

RTI CUSTOMER SNAPSHOT

634AI

MAESTRO: ROBOT-AS-A-SERVICE AT YOUR SERVICE

“The motivation for creating our MAESTRO system was helping our customers transform the way they fulfil everyday indoor tasks. RTI Connex DDS helped us create a central control tower that can streamline the management and control of any mobile task on an industrial floor. MAESTRO’s top-view visibility enables customers to achieve safer, more controlled and more effective floor operation all through a single system, and at a fraction of the price of today’s solutions.”

Onn Fenig
CEO, 634AI

HIGHLIGHTS

- 634AI uses RTI Connex[®] DDS for real-time hand-shake connectivity between its MAESTRO system and AMR platforms over Wi-Fi networks
- Connex features support fast, reliable communication between the MAESTRO system and AMRs with near-zero latency
- MAESTRO, a fully integrated RTLS system, offers customers a comprehensive control tower solution, enabling real-time floor mapping for safety and motion of employees, material and equipment in a Robot-as-a-Service model

ABOUT 634AI

634AI was founded in order to enable safer, more controlled, more effective industrial indoor mobility — for everyone, everywhere. Every-day task fulfilment in industrial floor environments should be straightforward — safe, efficient and affordable. This is why our solutions offer practical tools for fulfillment of indoor mobile tasks. The company has advanced indoor mobility in the digital era even further, making it possible for customers to benefit from safer, more controlled, autonomous floor operation from one single, integrated system.

634AI is on a mission to make any indoor task autonomous — from the industrial floor to the airport terminal, the warehouse floor or the hospital floor, and beyond. 634AI is in partnership with Japanese Musashi Seimitsu Industry Co., LTD, a global tier 1 auto parts manufacturer and a Honda Motor-affiliated company.

CHALLENGE

The automation landscape is changing rapidly. Autonomous Mobile Robots (AMRs) are replacing forklifts for a wide variety of tasks, including pulling and pushing tonnage through the factory, navigating around warehouses and picking from stacks of products, and even guiding autonomous cargo ships across the oceans.

However, acquiring traditional AMRs can require a significant initial investment — and even then, they may only be able to offer limited functionality and interoperability. Because with typical robots, all the computation, navigation, processing power and network capabilities are onboard the robot itself. This can translate into an unaffordable and hard-to-justify 1.5-ton payload, fork-based autonomous vehicle.

In addition, traditional AMRs tend to operate within a narrow field of view. This factor can hamper their ability to perform fetch tasks, foresee around-the-corner obstacles and avoid collisions, which in turn can affect the deployment cost and the overall solution’s level of safety.

Speaking of obstacles, many different companies produce AMRs, so each tends to run unique or proprietary operating systems, navigation systems and fleet management systems. This compounds the challenge of trying to achieve interoperability between equipment and systems that were never designed to communicate with each other.

Further technological innovation is required to deliver real cost savings and the interoperability needed to go above and beyond traditional automation. To give customers control and management of AMRs in one centralized AI-based system, 634AI created its MAESTRO solution. And to give it a robust, data-centric foundation, 634AI choose RTI Connex[®] DDS.

SOLUTION

634AI developed an innovative AMR solution concept that delivers autonomous mobility, completely independent of the functionality of a robot or robotic vehicle. Built on RTI's proven Connex connectivity framework, MAESTRO is a centralized AI system that understands everything in motion on the industrial floor and orchestrates the action. Through floor mapping, obstacle detection and continuous video streams generated by ceiling-mounted cameras, all vehicles are controlled by MAESTRO without the need for expensive on-board navigation sensors, LIDARs, or even full computing power.

The stripped-down AMRs are controlled from a device- and space-agnostic control tower, which can safely, affordably

and autonomously centralize human and robot efforts under one roof. MAESTRO coordinates the video processing to weave a "world map" of the floor environment, delivering full autonomy and enabling interoperability among AMRs.

The Data Distribution Service[™] (DDS) standard was already a known quantity to part of the team, as some of the executives involved were already highly familiar with it as the secure protocol of choice for the Israeli military. And for 634AI, who were seeking fast, reliable communication between the central system and the AMRs with near-zero latency, Connex DDS proved to be the right fit, even keeping data transport reliable over lossy Wi-Fi networks.

Choosing Connex to meet these requirements gave the combined team a way to ease deployment and avoid investing unnecessary time in building out the robust, scalable messaging system they needed. With Connex as the underlying communication framework, the team is able to add new messaging and devices seamlessly, with no latency and minimal effort. And because Connex offers a proven software connectivity platform, 634AI now has a common, shared infrastructure upon which to develop, deploy and maintain fully interoperable systems.

Because of its new Robot-as-a-Service business model and the interoperability afforded by Connex, 634AI is now in the desirable position of working with numerous AMR producers and building a community of partners for a mutual benefit.

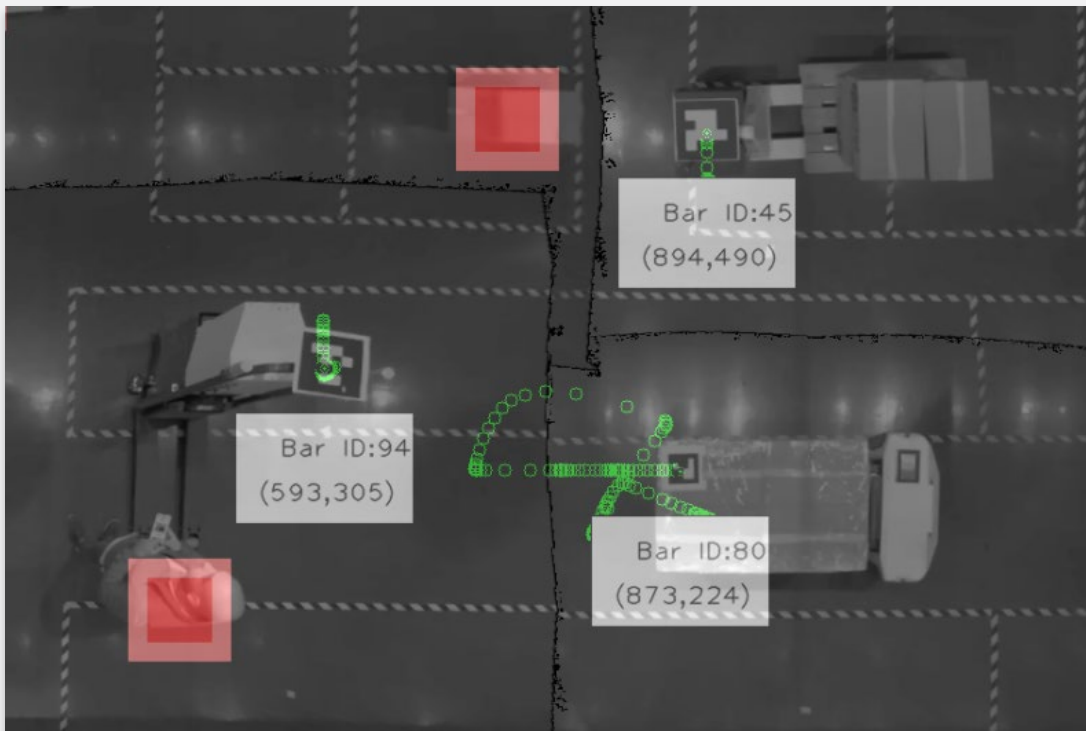


Fig 1: Analyzed image (by the MAESTRO) of the "world map" of the factory floor. This is the map the MAESTRO uses to send navigation commands (DDS) to mobile robots.



Fig 2: MAESTRO is the brain of the system

RESULTS

Thanks to the data-centric nature of Connex, MAESTRO users gain a real-time overview of the entire floor with continuous tracking and tracing of AMRs, including object identification and recording of movement and inventory. Customers are in a position to achieve higher levels of productivity, as the AMRs are now able to consistently avoid obstacles and humans through recognition and real-time path adjustments and alerts. By enabling sophisticated industrial floor control, MAESTRO has the capability to significantly increase the efficiency and productivity of indoor operations.

The ability to reduce costs is another compelling benefit. With MAESTRO, the costs associated with AMR collisions are eliminated or drastically reduced. In addition, MAESTRO's ability to offload operational functions from AMRs can result in a low-maintenance fleet that is both affordable and interchangeable.

The combination of MAESTRO and Connex enables 634AI to help its customers eliminate upfront capital expenditures and vendor lock-in. With MAESTRO, 634AI is now able to pursue a unique, cost-saving business model, offering a monthly Robot-as-a-Service licensing fee for the convenience of its customers.

And there's a clear benefit for manufacturers as well. Thanks to 634AI's ability to optimize functionality and enable innovation, equipment and mobile robot manufacturers are freed from solving the challenges of autonomous mobility and can focus their talents on innovating to meet and exceed the functional requirements of their equipment and vehicles.

"With MAESTRO as the solution, the efficiency and cost benefits of a Robot-as-a-Service approach could transform floor staffing and management in the decade ahead," says Fenig. "Far from futuristic, it's now simply another example of science fiction turning into science fact."

ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework company for autonomous systems. RTI Connex® is the world's leading architecture for developing intelligent distributed systems. Uniquely, Connex shares data directly, connecting AI algorithms to real-time networks of devices to build autonomous systems.

RTI is the best in the world at ensuring our customers' success in deploying production systems. With over 1,500 designs, RTI software runs over 250 autonomous vehicle programs, controls the largest power plants in North America, coordinates combat management on U.S. Navy ships, drives a new generation of medical robotics, enables flying cars, and provides 24/7 intelligence for hospital and emergency medicine. RTI runs a smarter world.

RTI is the leading vendor of products compliant with the Object Management Group® (OMG®) Data Distribution Service™ (DDS) standard. RTI is privately held and headquartered in Sunnyvale, California with regional offices in Colorado, Spain and Singapore.

Download a free 30-day trial of the latest, fully-functional Connex software today: <https://www.rti.com/downloads>.

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