Robotic Parking Systems, Inc.

System resilience and proactive monitoring drive automated parking

Business situation

Robotic Parking Systems is out to change the way the world parks cars. And, in the process, improve urban land use, cut polluting auto emissions, and adhere to LEED (Leadership in Energy & Environmental Design) green building construction and operation metrics.

Drive into a street-level "terminal" at a Robotic Parking garage, shut off the ignition, and exit your vehicle. The system automatically does the parking for you. It is premium valet service without the valet. Instead of a person driving up and down a network of concrete ramps and circling parking levels in search of an open space, the control-system network knows exactly where to place a car.

Behind the scenes, sophisticated software controls the platforms, lifts, motors, sensors, and other mechanical gear that transport the

QUICK FACTS

SOLUTION PROFILE

- Automatic car parking optimizes land use, cuts auto emissions, promotes 'green' urban development
- Continuous systems availability critical to flawless execution and customer satisfaction
- Includes a primary data center and a secondary site for disaster recovery
- Total redundancy, proactive monitoring built in to all IT and mechanical operations to prevent failure, and enable preventative maintenance

PRODUCTS

- Stratus ftServer systems
- GE Fanuc Intelligent Platforms Proficy HMI/SCADA-CIMPLICITY software
- Microsoft® Windows Server® operating system
- Microsoft SQL Server® database software

"True redundancy translates into a greater level of reliability and ensures uninterrupted operations."

Royce Monteverdi
CEO
Robotic Parking systems

car to an open slot in a multi-story steel shelving system. Different size bays accommodate sedans and SUVs, improving space utilization. When you are ready to leave, the system locates your vehicle and returns it to a ground level exit terminal – facing in the correct direction. Retrieving a car takes one to three minutes; each entry/exit gate can handle 30 cars per hour on average.

These garages take up only half the space of a traditional car park, making land available for green space, additional parking, or other development options. A facility can be stand-alone, below a building or above a building so long as there is adequate access to entry/exit terminals. Interior lighting and HVAC are not needed where the cars are parked. Compared to a traditional enclosed car park, a Robotic Parking operation uses 50 percent less power per cycle (car in/car out).

Robotic Parking created the first automated parking facility in the Middle East, in Dubai, UAE with 765 spaces. Another 1200-space underground garage is planned for Dubai, with a third in Abu Dhabi with 325 spaces. Garages are in Clearwater, FL and Hoboken, NJ USA, as well.

Business objectives

Robotic Parking operations are technology driven. According to company CEO Royce Monteverdi, the entire system is engineered with redundancy to the extreme. For example, not only are there two motors on a single machine, there are two machines each with redundant motors. Both can perform the same task at the same time. If one machine requires maintenance or repair, the back-up is already operating to keep cars moving in and out of the garage.

The same philosophy applies to software and hardware powering command and control operations. Two complete systems with redundant servers, programmable logic controls, and network cabling ensure that a worst case scenario — cars can't be retrieved because of a system failure — doesn't happen. Backing all that up is an emergency power generator with automatic transfer switch that kicks in if there's a power outage.

"True redundancy translates into a greater level of reliability and ensures uninterrupted operations," said Monteverdi. "No single failure will ever result in the system being inoperable. Uptime of the system is unprecedented."

CIMPLICITY Redundancy

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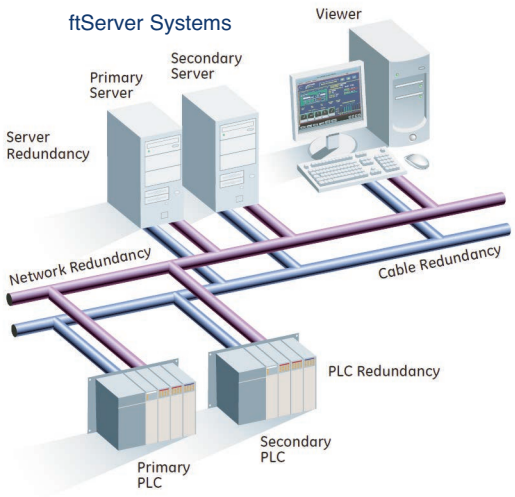

Partnering for Prevention

GE CIMPLICITY automation software powers the garages. It is a client/server based visualization and control solution with detailed HMI (human machines interface) graphics screens. Operators "see" every movement and car location on display terminals in real time and can perform supervisory system tasks as needed. The software's data store records the rotation of every wheel, bearing, gearbox and motor, making information about needed maintenance or repairs immediately available online to the service department. Data from approximately 35,000 input points, as well as input from customers driving in, are stored to Microsoft SQL server database.

CIMPLICITY software provides up to five different alarm messaging classifications. These early warning indicators and alarms can identify deteriorating conditions before a malfunction can occur. Alerts are forwarded automatically to technicians' beepers, cell phones or terminal screen, with up to three locations receiving simultaneous notification.

It was GE that brought Stratus ftServer systems to the attention of Robotic Parking Systems as the ideal hardware platform to host CIMPLICITY software. These servers support mission-critical applications around the world, delivering better than 99.999 percent uptime guaranteed in 24/7 operation. In 2010, the average downtime of an ftServer unit across the entire installed base was just 62 seconds.

Two is Better than One

Like every operational and mechanical aspect in these garages, ftServer systems are completely redundant within a single enclosure. The big difference from other high availability server solutions is that Stratus servers are designed to prevent failures from occurring, rather than recover from failure after the fact. There is no system failover or data loss. ftServer systems come pre-configured and ready to work, with no application modification, proprietary systems, or complex hardware or software.

Stratus ftServer systems have two features no other server solution in the world has: an automated uptime software layer and proactive availability management and monitoring.

The automated uptime layer is essentially embedded level-one managed service. It constantly monitors more than 500 system components and sensors, and manages system resources to preemptively protect against downtime and data loss.

If a problem is detected, the software isolates the offending component from the application and other system resources. The uptime layer may decide to return the component to service, or it may determine there's a more serious issue at hand. From the user perspective, it's simple and automatic, requiring no human intervention.

" Flawless operation and consistent performance are critical aspects to new business development, just as they are in day-to-day operations and customer satisfaction. In both contexts, I count on Stratus uptime assurance to help carry the day."

The second unique dimension is proactive availability management. Stratus availability technicians or authorized partners can access the system and automated uptime layer over a secure global network. Technology experts are at the ready 24/7 to remotely diagnose and remediate more complex issues. Everything a service technician can do onsite, Stratus proactive availability management does remotely, with no waiting several hours for a repair technician to show up, hopefully with the right part to get your business back online.

The technology layer will capture the root cause of problems, and report the information to the uptime experts to make the fix and avoid a repeat. All the while applications continue to run, and business continues to operate, with no intervention from your IT team.

Business Impact

Even with its highly sophisticated and environmentally responsible design, together with advanced IT systems technology, development cost for a Robotic Parking Systems facility is less than a traditional car park that has none of the advantages.

"When you factor in the additional revenue-generating potential of our parking solution in a typical urban environment, it will always result in a net development profit for the total project compared to conventional car parks," said Monteverdi.

More projects are in planning stages in several countries. Track record and proof-of-concept are important benchmarks in winning new contracts. "Flawless operation and consistent performance are critical aspects to new business development, just as they are in day-to-day operations and customer satisfaction. In both contexts, I count on Stratus uptime assurance to help carry the day."

About Stratus

Stratus delivers uptime assurance for the applications its customers depend on most for their success. With its resilient software and hardware, backed by proactive availability management services, Stratus products help to save lives and to protect the business and reputations of companies, institutions, and governments the world over.

To learn more about worry-free computing, visit www.stratus.com

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