Product Spotlight

By Marc R. Summerfield, BS, MS

Using the TUG Self-Guided Robot to Improve Medication Delivery Cycle Time

THE MEDICATION CYCLE COMPRISES FIVE INTERLOCKING STEPS BETWEEN the initial practitioner assessment/intent to prescribe and the final monitoring of the medication's effect:

- **selection and ordering**
- **order review and processing**
- **preparation**
- **delivery**
- **administration**

At the University of Maryland Medical Center, a 550-bed university-based teaching hospital in Baltimore, Maryland, a pharmacy department goal is to employ technology within the medication cycle, in order to improve patient safety, enhance the quality of care, and advance clinical practice.

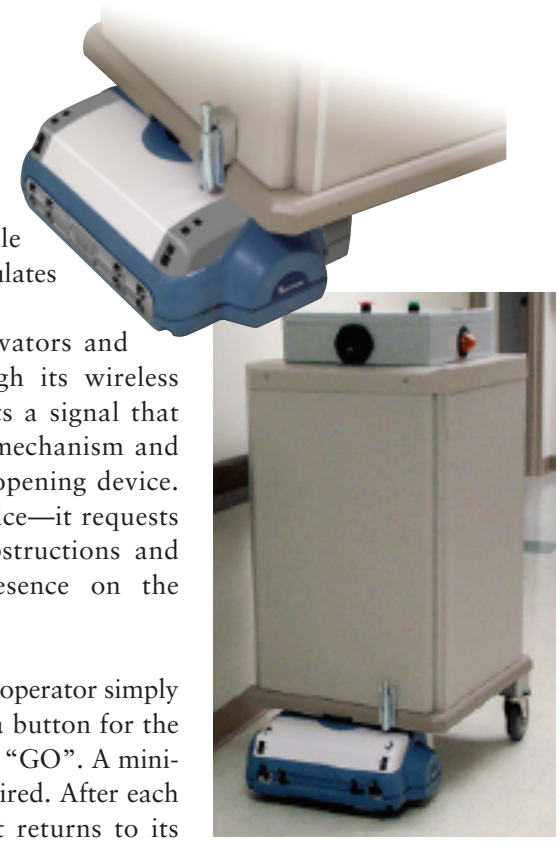
One of the many challenges the pharmacy faces in pursuing this goal is to ensure timely medication delivery. Delays interfere with the initiation of therapy and create a rift between the nursing and pharmacy departments.

The reasons for delays are familiar: illegible physician orders, un-faxed orders, lost orders, workload peaks, technicians unavailable for deliveries, and misplaced medications. Making an appreciable difference through incremental process improvement takes time. But the pharmacy department wanted to make an immediate impact, so it identified a primary bottleneck: the delivery step. After a medication is prepared, it patiently waits until a pharmacy technician delivers it to the patient care unit. Medication deliveries are scheduled no more than every hour, and supplemental deliveries occur only in perceived urgent situations. Most of the Medical Center is not equipped with a pneumatic tube system. Plus, tubes cannot transport medications such as anti-neoplastic therapy, proteins, and large volume parenterals.

The pharmacy department decided to investigate an automated medication delivery system, and connected with Aethon, Inc., the manufacturer of the TUG. The TUG is a mobile robotic delivery system that moves equipment and supplies throughout a hospital by "tugging" a cart. ("TUG" is not an acronym.) The pharmacy decided to employ the TUG to deliver medications. In addition to reducing delays, automated courier robots can also have the added benefit of significant labor savings, freeing up personnel for patient care, and saving FTEs. The TUG itself is an 8˝ x 20˝ unit that attaches to a cart of almost any shape and size. Existing carts can be retrofitted, or new customized carts can be ordered. These carts feature electronic locks limiting access, which are automatically secured during delivery.

The TUG employs a combination of technologies:

- The TUG uses a computer-embedded map of the hospital and its navigation software to guide it between the pharmacy and one or more patient care units.
- The TUG relays its location to the pharmacy and Aethon corporate headquarters. A map of the TUG's progress appears on the sender's touchscreen next to the TUG's home base (at the pharmacy), and the Aethon Help Desk is automatically alerted if a problem occurs during delivery.
- The TUG's matrix of infrared light sensors continuously measures distance to nearby walls and objects. The sensors keep the TUG on course and allow it to navigate around obstructions. If the TUG confronts an immovable obstruction, it calculates a new path.
- The TUG calls elevators and open doors through its wireless technology. It emits a signal that trips the elevator mechanism and controls the door-opening device.
- The TUG has a voice—it requests the removal of obstructions and announces its presence on the patient care unit.



Aethon's TUG

To start the TUG, the operator simply loads the cart, presses a button for the destination, and presses "GO". A minimum of training is required. After each delivery, the TUG unit returns to its home base and automatically charges itself. Batteries provide up to 10 hours of continuous operation.

Aethon and the pharmacy department decided to pilot the TUG in the Medical Center's Shock/Trauma Center. A satellite pharmacy serves the Center. The critical nature of the patients demands timely medication delivery. The pilot began late in 2003, and to date, three objectives have been met:

- Routine TUG deliveries have reduced cycle time by 20-30 minutes for most medications.
- Elimination of technician deliveries has saved 20 minutes of technician time per hour (1.4 FTE) and created the opportunity for personnel savings.
- Nurses have expressed an increased satisfaction with pharmacy services and a preference for TUG delivery over human delivery.

The hospital plans to employ several more TUGs to deliver medications: one for each of the pharmacy's satellites and one to deliver centrally-prepared first doses from the central pharmacy to the satellite pharmacies. We are looking forward to the expansion of the program and are anticipating system-wide advances in timely medication delivery, labor savings, worker satisfaction, and quality of care.

Those interested in visiting the TUG may contact the author at msummerfield@umm.edu. P&P

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Where to find it:

Aethon, Inc. ..... Circle reader service #21