

# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY



LOCATION:  
*Brooklyn, New York,  
United States*

YEAR:  
*2006*

STATUS:  
*Laureate*

CATEGORY:  
*Medicine*

NOMINATING COMPANY:  
*Cisco*

### ORGANIZATION:

SUNY Downstate Medical Center

### PROJECT NAME:

Robots Join the Workforce

### Summary

State University of New York (SUNY) Downstate Medical Center has a new employee. Weighing in at 600 pounds and only 56" tall, this employee makes hospital rounds four times a day, seven days a week, 365 days a year for no salary, no benefits, and has never taken a sick day. (SUNY) has deployed a high security robot that travels around the hospital delivering medications from the pharmacy to the nurse stations. Using Cisco wireless technology, the robot travels independently from floor to floor, communicates with the hospital's elevators and, through a Cisco wireless network, stays in constant communication with the pharmacy.

### Introductory Overview

(SUNY) Downstate Medical Center in Brooklyn, NY was looking for a way to reduce costs, increase productivity, and ensure that deliveries from its hospital's pharmacy were delivered securely and on time. Pharmacy staff began researching options and found that Cardinal Health had a secure robotic courier system that could deliver supplies safely throughout the hospital. The robot, called HelpMate, is part of Cardinal Health's line of Pyxis products.

The robot can be used to transport medications, lab samples, supplies, meals, medical records, and equipment. It can get around in cluttered, unstructured environments and can enter and exit elevators without assistance. The SecurePack (SP) backpack incorporates Pyxis BioID™ technology, enabling and optimizing a high level of security.

The solution seemed to fit the hospital's needs, but Joel Stern, associate director of information services for (SUNY) Downstate was concerned about the ability to track the robot's whereabouts once it left the pharmacy. The Pyxis system does not require a network. Users can program the robot with the hospital floor plan as well as program each stop it needs to make and although the robot keeps track of where it is through internal sensors, it was unable to communicate directly with the pharmacy.

"We put in a Cisco wireless network for two reasons," says Stern. "First, we wanted to implement access points that would tell us where the robot was at all times. Although this doesn't happen often, the robot could get stuck. With the wireless network in place, the pharmacy



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knows where it is and can take care of the problem. We also wanted a way to keep real-time inventory so that we always know what's on the cart, how much has been used, and where it was delivered."

Security was also a critical issue for Stern. "Each nursing station only has access to their particular drawer," he says. "The wireless network provides the pharmacy with data such as when its supply drawers were opened, what was taken out, and the robot's location."

Access to (SUNY) Downstate Medical Center's eight floors is no problem for the robot. "Wireless access points let the robot communicate with the elevator controller on the roof," Stern says. "When the robot calls the controller, the elevator will first deliver all its passengers to their appropriate floor and then will proceed to the floor where the robot is waiting. Once the elevator doors open, the robot rolls right on in."

### Benefits

The primary benefit to the hospital is increased productivity. For example, for the month of February 2006, the robot performed 169 runs, with the average run taking about one hour.

"Based on an eight hour work day, the robots saves us 21 days of work, even more important, it frees staff from the time-consuming task of making deliveries," says Nick Galeota, pharmacy director. "Additionally, the robot works all shifts and holidays making scheduling easier on all of us."

The level of maintenance and support required is minimal. Once the robot is programmed and communicating with the wireless network, very little support is required. "We don't even think about it," Stern says.

Other positives include increased patient satisfaction. With less time spent tracking down couriers to deliver medications from the pharmacy and other types of deliveries, staff on the hospital floor can also be freed up for other tasks.

### The Importance of Technology

(SUNY)'s Downstate's wireless local area network (WLAN) is comprised of Cisco Aironet 1200 wireless access points, Cisco 3500 series switches, as well as Cisco Works 2000 which monitors the network and all wireless access points. The WLAN implements a flexible data communication system for (SUNY) and allows them to augment rather than replace their existing wired LAN. WLANS use radio frequency (RF) to transmit and receive data over the air, minimizing the need for additional wired connections.

Pharmacists place the medications into the robot's storage drawers and then specify the destination via a menu on the robot's front panel. With the pre-programmed map of the hospital, the robot uses wireless radio and laser scanning technology to navigate through hallways and around obstructions.

"The robots have infrared and sonar sensors in them and can tell when they come up to an object," Stern says. "They can speak multiple pre-programmed languages and will ask the person or object standing in its way to please move. If it doesn't move, the robot goes around it."

(SUNY) Downstate will be able to use its scalable wireless network for future applications as



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well. “We’re planning to put in an entire patient data-gathering, monitoring, and order entry system,” Stern says. “And we envision using the wireless network for collecting patient data.” The new applications can enable nurses to take a patient’s vital signs at the bedside, enter the data into an IP-capable hand held device or laptop computer, and store the data directly on that patient’s computerized medical record.

### Originality

Robots were first deployed in hospitals throughout the country more than a decade ago, with either limited or very focused functionality. Cardinal Health reports that more than currently 90 U.S. hospitals and laboratories currently use one or more of these robotic couriers and the company expects that number to increase.

While today the robot is used only by (SUNY) Downstate’s pharmacy, it could potentially be used for almost any kind of delivery, such as meal delivery, nursing assistance, medical records, and supplies. Moving at two feet per second, the robot can climb a 10 percent ramp grade and carry up to 200 pounds of materials.

### Success

SUNY) Downstate’s high security, wireless robot system guarantees the timely and efficient delivery of medications, ensuring that patients receive their medications on time. Nurses do not have to spend time tracking down late deliveries. The system also reduces the cost of a live courier and increases productivity, since resources can be shifted to more value-added activities

### Difficulty

The hospital’s Scientific and Medical Instrumentation Center (SMIC) group, which provides application development and support on the hospital’s IT platforms, had a concern about implementing a wireless network within the hospital.

“It’s their responsibility to check and track every medical device that the hospital uses,” Stern says. “They were concerned that the wireless system might interfere with the RF telemetry system in the hospital that’s used to monitor mobile patients, so at first they were reluctant to let us move forward with it. But then they upgraded the telemetry system, which now uses different frequencies, so the wireless network doesn’t interfere with the telemetry system at all.”

The other issue the hospital had to contend with was making sure that the elevators were maintained properly so that they always stopped evenly with the floor. “One thing the robot can’t do is hop over a two inch step to get into the elevator if it stops a little high,” Stern says. Cardinal Health worked with the elevator contractor, resolved the problem, and the system has been running smoothly ever since.