



"All progress occurs because people dare to be different."

Harry Millner, Author

ADAM's Era: A New Age of Adaptability in Automation

Sometimes one kind of innovation leads to another. That's really the story of ADAM,[™] a robot with such revolutionary design and functionality, it's rewriting the chapter on performance while shedding the limitations of traditional Automated Guided Vehicle (AGV) technology.

The inspiration for ADAM came in 2003, when tire manufacturing clients asked RMT Robotics engineers to apply their problem-solving abilities to a vexing problem. Tire companies were searching for a solution that would conveniently, economically and reliably automate the movement of work-in-process inventory from storage to the production machinery, in their highly dynamic, congested and robust production environments.

In most tire facilities throughout the world, manual processes were still being used. Typically, building obstructions, technical rigidity and overall integration costs often ruled out the more traditional automation solutions such as conveyor, Electrified Monorail System (EMS) or even standard AGVs.

To survive in this kind of industrial production environment, RMT Robotics knew this new solution would have to be robust, simply designed, durable, and easily integrated as well as maintained. At the same time, the system had to maintain a high level of flexibility; and be non-obtrusive, nimble enough to dynamically navigate around human and equipment obstructions and be universally configurable to a variety of buildings and equipment layouts.

This would require something bearing the hallmarks of AI (Artificial Intelligence), a robot different than anything that had come before.

A Fusion of Technology

In design, RMT engineers crafted a sturdy, compact aluminum body for their new robot, giving it a resilient, low-weight, compact character. To ensure maneuverability, the machine was designed with a low centre of gravity, with two independently controlled servo wheels mounted centrally on the octagonal frame, permitting tremendous navigational freedom including a zero turning radius.

Although the vehicle began to look similar in appearance to some AGVs, RMT knew that to take advantage of the machines' highly maneuverable physical design, the navigational platform would have to be unique. Paths dictated by guide wires, reflectors, and strategically mounted transponders or magnets were the failing of conventional AGVs in these industrial applications, so a new, intelligent and independent method of self-guidance was needed onboard.

"We found exactly what we needed," said Richard Baumann, RMT Robotics' Vice President and one of three founders of the company. "In our search for a leading-edge solution we discovered a product by MobileRobots Inc. They had a unique navigational platform, which had the functionality we had envisioned; we struck a partnership!"

RMT's creation was outfitted with a laser range finding system, servo encoders and gyroscopic motion sensors. Collectively, they provide the inputs to the advanced on-board robotic control system giving ADAM the ability to direct itself,

plot an independent path, and navigate around both fixed and moving obstructions. The robot was also outfitted with Wireless Ethernet communications for real-time connectivity with others in the fleet as well as a central mission dispatcher.

Within a few months ADAM was born.

Using open path navigation and mission-based dispatch, ADAM independently plots the best path to its destination.

"If a door is closed, ADAM will recognize it and stop," said Baumann. "It could also look at a layout for the building stored in its memory and find an alternative route without human interaction."

When unmapped obstacles are detected (people, moving machinery, etc.) the on-board navigational software instantly calculates the shortest alternative path to destination, measuring the size of openings and pathways to ensure clear passage as it travels towards its destination.

"The programming is very simple," adds Baumann. "Since every ADAM shares information via RF, once you've trained one, the others are instantly programmed too."

Combined with smart battery technology and opportunity charging, ADAM is a truly industrialized workhorse.



ADAM Born Into a World of Opportunity

Tire makers were the first to capitalize on the new technology when RMT Robotics introduced ADAM to the marketplace in 2005. "The pressroom solution allowed tire manufacturers to, for the first time, automate a repetitive, physically strenuous task, lowering operating costs as well as reducing the risk to the health and safety of employees," said Bill Torrens, Director of Sales and Marketing for RMT Robotics.

ADAM's ability to adapt to its environment and complete its mission dependably, even in the most harsh, demanding conditions, make it ideal for the pressroom. But this compact, agile robot also has the breadth of functionality to do a lot more.

"We've had considerable interest from across the manufacturing spectrum," added Torrens. "ADAM's small size, fast speed and of course, dynamic navigation make it ideal in any application that requires product to be transported from one location to another."

What about beyond manufacturing? With its versatility and an ability to adapt and interact, ADAM is suited for many applications. Applications have been considered in hazardous environments or where human safety is a concern. ADAM can also be programmed to fetch tools and supplies, or in the advertising industry, serve as a moving display for signage.

"And the list goes on," said Torrens, Director of Sales and Marketing at RMT Robotics. "There are so many applications yet to be discovered and we are looking forward to working with systems integrators in delivering this innovative solution to their customers."

It's fresh thinking in automation; the kind companies are eager to find as they race to remain competitive in the face of global challenges.



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**Bill Torrens, Director of Sales and Marketing
RMT Robotics Ltd.**

Getting the Goods on ADAM

- Operates at 1.5 m/s (4.9 ft/s) maximum speed
- Zero turning radius
- Height of 510 mm (20 in), diameter of 1020 mm (40 in)
- 150 kg (330 lb) payload
- Compact, durable chassis with customizable top plate
- Laser range finding system for vehicle location and obstacle avoidance
- Onboard PC for mapping, navigation and drive control
- Two independent servo-motors (each with integrated gear reducers) for vehicle drive
- Smart battery technology with opportunity charging capability
- User-friendly, PC-based interface allowing easy operation by plant personnel
- Contact bumpers, front and rear (stop motion)



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