



Robotics Trends

The business guide for professionals who use, manage, or create robots and intelligent systems

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Table of Contents

Cover Story

1 Mining the Seafloor with Robots

In Brief

6 Robot Icons

6 DARPA Watch

7 DealFlow

8 Exploring the Oceans
for the Price of a Luxury Car

9 Fishing for Robotic Propulsion Secrets

Feature

11 Building Buildings with Robots

Analyses

15 **The Coming Boom in
Robotic Parking Garages**

18 When It Takes a Snake

Thought Leader

20 Regis Vincent's New Take
on Autonomy

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The Coming Boom in Robotic Parking Garages

Imagine your vehicle delivered to you in moments by an automated valet summoned via your smartphone.

By Esther Shein

The old adage in real estate is location, location, location. When it comes to parking lots, it is space, space, space. And space is precisely the idea behind a small but growing number of parking garages that use robotics to move and park more than two times as many cars as conventional garages.

That space saving can mean huge revenues in cities like New York, where individual spaces in conventional parking garages can sell for six figures. Automated garages offer reduced operational expenses as well, since they don't require attendants. But perhaps their biggest attraction to potential customers is a vastly improved user experience. Forget hard-to-navigate ramps, rush-hour congestion, exhaust-laden air, or the scary enclosed spaces car owners must walk through when searching for their vehicles.

Robotic garages, by contrast, provide a genteel, *Jetsons*'-like experience. In November, the *Miami Herald* reported that Germany-based Porsche Design Group and a local developer are planning a \$560 million condo in Sunny Isle Beach, Fla., with glass elevators that will take drivers to their units—while they sit in their cars, the first such design in the world. A robotic arm that works like an automatic plank will take the car and put it in the elevator along with the driver, bring them up to the driver's floor, leave the driver in front of his or her condo unit, and then park the car, according to the *Herald*. Residents will be able to see their cars from their living rooms.

Ramping Up

Little wonder that the idea is taking hold, especially among real estate developers, and it represents what could become a significant niche within the robotics industry. State-of-the-art robotic garages require everything from software to user interfaces to the customized mechanical systems that include elevators and other devices that fetch vehicles and deliver them directly to waiting customers.

Jeff Hyde, vice president of design and development for West Hempstead, N.Y.-based Automotion Parking Systems LLC, which has three automated parking systems in New York, says that while working on a project in downtown Manhattan in 2005, company officials were trying to figure out how to create as much value as they could from a residential and commercial development project. One way was to keep a parking garage on-site, he says, and they began exploring their options. The company chairman went to Germany to visit Stolzer Parkhaus, a firm specializing in automatic car-parking systems. He brought the concept back to the states and applied it to the Manhattan development project, which enabled Automotion to create a parking garage with 70 spaces, as opposed to 24 if the developer had put in a conventional garage, Hyde says. "We get roughly three times as many cars using automated parking versus conventional," he says.

Another company, Robotic Parking Systems Inc., based in Clearwater, Fla., also maintains that automated parking garages allow two times or more cars in the same footprint of space than a conventional parking garage. "The reason for that is you don't have to have

A small but growing number of parking garages use robotics to move and park more than two times as many cars as conventional garages.

State-of-the-art robotic garages represent what could become a significant niche within the robotics industry.

ANALYSIS: TRANSPORTATION ROBOTICS



Automotion, one of several companies involved in the design and construction of robotic parking garages, describes its operation as a “vending machine for vehicles.” The technology can transport people sitting in the comfort of their vehicles directly to the doors of their residences, then whisk the car away for storage, retrieving it again on demand. Robotic garages can also be used as public parking facilities. (Photos courtesy Automotion Parking Systems LLC.)

ramps for driving around to different levels or aisles to drive down,” explains Chief Administrative Officer Mary Lou DeWynGaert. “The cars can be in a racking system and are close together, and you don’t have to provide space for a person to get out. You don’t have pedestrian areas for walkways, and by eliminating that and using a steel rack system you get more cars in.” Robotic Parking has four automated garages: one in New Jersey, two in Dubai, and one that is under construction in Abu Dhabi.

The cost to build these types of garages varies, depending on the number of spaces they have, DeWynGaert says. Since they are custom designed, the price has to be calculated for each project, she says. Hyde puts the cost at between \$20,000 and \$25,000 per space, based on roughly 100 spaces. By contrast, conventional parking garages run between \$18,000 and \$40,000 a space for a standard 100-space garage, he says.

A Vending Machine for Vehicles

Automotion’s garages use a space of 125x75x14 feet deep with a two-level pallet and racking system. A car pulls into an entry room that resembles a one-car garage in a residential home, Hyde says. It is about 10x20 feet with the pallet in the middle. “The only thing that ever gets moved is the pallet in the automated system,” he explains. “It’s a vending machine for vehicles.” The pallet moves horizontally and vertically from that room into an “automated parking vault.” In the meantime, the driver walks over to a cash management kiosk and through a series of questions is identified and given a parking ticket with a time stamp in order to be charged for the amount of time the car is parked. When the driver returns, he or she only needs to put the ticket back into the kiosk and pay, and then the machine identifies the vehicle and returns it to the “entry/exit room.”

The system is designed to be completely automated, with no need for parking attendants, Hyde says, adding that it is up to the building management to determine how to run the garage. The

technology is very similar to elevators, he explains, using a series of sensors and motors that identify the distances a car needs to move. “Every millimeter of movement through the parking system is monitored.” Light sensors measure a vehicle’s dimensions, and with the use of laser scanners the car is placed properly on a pallet.

“All we’ve done is take a car and move it vertically and then horizontally to a space through a series of automated movements,” says Hyde. “This gives us the ability to manage time and space.” Parking has become a science, he adds, because the technology makes it possible to determine how long it takes to park and retrieve a vehicle. “So in a place like New York City, where parking is so in demand, it takes a minute and a half to retrieve your car with the automated system.” Once a driver walks up to the kiosk and pays for the parking time, it takes 90 seconds to walk to his or her car and drive away, he says.

“Anyone who has ever parked a car in New York City knows it’s certainly not going to be 90 seconds from the time they walk in to retrieve their car,” Hyde notes. “Being able to manage that time and the amount of space we dedicate to parking gives us as real estate

investors the ability to create more valuable real estate development.”

Robotic Parking also uses stacker systems horizontally and vertically to move cars, says DeWynGaert. “Our system is different in that each motion is done by different machines, so you can have a number of cars in motion at any one time.” Each machine performs a different function: Once a car is picked up, one machine moves it horizontally, while another moves it vertically, and a third one moves it into a rack. In the company’s 765-space garage in Dubai, she notes, there can be up to 32 cars in motion at any one time being moved horizontally, vertically, and put into the rack. Because the car is put on a pallet, the machines don’t ever touch it and once it is placed in its slot in the rack, none of the oil or dirt from the car above leaks onto it, DeWynGaert says. Nor are there parking fumes to contend with.

Like Automotion, a driver is required to put a card in a kiosk machine, but the driver is told which exit station the car will be at, and the driver walks there to pick up the car. All entry/exit stations are on the ground level and the lobbies are well lit, she says. “We recommend an operator for each shift.”

Robotic Parking has partnered with GE and uses its PLC project logic controllers, as well as with Stratus Technology for redundancy in its servers. “If an error occurs with the computer software that runs this, it automatically switches over to another server,” DeWynGaert says, “so transactions are redundant and can run on a different system. There’s immediate backup.”

Automotion’s lead time on projects is between three and five years, says Hyde, and the company is currently working on projects around the country. “We can create parking in a facility where conventional [parking] is not an option,” he says. “It gives us the ability to reevaluate the way a real estate development [project] is created ... it’s faster, more efficient, and it’s very green.”

And when the real estate market fully recovers, it could become the default way to build or remodel parking facilities the world over. [RT](#)

Both Automotion and Robotic Parking use stacker systems horizontally and vertically to move cars.

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