



Paging Dr. Robot: Aethon's Autonomous Hospital Helpers

SMB Innovators: *This high-tech hospital worker can move medicine, food, test samples, and even laundry from floor to floor quickly, effectively, and autonomously.*

by Erik Rhey



Though anthropomorphic, walking-and-talking robots get all the press and praise, it's the robots behind the scenes that keep human civilization humming. These unsung heroes are the bots that drive rivets, screw on bottle caps, remove spent fuel rods at nuclear power plants, and yes, even deliver medication at [hospitals](#). If you paused on that last one, then you probably haven't seen a TUG robot rolling down the hallways of your local medical facility.

The TUG robot, and the company that makes it—Aethon—is the creation of a group of engineers and a man, Aethon CEO Aldo Zini, who saw the robot's potential as a high-tech hospital worker that could move medicine, food, test samples, and even [laundry](#) from floor to floor quickly, effectively, and autonomously.

What TUG Does

Simply put, the TUG is a transporter, taking items from here to there inside a hospital—items as precious as cancer drugs that cost thousands of dollars per pill, as noxious as medical waste, as delicious (hmm) as trays of meals, and as cumbersome as 200 pounds of laundry. [Hospital staff](#) deploy the TUG units from a touch screen at their "bay" where they are stored, waiting in their charging stations. (They can also be summoned and tracked via a Web interface.) Once the items are loaded into the cart and secured, the TUG unit is off on its journey, riding elevators, navigating hallways—careful not to bump into walls, patients, or nurses speed-walking on their rounds. They perform a necessary function, a function that used to pull valuable doctors, nurses, and researchers away from their primary duties, wasting untold man hours.

The Tech Inside TUG

The main part of a TUG unit is essentially a motorized autonomous robot mounted to a secured cart. Physically a TUG looks like a granddaddy Roomba, measuring 7.25 by 20 inches (HW) and weighing 55 pounds. Its body is made of high-impact, abrasion-resistant ABS plastic. It is driven by two 24 VDC (volts of direct current) motors and four standard 12-volt lead-acid batteries.

TUG can detect people and objects using a matrix of "light whiskers" that employ sonar, infrared, and laser technologies. Its onboard computer (with custom-made motherboards and [Intel processors](#)) stores an AutoCAD map of the hospital to help it get around. In terms of securing TUG's payload and the robots themselves, Zini says that the robots are more safe and reliable than human messengers. The cabinet on a TUG unit requires thumbprint identification and a key code to get inside. The robots are monitored 24-7 with onboard cameras. If anyone tried to remove a TUG from the hospital, it would immediately trigger an alarm.

Aethon Background

Based in Pittsburgh, Aethon is a privately-held company with 65 employees. Though Aethon started in 2001, Zini says the company didn't really get going until 2004. The idea for the device, according to Zini, "came from a robotic engineer who co-founded the company. The idea was to develop a simple and mobile robot." When Zini came into the picture, he immediately saw its potential in the health care industry. "I decided we needed to turn this idea into a business and a product." So far, that product has been a success, being used in more than 100 hospitals across the country.



In terms of the challenges Aethon's engineers faced when building the TUG, getting it to use elevators unassisted proved a particularly daunting challenge. "Every elevator in the world is different, even [those] in the same building," Zini says. "It's a very convoluted industry with old technology interwoven with new technology." Thus, Aethon had to

develop its own universal software that could operate any elevator in the world—no easy task, Zini adds. "What we thought would take a couple months ended up taking a couple years."

Slide 1



Aethon TUG Unit

The Aethon TUG unit is a motorized autonomous robot (bottom) and sensors (front) attached to a secure cart.

Slide 2



What TUG Carries

The cabinet on a TUG unit requires thumbprint identification and a key code for access. TUGs often carry precious cargo such as expensive medications as well as blood and tissue samples for lab analysis.

Slide 3



TUG Hauls What We Can't

With a hauling capacity of 500 pounds, TUG robots are called upon to transport laundry, food, and even biohazardous waste and trash—tasks that are undesirable, dangerous, or cumbersome for humans.

Slide 4



TUG's Whiskers

TUG robots are outfitted with a matrix of "light whiskers" that use sonar, infrared, and laser technologies to navigate hallways and avoid bumping into people and objects.