our industry," said Michael Landis, vice president of marketing for Schindler. The idea behind destination dispatch, which Schindler pioneered in 1990s, is that elevators, equipped with a microprocessor, would start communicating with each other, rather than working independently. Instead of six people going to six floors on the same elevator, with six starts and stops, the elevators are now smart enough to calculate the optimum routes and group people according to their destinations. This enables fewer cars to move more people. When a passenger requests a certain floor on a keypad or touch screen, the system uses an algorithm to instantly assign the car that will get her to her floor as quickly as possible.

The first U.S. installation of Miconic 10 was at the Ameritech building

in Indianapolis in 1993. The next generation added a radio frequency identification, or RFID, reader to the keypad to identify passengers, so tenants could swipe their ID badge or card to call an elevator. In 2009, Schindler launched the third generation, called PORT (it stands for "Personal Occupant Requirement Terminal"), a software-driven system that uses a touch-screen and learns movement patterns, enabling it to personalize its offerings to each passenger.

"It has a predictive system," Landis said. "Say you go to the 12th floor every morning, and then at 10 o'clock you go to the second floor for coffee. If you wave your card in front of the reader at 10, the first option it will give you is the second floor. It's dynamic." Landis said building managers can restrict access to certain floors and can easily schedule maintenance and cleaning -- all remotely. They can also change settings for specific passengers, e.g. the blind tenant who will always be directed (audibly) toward an elevator to his immediate right, or the tenant in a wheelchair for whom the elevator doors will remain open longer.

This technology is also being deployed in hospitals, where moving people around can be a matter of life and death. Some hospital elevator systems today can recognize an emergency call based on a card swipe, and they will then send an empty car that ignores other requests. In New Jersey, Morristown Medical Center performs more than 1,100 open heart surgeries a year, and one of its most critical transportation issues is getting patients quickly from the rooftop helipad down to the operating room. They now have 36 elevators, two of which are dedicated during certain hours as express trauma

elevators.

As in countless other ways, we trade privacy for increased efficiency -- the same system that predicts our destination and prompts us to select the floor it thinks we will choose also tracks our elevator rides and knows if we're coming into the office late or skipping out early. In the case of suspicious activity, building managers can examine elevator use and identify people who aren't supposed to be there -- unless, of course, they use the stairwell, which may have its own card restrictions.

### **A smooth, quick ride**

The next generation of destination dispatch will integrate smart phone technology. Imagine going to a meeting on the 30th floor of a building in Tokyo. Your contact in that office will send you an e-mail with a bar code like you'd use for airport security. When you arrive at the building, you let the reader scan your barcode, from which it will dispatch an elevator and send you directly to the correct floor.

Destination dispatch systems can also sense when an elevator bank is quiet and will put some elevators in a standby mode, much like a laptop going to sleep, so they consume less energy. Only those cabs that are needed will be kept awake.

Among the million elevators in use in North America today, those with destination dispatch technology still represent only a single-digit percentage. Buildings where Schindler has installed its systems in the United States include the Crescent in Dallas, the Humana headquarters in Louisville and the Hearst Tower and Bank of America

buildings in Manhattan.

The elevators are more common -- and easier to install -- in new construction. But Landis said more than 70 percent of old building upgrades are now employing the technology. He said he is seeing it used more in residential and mid-rise buildings, in addition to high-rises. It can take as little as a couple weeks to convert the elevators and may range from \$60,000 to \$250,000 per elevator, depending on the size of the building.

In Raleigh, Schindler recently installed its PORT technology at Capital Bank Plaza's 15-story office building. The original Westinghouse elevators were more than 40 years old, said Don Carter, an owner of the building.

"They were very undependable," he said. "It was not usual to have a breakdown entrapment -- and that's not a good word in the elevator business -- every week, and the elevators would jump and jerk as they were getting to the landing floor."

The upgrade of the building's four passenger elevators -- which used the original motor and pulleys -- included installing electronic controls and replacing the rollers, which allow the cars to ride smoothly. Energy-efficient regenerative drives produce energy when the car is descending and return it to the building's grid for use elsewhere in the building.

The system will be able to adapt to smartphone technology, once it's available. Carter said the project, finished last year, cost less than \$1



million, and the elevators now use 35 percent of the energy they were previously using. "People call me and want to come by just to look at the elevators," he said. "I can't say we've captured a tenant because of them, but I can say if we hadn't done the modernization, I would have certainly lost some."

In New York, ThyssenKrupp is installing 73 elevators at One World Trade Center, which will open in 2013. The company says the elevators will be the fastest in the Western Hemisphere, traveling at speeds of up to 23 miles per hour; riding from the first floor to the 102nd floor will take just 60 seconds. In Boston, the company is participating in the Fraunhofer Center for Sustainable Energy Systems Building Technology Showcase, a research and demonstration project for sustainable technologies that will be completed this fall.

"One of the dilemmas in the elevator business is that it's hard to calculate energy consumption and power generation because it's not sub-metered; you typically just know what consumption is for the entire building," said Brad Nemeth, director of sustainability for ThyssenKrupp Elevator Americas. "The Fraunhofer project is unique because we'll be able to break it down and provide information on where building owners should be investing their money." Nemeth said the goal is to reduce energy consumption by 50 percent, which he said should help -- especially in the Northeast Corridor -- in reducing power outages and brownouts during times of peak energy use.

"We are experts at transporting people up and down," Nemeth said.

"We're not experts at the latest and greatest technology. So this

showcase is forward thinking and allows us to experiment with new things."

### **Ceding control to a computer**

From his experience in Raleigh, Carter acknowledges that the first time using destination dispatch elevators can be challenging. "You enter the building and run into the first elevator that's open, and there's no buttons," he said. But by the end of the first day after the change, he said, tenants had mastered the system.

To be sure, technological change is always tricky, especially when it invades a routine so entrenched in our lives. A *Wall Street Journal* article that covered the Marquis' new elevators in 2006 noted that there was an initial backlash to the futuristic elevators: "Just as riders in the 1950s complained at first about the disappearance of human elevator operators, some riders today are uncomfortable ceding control of their ride to a computer."

But nowadays, most people aren't threatened by a keypad or touch screen, and if they do make the mistake of running onto an elevator without buttons, they won't do it again.

At the Marquis, traffic is still heavy, and now there are the added passengers who visit the hotel just to ride the fancy elevators. But Stengel says this system has no problem accommodating all the existing traffic, plus those who are just along for the ride. No matter what language the passengers speak, he said, they quickly figure out the high-tech machines. As part of the renovation, Schindler also

installed flat screens in each of the cabs, so riders can watch the news. But Stengel no longer worries that people will be stuck anywhere watching an entire sitcom.

"It's remarkable," he said. "These are smart elevators, and the efficiencies that came from them were enormous."

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