ADLINK and Phenikaa-X Engineering the AMR Pallet Mover



Advanced Automation with a Cutting-edge Pallet Mover



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XPHENIKAA

"By combining Phenikaa-X's advanced robotics expertise with ADLINK's cutting-edge industrial computing technologies, we have developed a highly adaptable and efficient material handling solution. Phenikaa-X's robots, powered by ADLINK's reliable platforms, are customizable to meet diverse operational needs and seamlessly integrate with existing factory systems. This collaboration ensures continuous and effective operation of automated systems, reducing downtime and driving cost optimization. Together, we are helping businesses achieve productivity gains and meet their sustainability goals."





Phenikaa-X JSC
Manager of Robotics Department

Khong Minh

The global automated pallet truck market, currently valued at $4.9 billion, is projected to reach $33.4 billion by 2033 [1] as manufacturers increasingly work to optimize material handling operations. At a global leading electronics factory in Thai Nguyen, strategic partnership between ADLINK and Phenikaa-X addresses this growing demand for automation. Together, they are focused on creating cutting-edge automation solutions that combine advanced robotics with industrial-grade computing power.

Their shared vision to develop reliable, scalable material handling systems that can thrive in challenging manufacturing environments while delivering measurable operational improvements.

* [1] Automated Pallet Truck Market Research, 2033.

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Addressing Industry Challenges with ADLINK's Advanced IPC Solutions



[Phenikaa-X AMR Pallet Movers]

Phenikaa-X faced significant challenges in meeting the demanding industrial requirements with its APM990 Robot (AMR Pallet Movers), deployed at the Thai Nguyen electronics factory. These challenges included managing power consumption, maintaining operational stability, and delivering high-performance AI and image processing in a high-pressure manufacturing environment.

Improved Operational Stability

The SBC35-RPL delivered robust and reliable computational performance, ensuring that the robot could handle AI-driven decision-making and point cloud processing without interruptions, even in high-pressure environments. Its industrial-grade reliability enabled Phenikaa-X to meet stringent operational standards consistently.

Enhanced AI Processing

The DLAP-211-Orin Nano empowered the APM1000 Robot with superior AI capabilities, such as real-time environment monitoring and obstacle detection. By processing multiple video streams simultaneously at a stable frame rate of 20 to 25 fps, it ensured seamless performance in dynamic factory settings.

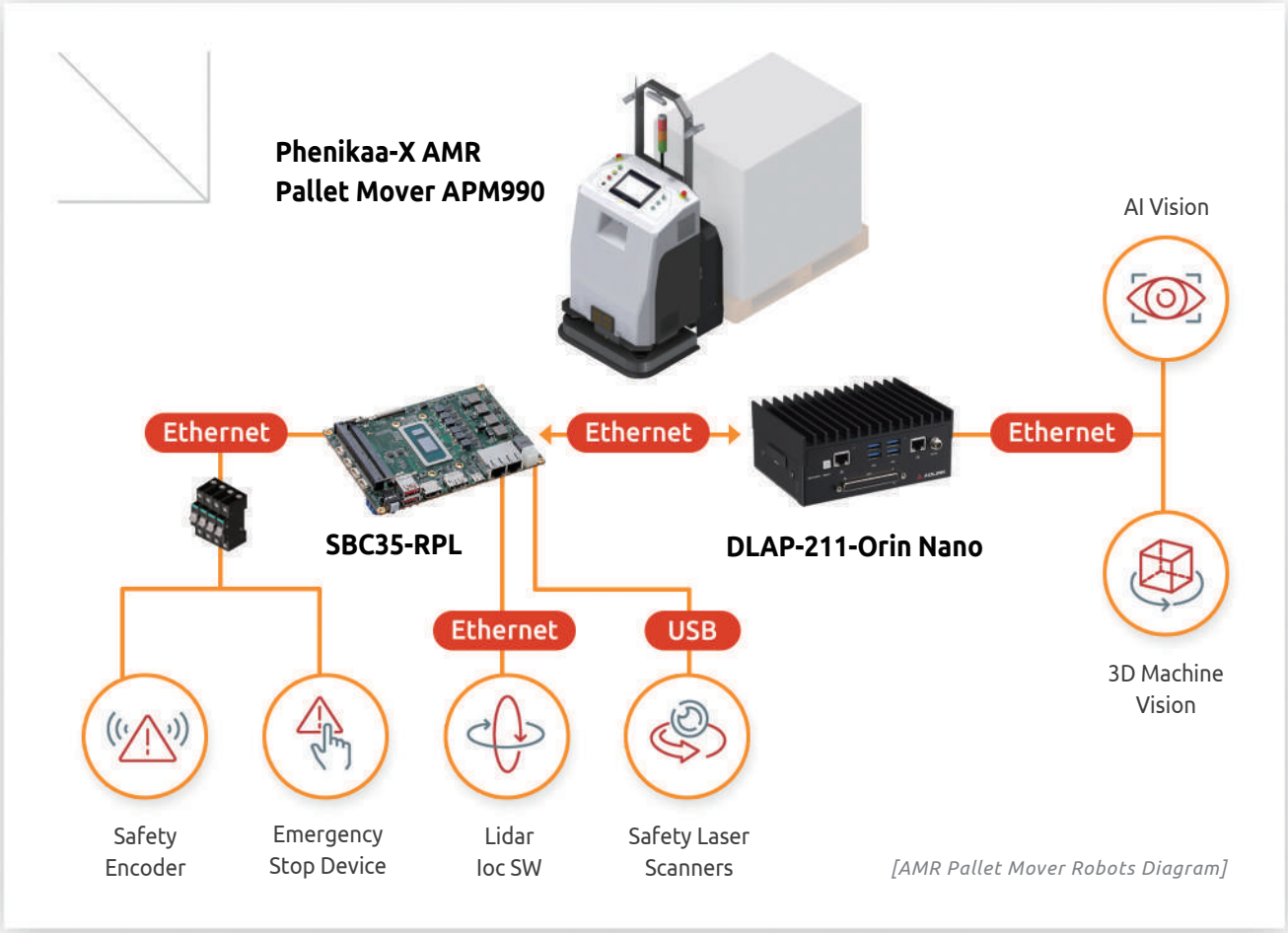
Optimized Power Efficiency

Phenikaa-X successfully addressed power and heat management challenges using the DLAP-211-Orin Nano. Despite running at full GPU capacity for 16-hour shifts, the device operated efficiently, consuming only 15W while maintaining optimal temperatures.

Together, these technologies empowered Phenikaa-X to overcome the critical challenges of developing a reliable, scalable, and high-performance AMR solution. ADLINK's contributions ensured that the APM1000 Robot met and exceeded stringent industrial requirements, ultimately enabling its seamless deployment in demanding manufacturing environments.

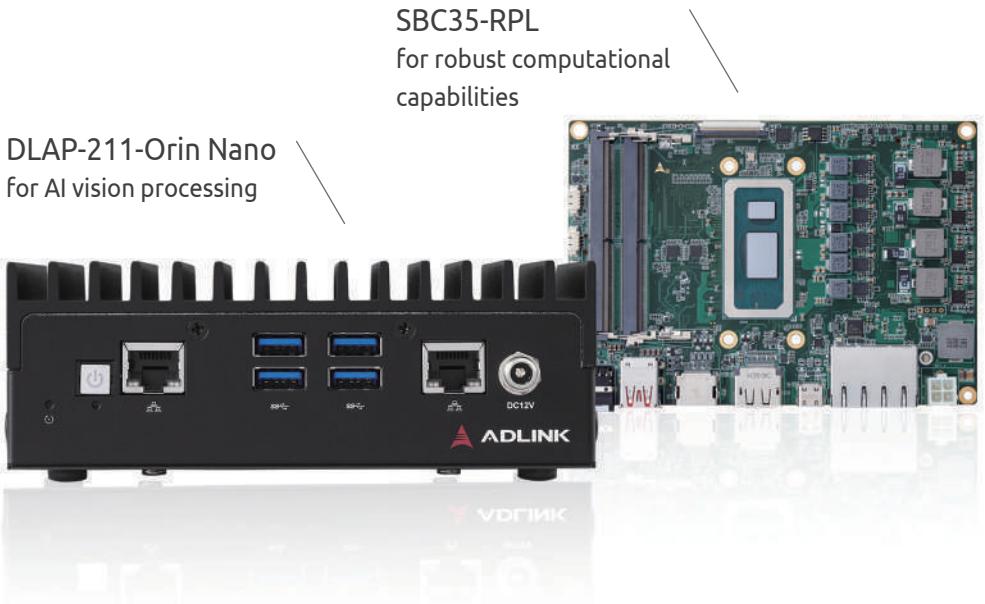
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Powering Next-Generation Automation



[AMR Pallet Mover Robots Diagram]

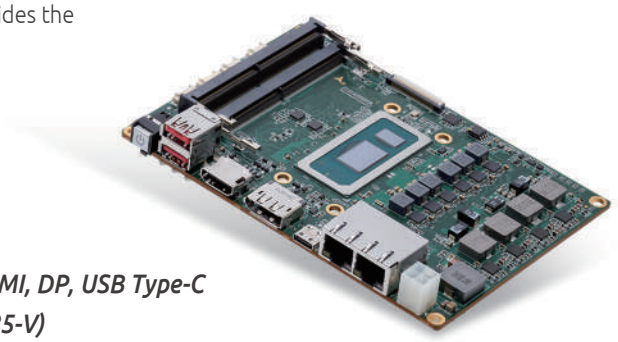
The solution required sophisticated real-time processing capabilities to handle simultaneous sensor inputs while executing complex navigation algorithms. ADLINK's industrial computing platforms provided the foundation for this advanced functionality through a carefully engineered dual-component platform:



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SBC35-RPL for robust computational capabilities

The SBC35-RPL serves as the APM1000 Robot's processing powerhouse, ensuring robust computational capabilities to meet the rigorous demands of industrial applications. Its reliable design adheres to stringent industrial standards, delivering stable and dependable performance across a range of tasks. Whether supporting audio analysis, AI-driven decision-making, or point cloud processing, the SBC35-RPL provides the versatility and reliability needed for high-performance robotics.



- ***Powered by 13th Gen Intel® Core™ i7/i5/i3 Processor***
- ***Dual-channel DDR5 4800MHz memory, supporting up to 64GB***
- ***Four independent display outputs: eDP/LVDS (default eDP), HDMI, DP, USB Type-C***
- ***Dual Ethernet ports: 1GbE (Intel® I219-V) and 2.5GbE (Intel® I225-V)***
- ***SBC-FM board expansion: PCIe x1, PCIe x4, USB 3.0/2.0, LPC***
- ***Optional TPM 2.0 for enhanced security***

SBC35-RPL

DLAP-211-Orin Nano for AI vision processing

The DLAP-211-Orin Nano delivers exceptional performance in industrial AI applications. With low power consumption (15W even during 16-hour shifts), effective thermal management, and stable AI-driven capabilities, such as obstacle detection at 20 to 25 fps, it ensures reliable and efficient operation in demanding environments.

- ***Embedded with NVIDIA® Jetson Orin NX/Nano™, delivering up to 100 TOPS***
- ***Extremely compact at 148mm x 120mm x 52mm with a fanless design***
- ***Extended operating temperature range from -20°C to 70°C***
- ***Hardware-accelerated encode/decode for multiple HD camera streams***
- ***Support for multiple simultaneous deep learning models***
- ***Real-time sensor fusion processing capabilities***



This computing foundation enables sophisticated real-time control of the autonomous mobile robot's (AMR) sensor arrays and actuator systems. The SBC35 Series handles critical navigation and safety functions with deterministic response times while the DLAP-211-Orin Nano processes multiple video streams for continuous environment monitoring and obstacle detection. The system architecture ensures that safety-critical functions maintain priority even under heavy processing loads. More broadly, this combination of versatile, robust, and amply validated computing elements helps significantly accelerate advanced AMR solution development cycles.



The resulting AMR Pallet Mover combines Phenikaa-X's advanced robotics platform with these ADLINK technologies. The AMR operates at speeds up to 1.2 meters per second while incorporating advanced safety features including dynamic speed adjustment based on environment conditions. Its sophisticated sensor array (including a 3D camera, LiDAR, and collision sensors) enables operation in both natural and artificial lighting conditions, with the ability to recognize and adapt to a range of pallet configurations common in Asian manufacturing.

DLAP-211-Orin Nano

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Scaling for Future Growth

The AMR Pallet Mover platform represents the culmination of innovative collaboration between ADLINK and Phenikaa-X, designed to meet the evolving demands of industrial automation. By combining Phenikaa-X's expertise in robotics with ADLINK's cutting-edge industrial computing solutions, the partnership has created a scalable and future-ready automation solution.



Driving Joint Innovation

Phenikaa-X leveraged its deep understanding of robotics and industrial needs to design a modular AMR system capable of adapting to diverse manufacturing environments. ADLINK's computing platforms, including the SBC35-RPL and DLAP-211-Orin Nano, provided the high-performance computing foundation necessary to power this advanced functionality. Together, the companies developed a platform that seamlessly integrates real-time sensor data, AI-driven decision-making, and flexible programming interfaces, enabling quick adaptation to changing operational requirements.

Enabling Scalability

The platform's modular architecture supports comprehensive fleet management, allowing manufacturing facilities to scale their automation operations without extensive infrastructure overhauls. With its open API support and compatibility and various SDKs (e.g., ADLINK's EVA and EdgeGO for AI deployment and remote monitoring/management), the AMR Pallet Mover integrates effortlessly with existing warehouse management and manufacturing execution systems. This flexibility ensures businesses can expand their automation capabilities as their needs evolve.

Future-Ready Solutions

ADLINK and Phenikaa-X's partnership ensures that the AMR Pallet Mover is not only a solution for today's challenges but also a platform for future innovation. Expandable I/O options and processing headroom, combined with robust software frameworks, make the platform adaptable to advancements in AI, robotics, and industrial automation technologies. This forward-thinking approach positions the solution as a cornerstone for scalable and sustainable growth in the manufacturing industry.

The successful implementation of the AMR Pallet Mover at a major electronics manufacturing facility demonstrates the solution's enterprise-ready capabilities. This initial deployment serves as a significant proof point for the platform's adaptability and integration capabilities, potentially opening doors for broader adoption across global manufacturing networks. The selection of this solution by a world-leading manufacturer particularly validates its potential for large-scale industrial automation applications.

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Customer Success and Industry Impact

The collaboration between ADLINK and Phenikaa-X brings together advanced computing capabilities and robotics expertise to address critical challenges in material handling automation. By combining ADLINK's industrial-grade computing platforms with Phenikaa-X's AMR technology, this partnership delivers solutions that help manufacturers improve operational efficiency, enhance workplace safety, and achieve greater flexibility in their automation initiatives. The resulting AMR Pallet Mover platform demonstrates how strategic technological partnerships can accelerate innovation in industrial automation while ensuring reliability and scalability for future growth.

“The computers are of top-tier quality, comparable to leading brands,” says Mr. Khong Minh, Robotics Manager of Phenikaa-X. “ADLINK's technical support team is efficient and timely, with fast delivery times, meeting the needs of projects that require quick implementation.”

Early implementations of this collaboration have already demonstrated the solution's ability to adapt to diverse manufacturing environments and specific material handling requirements. This flexibility, combined with streamlined deployment processes, positions the AMR Pallet Mover for rapid adoption across a wide range of industrial applications.

Accelerating Your Automation Journey

The AMR Pallet Mover project offers valuable insights for organizations considering similar automation initiatives. Perhaps chief among these are the importance of careful attention to local operating conditions, robust testing under varied environmental circumstances, and selection of computing platforms that provide both the performance and reliability needed for industrial automation.

For developers and integrators ready to advance their autonomous mobile robot initiatives, ADLINK offers:

- ***Technical consultation to evaluate computing requirements for your specific use case***
- ***Development kits for rapid prototyping and testing***
- ***Comprehensive documentation and engineering support***
- ***Long-term availability guarantees for production deployments***

Discover how ADLINK and Phenikaa-X can transform your automation initiatives with cutting-edge technology and expert collaboration. Contact us today to start your journey toward smarter, more efficient operations.

About Phenikaa-X

Phenikaa-X Joint Stock Company (a member of the Phenikaa Group) was established in October 2020, inheriting the research and development achievements of the research team at the Group.

Phenikaa-X primarily operates in the field of research and development of autonomous vehicle technology, manufacturing, and commercializing robots and drones. During its development, the company has achieved impressive milestones, including successful registration of several patents related to robots and autonomous buses in 2020, successful implementation of unmanned vehicle technology, high-resolution maps, various intelligent automation robots, affirming its pioneering position in the field of autonomous technology and robots in Vietnam. Additionally, Phenikaa-X has become a reliable partner in developing autonomous technology with some leading domestic and international corporations.

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