



"We're seeing such a dramatic impact to NorthShore's operational efficiencies, we couldn't be more delighted."

-ADAM GREENBERG, CEO
NORTHSHORE CARE SUPPLY

CASE STUDY

WiBotic Powers Waypoint Robotics Enzone Charging Station for Warehouse Fulfillment Operations

At the NorthShore Care Supply facility in Illinois, Waypoint Vector autonomous mobile robots can be found zipping around the nearly 4-acre warehouse floor, picking up high-capacity customized carts and shuttling them back and forth.

The carts are heavy, laden with the company's signature products: adult incontinence supplies, infant and pet sanitary pads, all being picked and prepped for shipping. In the past, NorthShore workers would manually push similar carts throughout the facility from the inventory aisles to packing stations. But these days, workers can stay in designated zones to focus their efforts on the picking process – something humans do very well. Waypoint AMRs are dispatched to meet them at various locations, where the carts are loaded before autonomously returning to the packaging area. Both workers and robots are seamlessly directed by Numina Group's Real-Time Distribution Software system, which ensures a cart is always available when and where the picker needs it.

This process is happening throughout the warehouse – and during multiple shifts if needed – so eventually those robots need to be charged. Enter the EnZone, an autonomous mobile robot charging station designed by Waypoint using WiBotic wireless charging technology.



■ BACKGROUND

NorthShore's signature products were already in high demand prior to Covid-19. After the pandemic hit and as customers rushed to purchase 6 to 12 months' worth of product in a single order, business exploded. Fortunately, NorthShore had recently moved to a larger 173,000-square foot facility, but they now faced the challenge of transporting picked orders across much greater distances to the packing area.

At the same time company managers were reimagining the floor space, they were also seeking ways to expedite and optimize the movement of product within the warehouse. They turned to autonomous mobile robots as the solution.

■ CHALLENGE

With such a large warehouse and increasing demand, any implementation of robotics had to require little or no human maintenance of the robots themselves. Autonomous charging was absolutely essential. Other key metrics were outlined as well: increased speed, accuracy, and safety while minimizing potential fulfillment issues during large swings in demand.

To realize these objectives, NorthShore needed autonomous mobile robots powered through a cutting-edge wireless charging system. Wired systems were quickly ruled out, as they cause undue wear and tear on electrical contact points from repetitive docking cycles. And they needed the system to be flexible enough to ensure proper charging each and every

cycle, for each and every robot when they returned to their charging docks. Otherwise, re-docking attempts could lead to robot downtime.

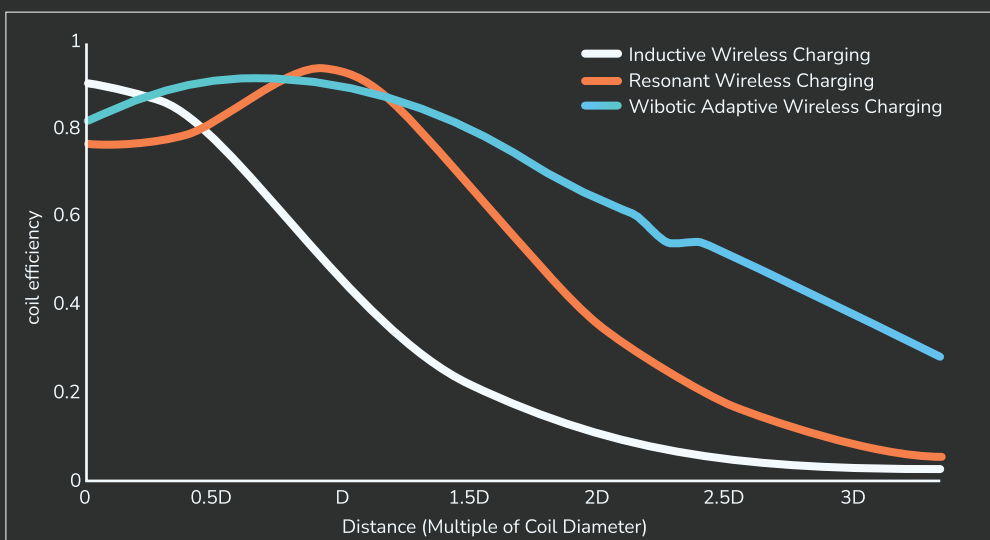
With the problem scoped, NorthShore and their systems integrator Numina Group began looking for solutions. They turned to Waypoint Robotics, a company that specializes in building industrial-strength autonomous mobile robots to tackle real-world applications.

■ SOLUTION

One of Waypoint's most innovative features, and a cornerstone of its autonomous robotics platform, is its EnZone wireless power system. Built upon WiBotic technology, EnZones are specifically designed to make robots easier to setup and use. High power wireless connections allow for opportunity charging, giving Waypoint robots the capability to charge anywhere, and at any time there's a natural break in the work cycle.

WiBotic systems are also programmable, meaning they can charge slowly – at lower energy levels – to extend their battery lifespan after a complete work shift. Or they can “top off” between tasks with a faster charge, to ensure continued operations throughout the day.

What really makes this charging system unique, however, is the extended antenna range and docking flexibility offered by WiBotic's proprietary adaptive tuning technology.



Adaptive wireless charging provides superior antenna range.

■ TECHNOLOGY

Most wireless power systems are based on electrical induction. In those systems, current (amps) flowing through the source antenna is induced into the load antenna across an air gap. As shown in the graph, however, the efficiency of inductive systems (and therefore the power they deliver) drops dramatically as the two antennas are separated. Typically, a range of only 2-5 millimeters is acceptable to get full power. Unfortunately, even robots with the best navigation will have a hard time docking with that level of accuracy every time.

More recently a form of wireless power has emerged based upon Magnetic Resonance. Unlike induction, this new technology primarily uses magnetic fields to transmit energy across a larger air gap, and therefore provides better overall antenna range. But as shown in the attached plot, resonant systems can be finicky and tend to have one antenna position where power is maximized. This is due to changing electrical impedance between the antennas when they are at different distances, and the need to choose a specific impedance level where all of the electronics are optimized. Again, unless the robot is accurate enough to hit that “sweet spot” every time, loss of efficiency, stability and power can occur.

WiBotic’s technology is different. It uses a proprietary system involving adaptive tuning that constantly monitors the stability of both transmitter and receiver and uses software and hardware adjustments to adapt to different positions. This provides maximum efficiency and power when our standard antennas are as close as touching, or as far apart as 5cm. Or anywhere in between. The antennas are also sized to provide 5cm of side-to-side or up-and-down flexibility with the same efficiency. In short, we eliminate the “sweet spot” is eliminated and replaced with a large zone where full power is available.

Waypoint recognized these benefits and others such as programmable charging that enables transmitter stations to charge any robot regardless of battery chemistry or voltage. Because there are no contact points to wear out, and the electronics can be sealed inside the EnZone, the solution requires zero maintenance even in dirty and dusty warehouse environments.

■ RESULTS

Just a few months after deployment, the NorthShore facility has doubled the number of products shipped per labor hour. Workers have tripled their picking output by not having to manually push carts between the inventory aisles and the packaging/shipping area. The facility is now meeting demand despite a continued surge in orders, with robots operating continuously.

Robots charge during periods when there is a pause in picking activity to ensure maximum uptime. Additionally, there have been no mechanical maintenance issues with charging stations despite thousands of successful charge cycles. And no missed charging cycles whatsoever.

Finally, Waypoint navigation, coupled with WiBotic antenna range, makes charging extremely reliable, and charge cycle log files available from WiBotic are now being used to optimize battery longevity.

“When NorthShore and Numina Group approached us and described what they were looking for in an autonomous robotics solution, it was incredible,” said Jason Walker, CEO of Waypoint Robotics. “Their list of requirements seemed to fit hand-in-glove with the challenges our industrial mobile robots – and EnZone wireless charging stations – were designed to tackle. So we were extremely happy when quick and dramatic results were achieved. And we expect the EnZone wireless charging systems, built on WiBotic technology, to help enable further gains as NorthShore continues to optimize and expand their operations.”



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-JASON WALKER, CEO, WAYPOINT ROBOTICS



ABOUT WIBOTIC

WiBotic wireless charging solutions can greatly enhance the working efficiency of your robot fleets and significantly reduce your company's charging and maintenance costs.

Our solutions include wireless charging and power optimization software. So we not only maximize the battery life of each battery we charge, we create an operational plan for the entire collection of batteries in your robot fleet.

WiBotic wireless charging and power optimization solutions are safe, reliable and scalable. And they are easy-to-implement and highly customizable for specific robot deployments.



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