



A ROBOTIC

As more people move to urban areas, robotic parking's day has come.

By Wes Guckert, PTP

A report recently issued by the United Nations highlighted a global trend: More than half (54 percent) of the world's population lives in urban areas. This trend isn't expected to slow anytime soon. In fact, that number is forecast to rise to 66 percent by 2050. By 2030, the world is projected to have 41 mega-cities with 10 million residents or more. By comparison, there were 10 mega-cities in 1990 and 28 in 2013.

The U.S. is experiencing similar growth in urban centers, reversing a trend that started more than 100 years ago. This summer, Brookings Institution demographer William Frey examined 2012 and 2013 population growth figures from America's 51 largest cities, comparing and contrasting the growth of those urban centers to their suburban areas. What he found wasn't surprising given what the rest of the world is seeing: city populations are growing faster than those in the 'burbs. Not surprisingly, some of these cities include New York, Seattle, Denver, and Washington, D.C.

What does all this have to do with parking? More people means more demand for premium land within a city. This will continue to make land in urban settings more and more costly, and developers will continue to look for more ways to accommodate more people into urban centers. Automated and robotic parking garages accommodate twice as many vehicles in the same space as conventional parking.

Asia and Europe have been using this technology for the past 20 years. Robotic parking is a tested and proven solution. The technology

for robotic parking uses the same technology and philosophy that Amazon, FedEx, and UPS warehouses use to maintain automated efficiency and organization.

Additionally, data show that in the not-too-distant future, our urban centers are going to have to accommodate more people—many more. Planners, developers, and government officials need to consider this shift and plan for it now.

Saving a Space

The ability to park vehicles door-to-door and bumper-to-bumper allows robotic parking garages to save significant amounts of premium space. A developer can build robotic garages using 30 to 50 percent less land than needed for a conventional garage with the same capacity. That means twice the number of parking spaces can be accommodated in the same volume of space. It also means land acquisition costs decrease substantially. That additional land can be used to develop retail, office, and residential units, which are more profitable ventures.



At left, a conventional garage. At right, a robotic garage on the same footprint that holds the same number of cars but adds mixed-use to the building.

REVOLUTION

To put it in perspective, a 90,000-square-foot office building (three levels of 30,000 square feet per level) on a four-acre parcel would require 297 surface lot parking spaces (based on 3.3 spaces per 1,000 square feet). In such a scenario, the combination of the office building and the surface lot parking encompasses the entire four acres. An automated garage can achieve 300 spaces in a fraction of the footprint, and 2.39 acres of land can be saved if the garage is built directly under the building. If the garage is constructed behind the office building, 1.77 acres can be saved.

Why is this? Robotic garages use narrower spaces than traditional parking facilities because there is no need for drivers to get into and out of cars. Also, the ceiling can be lower in these garages as pedestrians do not have to be taken into consideration, vehicles can be parked inches away from each other, and there is no need to incorporate stairwells, elevators, or ramps.

Environmentally Friendly

Beyond actual land use, robotic garages mean fewer car emissions and reduced fuel consumption; cars are turned off as soon as they enter the parking bay. No longer do cars idle for long stretches of time when a sporting event or concert is over, nor do they need to drive up and down ramps, which also contributes to air pollution. In robotic parking garages, fuel savings average 83 percent, while toxic substances in the air drop 68 percent for volatile organic compounds (VOCs), 77 percent for carbon monoxide, and 83 percent for carbon dioxide (compared to conventional parking systems), making them much more environmentally friendly.

Robotic parking garages are so much better for the environment, in fact, that there is an opportunity for additional LEED points when developing a robotic garage versus a standard ramp garage.

Safety Increases

Robotic parking garages eliminate the need for drivers to walk long stretches to a vehicle. In an automated parking garage, the driver simply drops off the vehicle at a drive-in entry cabin. When returning to pick up the car, the driver waits in a pick-up zone for his vehicle.

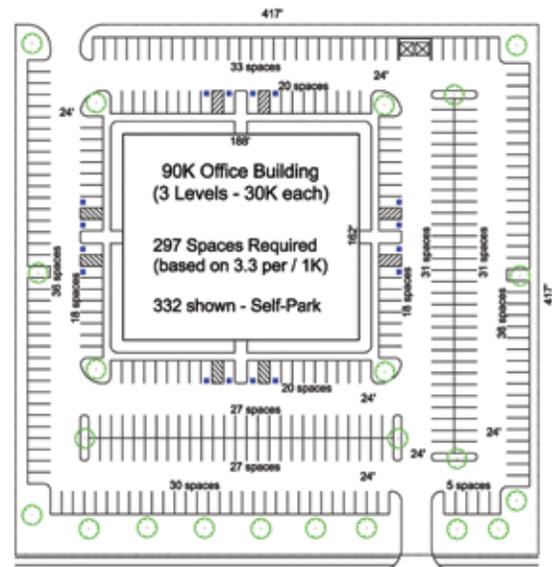
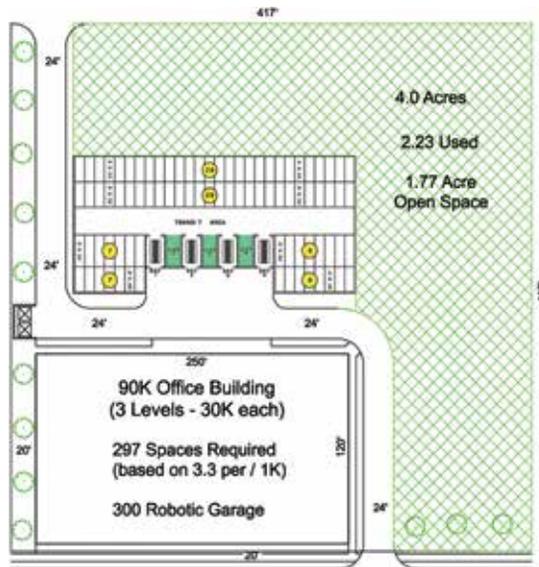
Because there is no access by the public to the vehicle storage area, the risk of theft or vandalism is non-existent. As a result, the driver experience is comparable to a high-quality valet parking operation in which valet runners are replaced with efficient automated technology.

Without having to deal with pedestrians, strollers, shopping carts, or bad drivers, dents, dings, and scrapes are practically eliminated.

Case Study

Recently, The Traffic Group undertook a 24-hour study of an automated parking garage located in a suburb of Baltimore, Md. The purpose was to obtain very detailed and precise information on how the parking garage operated, specifically relating to inbound and outbound conditions, trip generation rates, and drop-off and retrieval time.

The process included placing five video cameras in the garage—one at the main entrance to the 520-space garage and one each at



the four loading/unloading bays. The video cameras recorded for 24 hours before the data were reviewed.

During the 24-hour period, there were 197 occurrences of vehicles being dropped off and 204 occurrences of drivers picking up their vehicles. The data showed that the average time for vehicle retrieval was 3 minutes, 27 seconds, while the average time for vehicle drop-off was 2 minutes, 1 second. It was also discovered that there was rarely an occasion when more than one person was waiting to pick up or drop off his car. This garage has four bays, each able to accommodate 100 vehicles.

The results show that in an urban situation, even with 357 apartment units and 520 total parking spaces, the trip generation rate for a parking garage is significantly lower than what has been reported by the industry in years past. Additionally, the average drop-off and retrieval time is in line with what has been reported at other automated garages on both the national and international basis and is generally in line with the retrieval and drop-off times reported by manufacturers. Clearly, automated parking works and it is a technology whose time has come.

Varieties

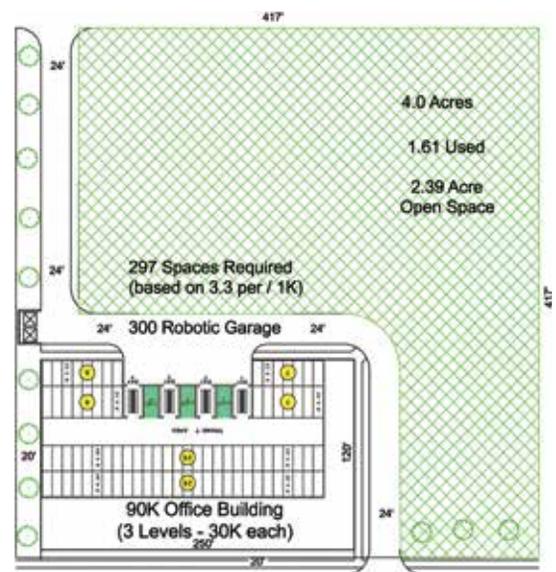
Depending on the facility, robotic, automated, and mechanical parking all use a variety of technologies. The first type of parking system is the lift & slide, which is for smaller garages, accommodating 15-50 cars at a time. Robotic parking, a second system, does not have a limit on the number of cars it can service. The largest robotic parking facility in the world is located in Dubai. It is also known to be one of the most luxurious. The third type of system is robotic parking valet. This is the most economical when servicing a minimum of 200 cars.



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Retrofitting Existing Buildings

Even older, existing buildings can be converted into robotic parking garages; it's not just best in new construction and development. Cities are filled with old factories, warehouses, and other vacant buildings. These



facilities are ideal for conversion into robotic parking garages. Retrofitting and giving new life to these older buildings will provide two to three times the amount of parking, and costs are minimal because no major rehab work needs to be completed and the technology can quickly and easily slide in. The front of the building can even be saved and turned into restaurants and shops for increased revenue opportunities.

Other typical robotic, automated, and mechanical parking works well for hospitals, universities, and office buildings. In addition to urban residential buildings, restaurants, and retail, these types of facilities often bring a high volume of people, most of whom have vehicles to park.

As the population continues to grow, robotic parking now offers city officials, planners, architects, and developers a real-world solution that saves space and money, is environmentally friendly, and is much safer for citizens. With the range of solutions available for both new development and redevelopment, what's not to like? **P**