



*Robotic Parking Systems, Inc.*

— ALWAYS AHEAD —



LARGEST AUTOMATED  
PARKING FACILITY

## ROBOTIC PARKING SYSTEM

### COMPANY PROFILE & ACHIEVEMENTS SO FAR

- Over 25 years in business of Automated Parking.
- So far globally 7,810 automated parking spaces built.
- More than 250 years cumulative engineer's experience.
- Millions of parking transactions performed as on date.
- Built the first automated parking systems in the US and the Middle East.
- Guinness World Record holder for Largest Automated Parking Facility – not just once but twice.
- First to build and utilize simultaneously operating robots for parking – three axis independent motions.
- Certified highest peak traffic throughput (cars / hour) in the industry.
- We are ISO 9001:2015 certified and hold a UL certificate of Compliance for Industrial Control Panels.
- Played a key role in developing a) NFPA 88A fire safety codes for automatic parking and b) UAE Civil Defense codes to guide future robotic parking garages in that region





## LARGEST AUTOMATIC PARKING FACILITY IN THE WORLD

### WHY WAS IT BUILT?

- Safety and security
- Environmentally sensitive
- Restricted land use
- Premium land use
- Shortest walk to court
- No "searching for my car"
- Cost effective



AL JAHRA COURT COMPLEX, KUWAIT  
**2,314 SPACES**

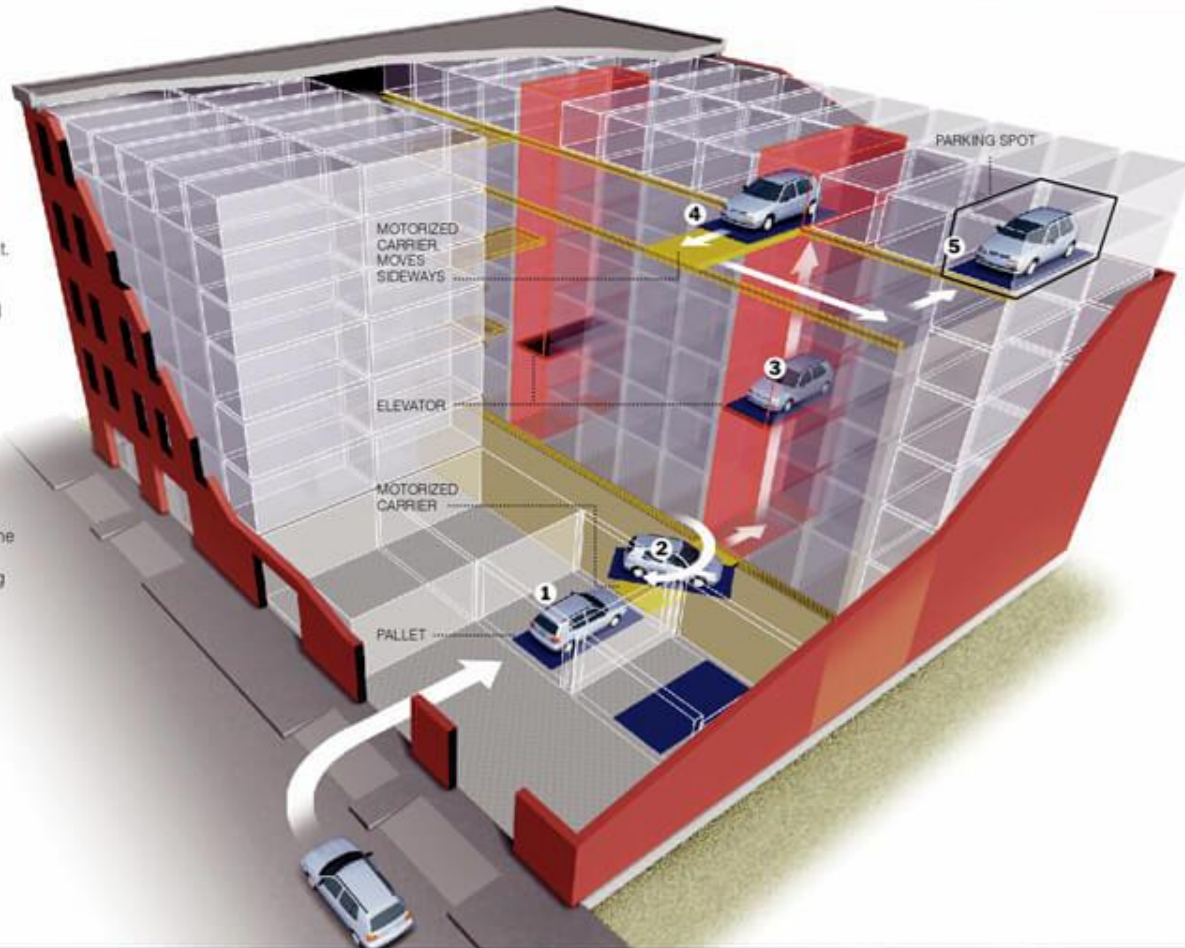


# ROBOTIC PARKING SYSTEMS ILLUSTRATED BY NEW YORK TIMES

## Robotic Chauffeurs

Cars parked at a robotic garage in Hoboken ride to their computer assigned parking spaces atop a pallet. The pallet is moved by motorized carrier on and off an elevator and then on and off a platform that moves laterally to align with the designated space.

- 1** The customer drives into the garage and parks on a steel pallet.
- 2** The computer-controlled carrier pulls the pallet and the car and rotates both by 180 degrees, so the car is facing forward when it is retrieved.
- 3** One of two elevators takes the pallet and car to an upper level.
- 4** The pallet is transferred by another carrier that moves it laterally to an open space.
- 5** The car and its pallet are rolled to the designated parking spot.



## KEY DETAILS FOR AN INFORMED DECISION

- It is often said, “the devil is in the details.”
- There are “key details” that set apart any parking, from concrete garages to other automated parking systems.
- To compare one system to another and to make an informed decision, it is important to look at the differentiating details. That’s what we attempt to do in the following slides.
- So, fill up that cup of coffee and enjoy the ride for the next 20 minutes.



**KEY DETAIL: FIT FOR VEHICLE WEIGHT & GROUND CLEARANCE**  
ROBOTIC PARKING SYSTEMS (RPS) CAN PARK CARS THAT SOME OTHERS CAN'T

**BASED ON MAXIMUM CURB WEIGHT : RPS CAN TAKE UP TO 6,600 lbs.**



**GMC-YUKON**  
5,965 lbs.



**FORD EXPEDITION**  
5,700 lbs.



**ESCALADE**  
5,900 lbs.

**BASED ON LOW GROUND CLEARANCE : RPS HAS NO LIMITATION ON GROUND CLEARANCE**



**TESLA MODEL S**  
6" (152mm)



**MINI COOPER**  
6" (152mm)



**CADILLAC CTS V**  
5.9" (150mm)



**CORVETTE**  
5.3" (134mm)

**MIATA** 4.3" (109mm)



## KEY DETAIL: FIT FOR VEHICLE WIDTH & LENGTH

ROBOTIC PARKING SYSTEMS (RPS) CAN PARK CARS THAT SOME OTHERS CAN'T

BASED ON MAXIMUM WIDTH OF CARS : RPS CAN PARK CARS UP TO 88" (2.235m)



**GMC-YUKON**  
80.5" (2.045m)



**LAMBORGHINI AVENTADOR**  
82.6" (2.098m)



**MODEL X**  
81.5" (2.070m)

BASED ON MAXIMUM LENGTH OF CARS : RPS CAN TAKE CARS UP TO 228" (5.792m)



**FORD EXPEDITION**  
210" (5.334m)



**FORD F-150 TRUCK | REGULAR CAB**  
209.3" (5.316m)



**CHEVY SUBURBAN**  
224.4" (5.700m)



## KEY DETAIL: PALLETS

### PALLET BASED SYSTEM & ITS ADVANTAGES

- Pallets are steel plates with grooves that transport cars. Grooves in the pallets help drivers easily position their cars. Pallets are nominally 19' long and 7'4" wide (5,79 m x 2,235 m).
- Pallets prevent drippings of oil, acids, air-conditioning condensation, salt water, snow and ice, or sand onto the parking system machinery, concrete surfaces or the cars stored inside the facility.
- Pallets eliminate all direct contact with the car and guarantee that no machinery ever touches the vehicle. This design feature ensures one of the highest standards of product liability protection for automated parking facilities.
- RPS offers a pallet-cleaning mechanism for garages in locations that regularly have snow and ice. This system can remove water, sediments, and salt from pallets.





## KEY DETAIL: NO MACHINERY DRIVES UNDER CAR

### NON-PALLET BASED SYSTEMS & THEIR DISADVANTAGES

- Several automatic parking systems do NOT use pallets. These systems use dollies that move under a vehicle and clamp onto its tires to transport it.
- Dollies used in these systems have a major technical design flaw that can cause serious damage to low-lying cars or a chassis that was altered by the owner. The garage owner cannot defend against such a damage claim.
- Vehicles with a close-to-the-ground base can be scratched, dented, or have their bottom components ripped off altogether as the dollies travel under the vehicle. Electric vehicles have a low ground clearance to accommodate a battery pack. For these reasons, non-pallet systems may not accept certain vehicles.



## KEY DETAIL: SYSTEM CAPACITY & SCALABILITY



**Robotic Parking Systems, Inc. made a major breakthrough in the automated parking industry in 2001 with the debut of its Lift and Run technology.** To understand why this technology was revolutionary, it is necessary to understand how things were done previously (and are still being done by many). The picture at the top left demonstrates the older, but widely used, technology. This type of system relies on one or only a few machines to transport each vehicle from the entry terminal up to its final parking space. This means that the machine must park the car before it can return empty to the entry terminal to pick up another car. This is very inefficient and decreases system capacities, particularly during morning and evening rush hour for example.



**Our patented Lift and Run technology uses the principle of 'passing' the load from one machine to another.** It lifts the vehicle, runs with it for a certain distance on one of the X, Y and Z coordinates (directions), and then passes it to another machine operating on another coordinate. This is much more efficient than having one machine do the entire transportation cycle along all three axis', and it increases the overall speed of the system.

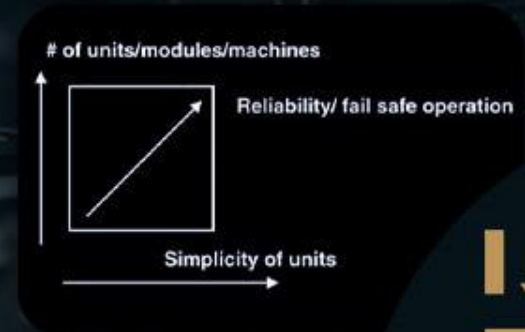


## KEY DETAIL: SYSTEM RELIABILITY AND REDUNDANCY

- Any piece of machinery or electronics (e.g., cars, appliances, and computers) is prone to occasional failure. The only way to successfully overcome this inherent possibility lies in the strict application of true redundancy throughout an entire system. This does not mean merely installing two motors in each machine; rather, it also means providing two copies of each machine, as well as ensuring the redundancy of components within a single machine.
- Automated parking systems must provide true redundancy with multiple elements controlling the same process to provide alternatives in case of failure. All major components must have at least one backup system (and, in some cases, as many as four).

In addition to redundant system design, Robotic Parking Systems implement several additional reliability metrics:

- Transportation machinery uses electromechanical components and avoids hydraulic or pneumatic equipment that involves high maintenance.
- Machinery that can operate in varying temperatures and levels of humidity, dust, and other climate conditions prevalent in a certain region.
- Well-defined maintenance and backup procedures, and user manuals with maintenance instructions.
- Built-in intelligent diagnostic systems that can predict any premature failure and thereby reduce downtime.
- A robust computer hardware system to avoid any data loss. Stratus servers (often used by credit card processing companies and banks) offer a particularly fault-tolerant fail-over solution.
- True redundancy translates to a high level of reliability and ensures uninterrupted operation. No single failure will ever result in the complete inoperability of a Robotic Parking System.
- By including inherent redundant systems, we can ensure that if one machine needs maintenance or repairs, there is always a backup machine that can keep the cars moving in and out of the garage.

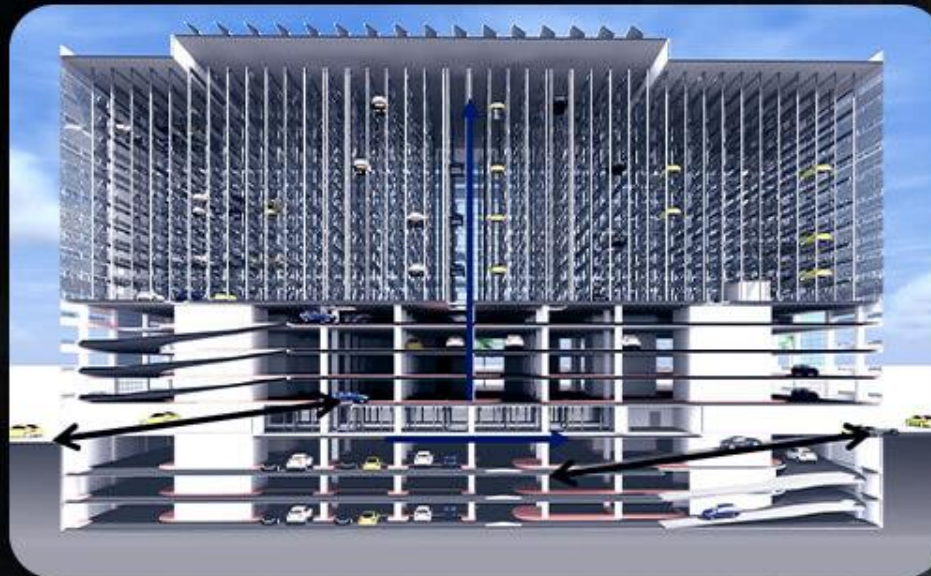


## KEY DETAIL: TRIPLE THE NUMBER OF PARKING SPACES

Besides local zoning code requirements, there are other limitations for conventional parking garages. For example, users do not want to drive up and down more than 5 or 6 levels of ramps.

There may also be local zoning benefits because robotic parking can be considered a one-story building. We do this by using a rack system with concrete only for the foundation slab of the entire structure. Rack levels are constructed using removable steel components and inserted machinery.

This illustration from an executed project shows the dramatic change and efficiency gained by going from conventional parking to an automated system. In this project, **the space efficiency with Robotic Parking was more than triple (3.38) compared to the concrete ramp garage portion.**



Concrete Ramp Parking = 684 spaces  
**ROBOTIC PARKING SYSTEMS = 2314 SPACES**

*Footprint is 328 feet by 168 feet. Conventional 7 levels with a height of 97.44 feet.  
RPS 11 levels with a height of 115 feet. Throughput 425 cars / hour.*

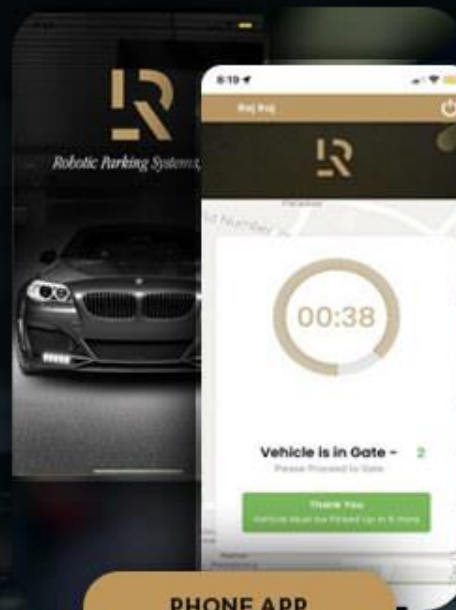


## KEY DETAIL: TOUCHLESS PARKING IN A PANDEMIC WORLD

- Another bonus of automated parking is the premium valet experience along with a contactless parking process to accommodate for pandemic needs.
- When the driver and the passengers have left the entry area (terminal), **the driver initiates the parking process with a touchless near-field communication (NFC) card, FOB, or with an app on a smartphone.** Instead of passing the keys to a valet, patrons simply use an app and keep their keys.
- In simple terms, automated parking enhances the vehicle parking and retrieving experience—elevating it above the level of valet parking.



FOB



PHONE APP



NFC CHIP CARD



## KEY DETAIL: EMERGING TECHNOLOGIES

For higher levels of technology integration, we oriented our system around CASE. <sup>(1)</sup>

- **Connectivity:** Through Cimplicity® software from GE Automation, Robotic Parking System is connected and can receive and share information on an open network.
- **Autonomous Driving:** We developed a partnership with Bosch to facilitate the parking of “autonomous driving cars.”
- **Sharing and Services:** Communications exist to handle car sharing, fleets and servicing cars.
- **Electrification:** Designed to include automatic electric car charging stations. The owner just plugs the cable in our entry terminal to the car.
- **Bonus:** With a Robotic Parking garage a Digital Twin is already included.

### FOUR MAJOR TRENDS CHANGING THE AUTOMOTIVE INDUSTRY



<sup>(1)</sup> CASE strategy as defined by Mercedes-Benz at the Paris Automobile Show.



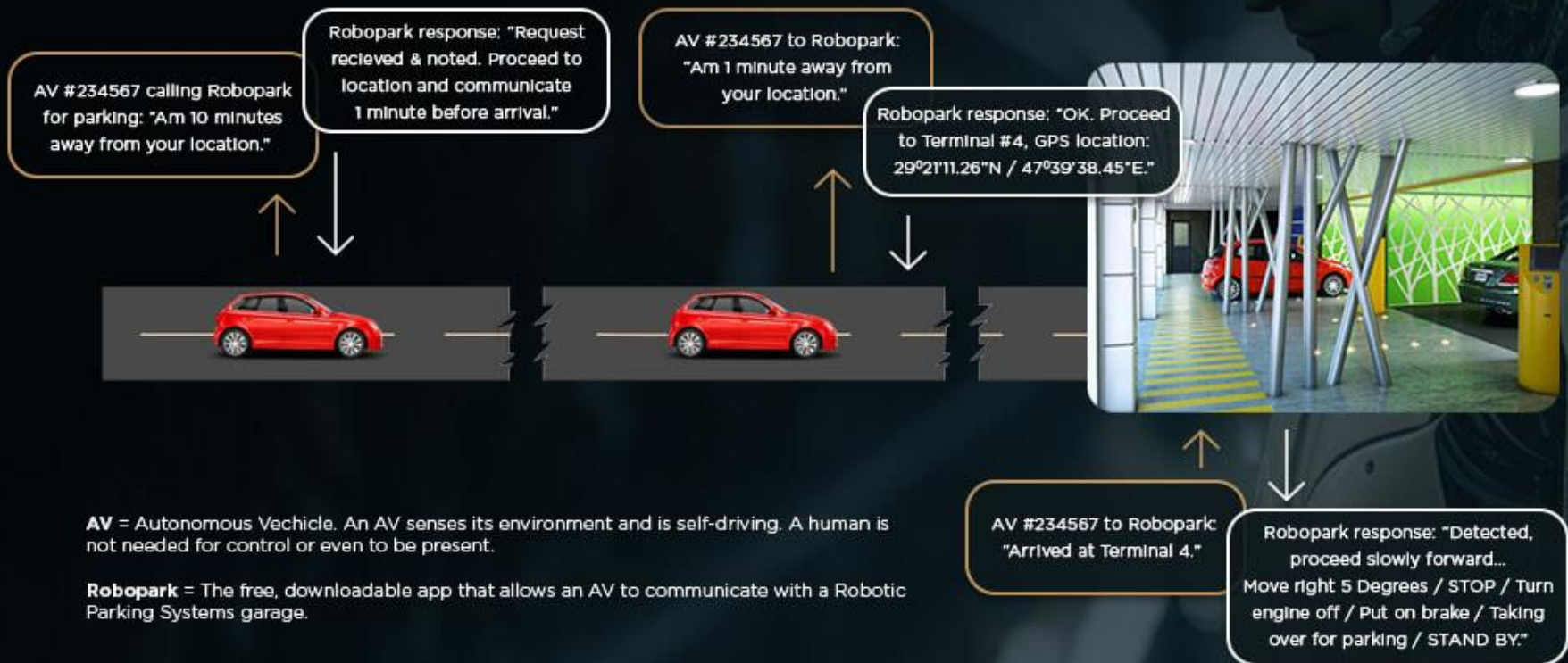
## KEY DETAIL: WIRED (L2), NOT WIRELESS, CHARGING

- **Our fully automated parking system can be equipped with optional automatic electric car charging stations.** There is no limit on the number of charging stations that can be incorporated and more can be added at a later point if needed.
- **Once the car is charged in an automated garage, machines move the car to an ordinary parking slot** and can bring in the next car in the queue for charging. Patrons can avoid receiving fines for blocking the charger after their car is fully charged.




## KEY DETAIL: AUTONOMOUS VEHICLE PARKING

- Research papers state that in order to cater to the needs of self-driving or autonomous cars, conventional concrete garages will require large investments to be retrofitted with sensors, hardware, software, and other guidance equipment. This increases the cost of investing in garage construction.
- Robotic Parking Systems, however, already have a built-in automation platform that can relatively easily accommodate self-driving cars. See Graphic below.





## KEY DETAIL: ADDITIONAL FEATURES

- High-level software developed with GE Intelligent Platform Development Center.
- Uses ultra high-end, fault tolerant Stratus servers (99.999% worldwide uptime.) Redundant servers operating in parallel.
- Hot swap capability – if one server fails the second server takes over automatically with no interruption of service. No loss of data.
- Highest peak traffic throughput in the industry. Autonomous machines. Performs separate x, y and z movements.
- Patented in most parts of the world, Mature system: over 23 years of experience.
- Uses off-the-shelf parts with long history of successful operation.
- No single machine failure will interrupt operations. Offers true redundancy.
- Interchangeable entry / exit terminals – dynamically either an entry or an exit.
- Two high-resolution cameras on entry and exit for vehicle documentation.
- Backup generator with automatic start. Sophisticated diagnostics and high-level warning systems.
- Historical performance during our operation period is 99.9% uptime.
- User-friendly graphical user interface for operation.
- ISO 9001:2015 certified. We also hold a UL Certificate of Compliance for Industrial Control Panels.
- All machinery is manufactured in the USA at the company's headquarters in Clearwater, Florida. We manufacture our machinery from raw steel to finished product using off-the-shelf components primarily from US distributors.
- In partnership with  **BOSCH**



# KEY DETAIL: REDUCED POLLUTION, CARBON FOOTPRINT, LEED POINTS & CARBON CREDITS

## ROBOTIC HAS MEANINGFUL ENVIRONMENTAL IMPACT

### TOXIC EMISSIONS ELIMINATION:

For one 1,000 space garage per year:

(Toxic fumes and particles that parkers do not inhale by using Robotic Parking.)

### RESULTING IN:

- Drastic carbon footprint reduction
- LEED point gain up to 17
- Sustainable building – reusable
- Clean environment

**CARBON DIOXIDE** | 275,422 lbs

**CARBON MONOXIDE** | 5,463 lbs

**GASOLINE** | 13,750 gal

**TIRE DUST** | 9,800 lbs

**HCO** | 2,001 lbs

**NOx** | 103 lbs

**BRAKE DUST** | 100 lbs



## KEY DETAIL: PEAK HOUR CAPACITY

DESIGN INTENT & FITNESS FOR PURPOSE / STANDARD OF CARE

- DESIGN PROFESSIONALS

Table 1. Peak Hour Arrival/Departure Traffic Volume (percent of parking capacity)

Land Use	Peak AM Inbound	Peak Am Outbound	Peak Pm Inbound	Peak PM Outbound
Residential	5-10	30-50	30-50	10-30
Hotel/Motel	30-50	50-80	30-60	10-30
Office	40-70	5-15	5-20	40-70
General Retail	20-50	30-60	30-60	30-60
Convenience Retail	80-150	80-150	80-150	80-150
Medical Office	40-60	50-80	60-80	60-90
Hospital Visitors	30-40	40-50	40-60	50-75
Hospital Employees	60-75	5-10	10-15	60-75
Airport				
Hourly Lot	50-75	80-100	90-100	90-100
Daily Lot	5-10	5-10	5-10	5-10
Special Event	80-100			80-200

Source: *PARKING STRUCTURES: PLANNING, DESIGN, CONSTRUCTION, MAINTENANCE, & REPAIR*, Third Edition, by Chrest, et al. Kluwer Academic Publishers, Norwell, MA 2001



National Parking Association  
1112 16th Street, NW, Suite 300  
Washington, DC 20036  
800/647-PARK • 202/296-4336  
Fax 202/331-8523 • [www.npapark.org](http://www.npapark.org)

*"The most important factor for designing the access requirements for any parking facility is to determine the peak hour arrival and departure traffic volume."\**

The table provides easy-to-use percentages depending on the use of the parking facility and its parking space capacity.

The hourly peak traffic from the chart can be used to determine the performance requirement of an automated parking system.

*Alternatively, if a traffic study is available, the designers can use it for the design specifications.*

*\* Source: The National Parking Association in its publication "Guide to the Design and Operation of Automated Parking" (2003). Table also from this publication.*



# KEY DETAIL: 3RD PARTY VERIFICATION

تي بوفي ميديل ايسست ذمم  
TUV MIDDLE EAST W.L.L



This document is issued as per TUV Middle East procedures in accordance with the requirements	TUV Middle East	KUWAIT
	Report No.	RPSK/RP/280817/01GV
	Work Order No.	WD-ISO-KWT-009936
	Inspection Date	28 <sup>th</sup> AUGUST 2017
	Place of Inspection	AL JAHARA COURT COMPLEX

P.O. Box 29643, KUWAIT  
Tel: +965 22450112/113  
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Email: [sales@tuv-nord.com](mailto:sales@tuv-nord.com)  
[www.tuv-nord.com/](http://www.tuv-nord.com/)  
[www.tuvme.com](http://www.tuvme.com)

## INSPECTION REPORT

Name and Address of the Owner	Robotic Parking Systems Inc. Al Jahara Court Complex, Basement. P.O.Box 21403, safat 13075 Al Jahara, State of Kuwait.
Type of Inspection	WITNESSING OF THROUGHPUT (VISUAL AND FUNCTIONAL INSPECTION)
Location	AL JAHARA COURT COMPLEX
Equipment	Robotic Parking System
Name of Manufacturer	Robotic parking system inc
Average retrieval time for single vehicle	177 Seconds
Throughput capacity	425 cars/hour (in bound and out bound traffic).

Note: Witnessing carried out with empty car pallets only.

### Inspection Carried Out:

The witnessing of through put /visual inspection and functional test has been carried out on the above Robotic system and it is safe to operate for its intended use within the design limits specified, provided there is continuous maintenance applied.

### Inspection Results:

The above Robotic system has been visually inspected and functionally tested, found satisfactory at the time of inspection.

The report become invalid if any alteration made to the above mentioned system.



This document is issued subject to the condition that nothing herein constitutes or is to be deemed to constitute a warranty, approval or endorsement by TUV Middle East W.L.L. liability shall be limited to the site of inspection. The signatory, manufacturer, seller, importer or operator of any equipment, appliance or machinery or damage to any person or property occurring by reason of negligence, or any defect in materials, machinery, equipment or other items other than such defects attributable to normally accepted testing standards shall be the responsibility of the signatory, manufacturer, seller, importer or operator of any equipment, appliance or machinery, and which are covered under the document.

- Peak traffic throughput capacity = total cars per hour in a combination of inbound and outbound traffic.
- Third-party verification and certification is provided by Robotic Parking Systems Inc. to show compliance with throughput performance specifications in our contracts.
- Throughput capacity is more critical than single retrieval time in day to day operations.



## KEY DETAIL: TRACK RECORD MATTERS

NOT ALL AUTOMATED PARKING SYSTEMS ARE MANUFACTURED EQUALLY.

It is critical that decision makers **practice “look, don’t listen”** when choosing the manufacturer for their automated parking facilities. A financial guarantee on construction does nothing to make up for an inoperable parking system or clients leaving due to parking inconvenience. Decision makers should look at existing automated parking facilities of any company under consideration and should inquire about past failures and successes.

- **Third party assessment for positives and risks:** A professional assessment would be beneficial for clients doing a thorough study on various automated parking systems offered. A Robotic Parking Systems’ customer commissioned Zuhlke (Switzerland) in 2010 to complete such an analysis. Here are a few of the comments.
  - Highly redundant, cleverly designed system with good traceability
  - Best practice compliance
  - Mature, extensible system: over 10 years of experience in automated parking
  - Easy integration with third party products
- For your convenience, we offer a **direct video demonstration of a working garage** so that you can **avoid travel** and still get a real time experience.
- Work with a manufacturer that provides vertical integration of the mechanical and software systems (in-house R & D and engineering teams).
- An additional advantage includes a manufacturer that has strategic partnerships with world leaders in automation such as GE, Control Techniques, Emerson and BOSCH.

**zühlke**  
empowering ideas

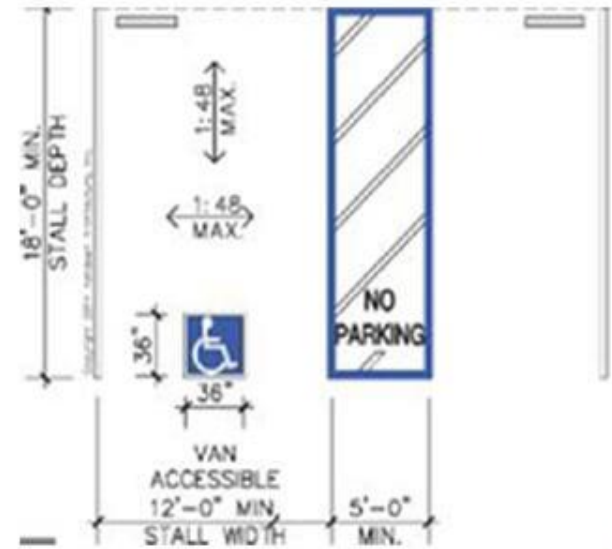
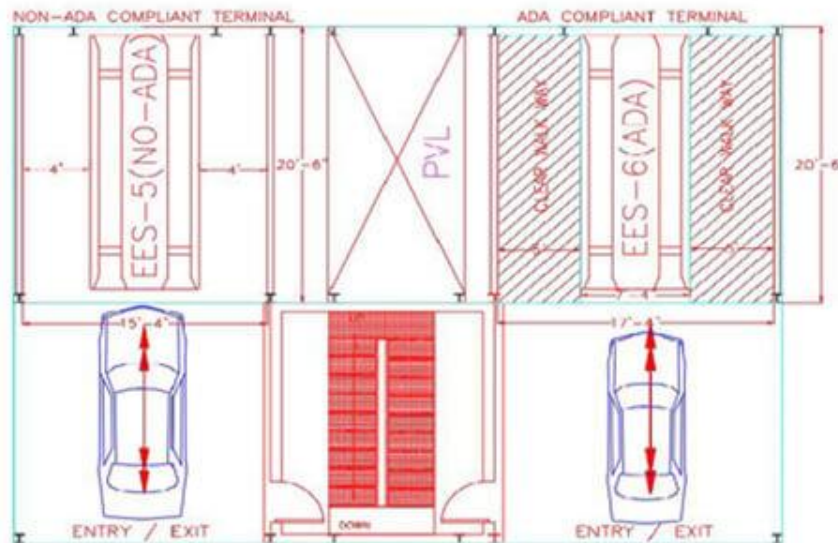


**LONG TERM EXPERIENCE  
MATTERS!**



## KEY DETAIL: ALL SPACES ADA COMPLIANT

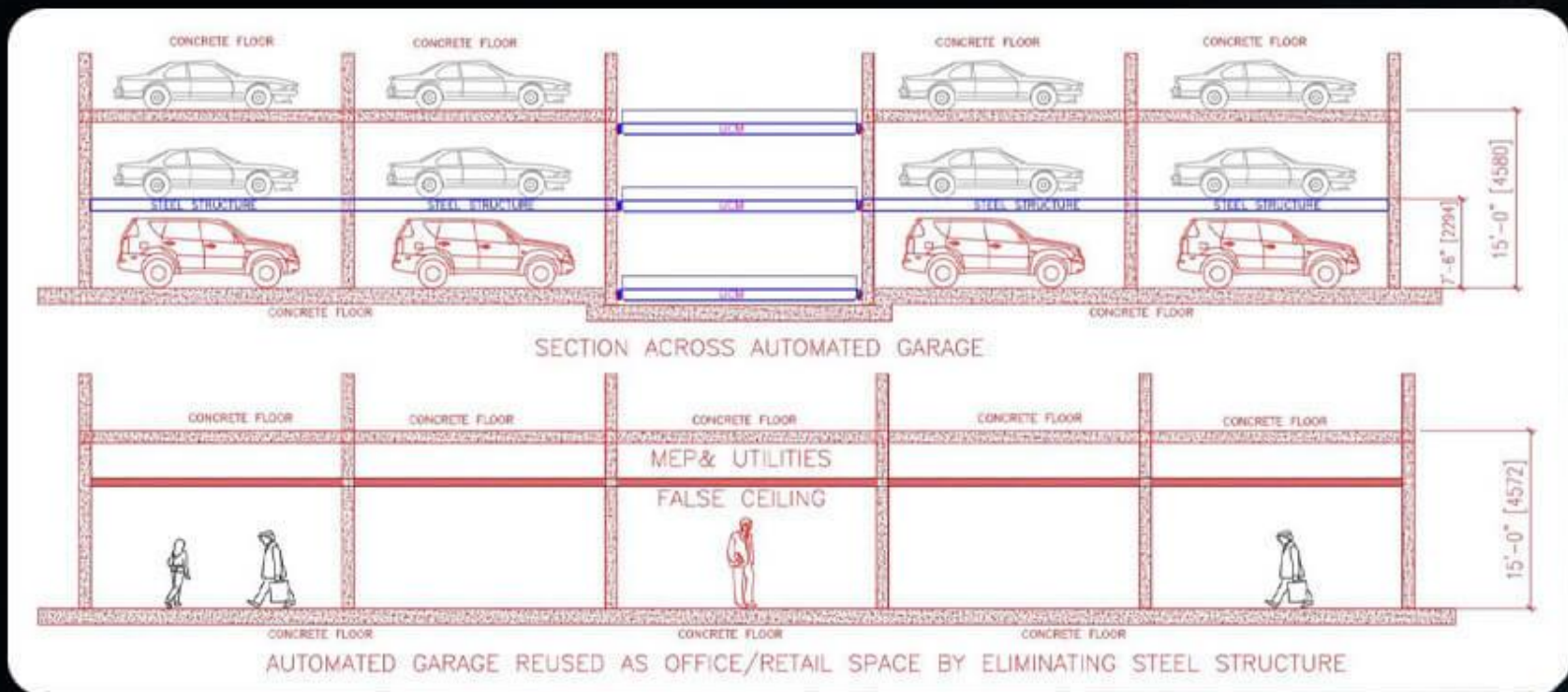
- All RPS entry / exit terminals can be ADA (American Disabilities Act) compliant. The terminals are extra large and comfortable.
- The minimum width of each standard terminal is 15' 4". Each walkway has 4' of equal clearance on the left and right of the parked car. The minimum width of the ADA entry / exit terminals is 12' of car slot and 5' minimum on one side of the walkway for wheelchair access. This is a total width of 17'.
- The Robotic Parking Systems' ADA terminals have 5' of walkway on the left and right side of the car (the car faces outward when it is retrieved) and provides a total width of 17'4" which is more than what the building code requires for ADA parking.



## KEY DETAIL: ADAPTIVE REUSE FOR FLOOR SPACE

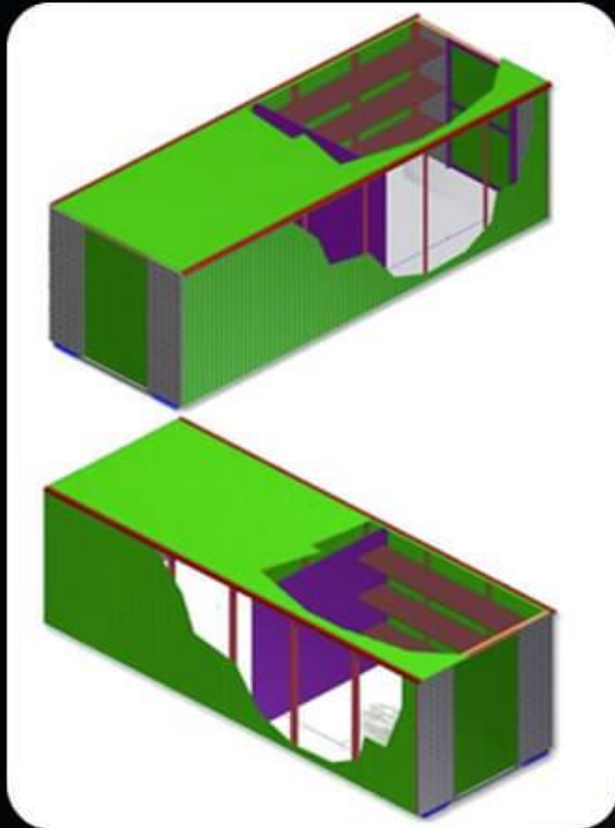
Robotic Parking Systems' facilities can be more easily adapted than traditional concrete parking garages OR automated parking garages that rely on concrete for each level.

- As the sketch shows, the system can be taken out and the space reallocated for other uses with ample heights
- The system, partially or entirely, can be relocated to another location, allowing developers to convert the facility into other usable space.



## KEY DETAIL: ADAPTIVE REUSE FOR VALET STORAGE

All or a portion of the parking spaces can be re-used as storage spaces by providing containers on top of the pallet.





## KEY DETAIL: SAFETY SECURITY & CONVENIENCE



**NO SCRATCHES / DENTS**



**NO ASSAULTS / SAFE**



**NO LONG SEARCH/WALKS**



**NO PARKING LOT ACCIDENTS**



**NO VANDALS / THEFT**



## THE REAL COST OF PARKING: MAIN FACTORS

The cost of automated parking facilities depends on three main factors listed below.

100 Spaces?  
Or, 1000 Spaces?



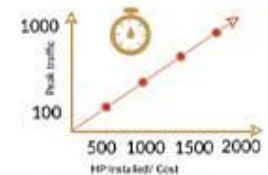
# OF PARKING SPACES

60 x 60 Feet?  
Or, 100 x 400 Feet?



SIZE OF LAND

100 Cars/Hour  
Or, 600 Cars/Hour?



PEAK TRAFFIC



## THE REAL COST OF PARKING: COMPLETE PICTURE

- When planning a project's parking needs, it is important to consider all the potential costs and benefits including land, structure, a façade that blends into the project, wayfinding systems, access and revenue control systems, safety and security installations, new emerging technologies, aesthetics, valet services, liabilities, and more.
- When comparing the cost of a conventional concrete ramp garage to a Robotic Parking System, too often all of the costs of Robotic Parking are compared with only the cost of structure for a concrete ramp. The graphic below illustrates why this gives an inaccurate comparison of costs.

750 PARKING SPACES WITH PEAK TRAFFIC OF 240 CPH (CARS PER HOUR)



Disclaimer: This cost assumption may differ based on the geographical location.



## THE REAL COST OF PARKING: EXPERT STATEMENT

Parking Alternatives		
	Conventional Parking	Automated Parking
<b>Capacity &amp; Labor Assumptions</b>		
Capacity	892	892
Hours of Operation	24/7	24/7
<b>Expenses</b>		
Payroll & Benefits	\$850,000 <sup>1</sup>	\$145,000
Insurance Expenses	\$95,000	\$50,000
Utilities Expenses	\$165,000	\$200,000
Repairs & Maintenance	\$145,000	\$50,000
Bank Fee Expense	\$100,000	\$100,000
Marketing Expense	\$20,000	\$20,000
Support Service Expense	\$75,000 <sup>2</sup>	\$35,000
Other Operating Expense	\$150,000 <sup>3</sup>	\$75,000
<b>Subtotal Operating Expenses</b>	<b>\$1,600,000</b>	<b>\$675,000</b>
Real Estate Taxes Expense	\$150,000	\$150,000
<b>Subtotal Non-Operating Expenses</b>	<b>\$150,000</b>	<b>\$150,000</b>
<b>Total Expenses</b>	<b>\$1,750,000</b>	<b>\$825,000</b>
<b>Capital Costs</b>		
Security Camera/DVR System	\$30,000	\$30,000
Capital Account	\$240,000 <sup>4</sup>	\$60,000
<b>Total Capital Cost</b>	<b>\$270,000</b>	<b>\$90,000</b>
<b>Grand Total</b>	<b>\$2,020,000</b>	<b>\$915,000</b>

1. See Labor Schedule  
 2. Includes security, legal fees, and adult fees  
 3. Includes license/permit fees, uniforms, office supplies, claims, etc.  
 4. Conventional Garage: 30% of garage repaired every 10 years at \$50/sf

Figure 10: Comparison of expenses and capital costs for Parking Alternatives Case Study: Upper Manhattan, New York City<sup>2</sup>

- Samuel I. Schwartz, P. E. (former Transportation Commissioner of New York City) compared the operating and capital costs of an 892-space conventional garage versus those of an automated parking facility. Schwartz concluded that, when all factors are considered, the cost of operating an automated garage is less than half (55% savings) than that of a conventional garage.
- In his paper, “The Garage of the Future Must Be Green,” Schwartz stated, “An owner can save over \$1.1 million per year with automated parking. In the current real estate climate, this is equivalent to capital cost savings of over \$15 million.” Schwartz also stated that the useful life of a conventional concrete parking garage is about 20 years. The earliest European mechanical/automated systems show little to no wear after more than 50 years of usage (an example is the parking system of Deutsche Bank Munich, installed in 1956).



## AUTOMATED PARKING & CODES

### INTERNATIONAL CODES

- **Building Code Observations International Building Code (IBC):** Occupancy per section 311 group Storage S2, further per Section 503.1.1 “Special Industrial Occupancies” and as further detailed in Section 2208 (“Steel Storage Racks”). Automated parking systems are unoccupied space; thus, Section 406, dealing with garages in the common understanding as “people driving vehicles through a building structure used for parking,” does not apply. Rather, automated parking is considered an unoccupied, automatic storage system.
- As to FAR, if used with an open rack structure, a building is considered a one-story construction. Some jurisdictions classify automated parking systems as “equipment” and issues appropriate requirements for certain fire ratings of the surrounding supporting building elements.



## AUTOMATED PARKING & CODES

### INTERNATIONAL CODES

- **International Fire Code:** Chapter 23, section 2309 (“Automated Storage”): Due to the high content of plastic as well as the existence of fuel tanks in automobiles, the storage should be considered to be a “high hazard commodity”, and, in accordance with Chapter 2309 and Table 2306.2, require an in-rack sprinkler system per the National Fire Protection Association (NFPA) 13 as well as a building access point placed every 100 feet. These and similar requirements are also in accordance with NFPA 88A, which details such as well in its Chapter 9. Also described there are ventilation requirements of two air changes per hour. Which can be satisfied, where possible, using natural ventilation.



INTERNATIONAL FIRE CODE

NFPA 5000



## AUTOMATED PARKING & CODES

### ADDITIONAL CODES

There are various codes that are available for automated parking. The following are highly common:

- National Parking Association (NPA), "Guide to the Design and Operation of Automated Parking Facilities"
- American Society of Mechanical Engineers (ASME) B30.13 "Storage/Retrieval (S/R) Machine and Associated Equipment"
- All electrical equipment is ETL or UL listed and approved.



## RPS IS IN A LEAGUE OF ITS OWN

### ROBOTIC PARKING "FIRSTS"

- Coined the term **"robotic parking"** to describe the new technology and used the term for our company and product names.
- First to build and utilize **simultaneously operating robots** for parking – three axis independent motions.
- Built the first automated parking systems in the **US** and the **Middle East**.
- Played a key role in developing a) **NFPA 88A** fire safety codes for automatic parking and b) UAE Civil Defense codes to guide future robotic parking garages in that region.
- Guinness World Record holder for **Largest Automated Parking Facility** – not just once but twice.
- Certified **highest peak traffic throughput** (cars / hour) in the industry.
- Instrumental in the development of National Parking Association's Guide to the Design & Operation of Automated Parking Facilities.
- Leader in the integration of **emerging transportation** technologies including association with Bosch for autonomous driving vehicles.
- The **ORIGINAL robotic parking** – not a copy.
- **Robotic Parking Systems' technology evaluated and audited by Independent technology experts.**





# KEY DETAIL: ROBOTIC PARKING SYSTEM PATENTS

As a pioneer and innovator in the automated parking industry, RPS holds multiple patents on the system in the US and other countries.

The benefit for owners and developers building with Robotic Parking Systems, Inc. is that their projects can never be challenged by anyone due to patent infringement.

The image displays four overlapping patent documents from the United States Patent and Trademark Office (USPTO). The documents are for the following patents:

- US Patent 5,669,753**: Filed by Schween, dated Sep. 23, 1997.
- US Patent 6,502,011 B2**: Filed by Haag, dated Dec. 31, 2002.
- US Patent 6,662,077 B2**: Filed by Haag, dated Dec. 3, 2003.
- US Patent 6,851,921 B2**: Filed by Haag, dated Feb. 8, 2005.

The bottom-most patent document (US 6,851,921 B2) includes a detailed technical diagram of a robotic parking system. The diagram shows a grid of parking spaces with various mechanical components labeled with reference numerals (e.g., 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990). The diagram illustrates the layout of the parking system, including the arrangement of the parking spaces and the mechanical components used to move the vehicles.



## ROBOTIC PARKING SYSTEM - ACHIEVEMENTS



It became official In February 2018. For the second time a Robotic Parking Systems' facility was awarded the Guinness World Record for the Largest Automated Parking Facility In the world - 2,314 spaces.



Eng. Mohammed Al Kholy, General Manager M. A. Al-Kharafi, stated, "I am writing this letter to express my gratitude and appreciation for the high-quality service being provided to us... They (Robotic Parking Systems) have executed the design, manufacturing and delivery of over 1,293 tons of machinery, electronics and automation equipment within a remarkably short time to meet the project schedule demanded by Amiri Diwan."





## **ROBOTIC PARKING SYSTEMS PROJECTS**

**DESIGNED, MANUFACTURED AND INSTALLED MACHINERY  
AND EQUIPMENT FOR APPROXIMATELY 7810 SPACES.**



## HOBOKEN, NEW JERSEY



NUMBER OF SPACES

**314**

FOOTPRINT

**100 ft. x 100 ft.**

HEIGHT

**56 ft.**

THROUGHPUT

**120 cars/hr**

YEAR OPENED

**2021**

- Delivered in 2002, it was the first automated parking system in the USA per the New York Times.
- About 700,000 transactions in the first 5 years of operation in the automated garage show an "up time" over four years of continuous 24/7 operation of 99.9%.
- These intensive operational conditions taught us exactly what elements could be improved. These improvements were incorporated into our next generations of installations.



## PINELLAS PARK, FLORIDA



NUMBER OF SPACES

114

FOOTPRINT

97 ft. x 72 ft.

HEIGHT

33 ft.

THROUGHPUT

80 cars/hr

YEAR OPENED

2023 / 2018

- This garage serves as employee parking, as well as the company's research, development and testing facility.



## IBN BATTUTA GATE COMPLEX – DUBAI, UAE



- The first automated parking garage in the Middle East.
- Performance tests proved peak traffic handling of more than 250 cars per hour with the capability of 32 cars in motion at any one time.
- To date, this facility has had a continuous operations track record.
- The World's Luxury Guide awarded the Robotic Parking System at Ibn Battuta Gate the status of the most luxurious automated garage in the world.

NUMBER OF SPACES	765
FOOTPRINT	276 ft. x 98 ft.
HEIGHT	57 ft.
THROUGHPUT	250 cars/hr
YEAR OPENED	2009



## EMIRATES FINANCIAL TOWERS (EFT)-DUBAI UAE

- Designed, manufactured and installed the machinery and automation.
- EFT previously held the Guinness World Record for **Largest Automated Parking Facility** at 1191 spaces.

NUMBER OF SPACES	1191
FOOTPRINT	320 ft. x 120 ft.
HEIGHT	72 ft.
THROUGHPUT	330 cars/hr
YEAR OPENED	2010



## AL JAHRA COURT COMPLEX KUWAIT



- 2018 Guinness World Record holder for Largest Automated Parking Facility.
- A 2314 space automated car park for Amiri Diwan Al Jahra Court Complex in Kuwait.
- The facility is a combination of 684 concrete ramp parking spaces plus the 2314 automated spaces.
- Certified peak traffic throughput of 425 cars per hour inbound / outbound and average single retrieval of 177 seconds.

NUMBER OF SPACES	2314
FOOTPRINT	328 ft. x 168 ft.
HEIGHT	115 ft.
THROUGHPUT	420 cars/hr
YEAR OPENED	2017





## AL JAHRA COURT COMPLEX KUWAIT



## CURRENT PROJECT NEW PALACE OF JUSTICE - KUWAIT

The New Palace of Justice has a unique and modern design and will be the world's tallest and largest judicial building.

Robotic Parking Systems is building 2433 automated parking spaces for the facility.



# NEW PALACE OF JUSTICE - KUWAIT



# NEW PALACE OF JUSTICE - KUWAIT





## SUMMARY

### ROBOTIC PARKING SYSTEMS

### **INNOVATIVE PARKING SOLUTION WITH PREMIUM ADVANTAGES FOR EVERYONE.**

- More spaces and better parking experience.
- Better safety and security for individuals and their cars.
- Environmentally friendly. Less congestion.
- True redundancy, speed and reliability.
- Proven in multiple facilities, for over 20 years.
- Automation is based on international automation experts – GE, BOSCH, EMERSON and others
- Integrates with emerging technologies in transportation.
- Scalable and allows for adaptive reuse.
- RPS is the foremost pioneer and innovator in automatic parking internationally.





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“ **The first & last impression counts** ”

