

A night cityscape with skyscrapers and light trails. The image features a dark blue sky and a city skyline with numerous tall buildings. Some buildings are illuminated with blue light, while others have warm yellow lights. In the foreground, there are several bright blue light trails that appear to be moving across the frame, suggesting a fast-paced, technological environment. The overall color palette is dominated by blues and oranges.

# 30

## TECHNOLOGY COMPANIES LEADING THE WAY IN 2023

## RECOGNIZING MARKET LEADERS

Whether you are trying to understand how you stack up to your competition or looking for the best technology solution for your organization, navigating your way through the labyrinthine technology landscape can be a daunting challenge.

That's why ABI Research publishes our Competitive Rankings reports, which offer comprehensive insight into different markets by identifying leaders and assessing companies' implementation and innovation strategies. Based on data and intel gathered from providers, partners, and end users around the world, these Competitive Rankings can help you zero in on the strategy or solution that makes sense for your business.

Our most recent Competitive Rankings examine a diverse range of markets. In the industrial space, which is ripe for innovation, we examined the leading autonomous forklift system vendors and manufacturing data analytics platform vendors. As autonomous driving reaches a go-to-market tipping point, we analyzed the top players in the autonomous vehicle platforms marketplace to determine who is in a prime position to lead the way in this emerging space. In total, we identified 22 leaders, 25 top innovators, and 23 top implementers.

To learn more about them and our findings, read on.

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## LEADING THE WAY

The following companies have been recognized as leaders in their market.

### OVERALL LEADERS



### LEADERS



## LEADING THE WAY

The following companies have been recognized as top innovators or top implementers in their market.

### TOP INNOVATORS



### TOP IMPLEMENTERS



## SCADA/HMI SOFTWARE SUPPLIERS

	Overall Leader	Leader	Top Innovator	Top Implementer
Siemens	●		●	●
GE Digital		●	●	●
Rockwell Automation		●	●	●
Hitachi Vantara		●	●	●
Yokogawa			●	
Emerson				●
ABB				●

This study assesses and compares 14 suppliers of Supervisory Control and Data Acquisition (SCADA)/Human-Machine Interface (HMI) software to offer an unbiased assessment and ranking. Siemens came out on top while GE Digital, Rockwell Automation, and Hitachi Vantara also ranking as leaders.

### INNOVATION

Siemens was recognized as a Top Innovator due to its success in being able to offer deployments of WinCC Unified and WinCC V7/V8 in tandem, supporting manufacturers by creating strong Information Technology (IT)/Operational Technology (OT) convergence, as WinCC Unified runs visualization automation software much closer to the hardware elements of manufacturers' operations. GE Digital, with iFIX and CIMPLICITY being strong modular solutions that sit within the company's wider Proficy portfolio, supporting the SCADA/HMI software with Proficy Operations Analytics, Proficy Historian, and GE Digital MES. GE Digital offers the Smart Factory Package. Rockwell Automation offers FactoryTalk Optix, a flexible, cloud-based software that provides manufacturers with an easy, on-demand way to scale their operations, alongside being supported by the company's extensive FactoryTalk portfolio and hardware offerings. Hitachi Vantara and Yokogawa also scored as leaders in the innovation criteria, both providing manufacturers with cloud-based software solutions. Furthermore, the companies offer their solutions with unlimited licensing models, allowing flexible scalability for manufacturers.

### IMPLEMENTATION

Siemens excelled in implementation with its significant customer base and deployment experience across all manufacturing verticals, excellent integration with Siemens' software, technology, and third-party offerings, zero-downtime deployment, and easy scalability for manufacturers. GE Digital provides manufacturers with rapid deployment rates with zero downtime in production. This is supported by the company's extensive partner network and vertical market expertise. Emerson has the highest deployment numbers and excellent integration with both its own hardware and software. Rockwell Automation, ABB, and Hitachi Vantara also scored as Top Implementers.

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## AUTOMATED BORDER CONTROL SYSTEMS

	Overall Leader	Leader	Top Innovator	Top Implementer
Idemia	●		●	●
Thales		●	●	●
Vision-Box		●	●	●

The leaders group consists of companies that offer highly successful and flexible solutions, mostly as a turnkey offering or with a high level of completeness, with access to the global market and best-in-class biometric and operational factors. The mainstream group consists of companies that serve a narrower area of the ABC system value chain. Biometric and operation benchmarks are generally lower, with flexibility of deployments being of a lower standard.

### INNOVATION

Companies that rank as top innovators provide market-leading offerings that relate to biometrics, as well as having the greatest flexibility in catering to specialized designs/ implementations, and a high Research & Development capacity. Idemia and Thales are top innovators.

### IMPLEMENTATION

Top implementers include those with a genuine global market presence, and a wide product portfolio with high integration capacity, both in vendor partnerships and delivering solutions to governments and border control authorities. Thales, Idemia and Vision-Box are the top implementers.

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## ENTERPRISE WI-FI AND WLAN VENDORS

	Overall Leader	Leader	Top Innovator	Top Implementer
Aruba	●		●	●
Juniper		●	●	●
Cisco		●	●	●
Huawei			●	

The enterprise WLAN networking vendors profiled in this report operate within a mature market that contains many deep-rooted incumbent companies with robust global distributor and reseller channels across various business verticals. These networks help protect the strong client bases of the legacy vendors, most notably Cisco and Aruba, and ensure that they face little significant disruption from upstart vendors entering the market. Smaller-scale vendors looking to grow market share in enterprises are required to develop highly optimized end-to-end solutions for the specific vertical they are targeting. For example, Extreme Networks' solutions have been optimized primarily for their target markets of large public venues, while Arista has focused almost exclusively on data centers and campus environments.

### INNOVATION

Aruba's broad range of proprietary WLAN technologies and strong WLAN portfolio has helped excel in the innovation rankings. Juniper's hardware portfolio is both technologically advanced and broad in range, and is supported by unique capabilities, such as patented virtual BLE antenna arrays and proprietary algorithms to eliminate deployment errors. Cisco is heavily involved in the Wi-Fi/5G convergence and was the original developer of the OpenRoaming technology. The company also continually develops new proprietary features that enhance WLAN performance, such as Zero Wait Dynamic Frequency Selection (DFS), released in 2022.

### IMPLEMENTATION

A key strength of Aruba's offering is its NaaS abilities. The company was one of the first vendors to begin building up its NaaS capabilities, and in 2022, it successfully made its entire portfolio available as-a-Service. The company also introduced new education and certification programs into its channel partner program to support its partners in deploying this service. Cisco is the largest enterprise vendor both in terms of shipments and revenue. Cisco's extensive experience selling into enterprise provides it with a robust network of resellers and distributors globally, and the company continues to invest considerable resources into supporting their business partners. Juniper Networks' series of acquisitions in recent years to enhance its AI and cloud networking capabilities has borne fruit for the company, enabling it to offer a highly competitive solution. In 2022, new capabilities were also added to the Juniper Mist cloud, which expanded its ability to deliver NaaS.

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## AUTONOMOUS FORKLIFT SYSTEM VENDORS

	Overall Leader	Leader	Top Innovator	Top Implementer
Balyo	●		●	●
Teradyne		●		●
Seegrid		●		●
SEER		●	●	
ForwardX			●	
Vecna			●	
VisionNav Robotics			●	
ABB				●
Toyota Material Handling				●

Fewer than 1% of the deployed forklifts today are autonomous, so the autonomous forklift market is expected to undergo robust growth in the near future. These vendors assessed in this report provide at least one of the following form factors: reach truck, counterbalance stacker, pallet stacker, pallet truck, and pallet jack. These autonomous forklifts are Autonomous Mobile Robots (AMRs) that can move freely without relying on surrounding infrastructure, as all players use either vision Simultaneous Localization and Mapping (SLAM) or laser SLAM.

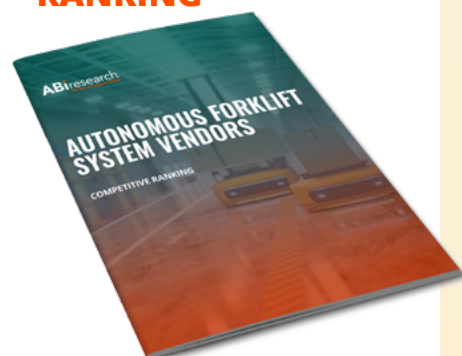
### INNOVATION

SEER, BAYLO, ForwardX Robotics, Vecna Robotics, and VisionNav Robotics are the top innovators in this ranking. SEER's credentials come mainly from hardware innovation, where the company's top-end Arm-based controller can perform on-robot navigation, while meeting all critical functional safety standards. Vecna Robotics' unique advantage comes from software. Pivotal enables the automation and navigation capability of the robot through various orchestration components and an orchestration engine that processes historical data from other sources and orchestrates the fleet movements in the entire facility. BALYO does not, in any way, modify the base track of the vehicles it automates. Instead, BALYO focuses purely on laser SLAM solutions, making it the first-choice partner for major forklift Original Equipment Manufacturers (OEMs). Lastly, ForwardX Robotics and VisionNav Robotics have developed highly reliable and accurate laser SLAM and complementary software capabilities that make their robots competitive with their Western counterparts.

### IMPLEMENTATION

Not surprisingly, the top implementers are dominated by publicly listed entities with deep resources, wide distribution networks, and solid technology partners, with Seegrid as the only exemption on this list. As the only publicly traded autonomous forklift company, BALYO has industrial partnerships with KION and Hyster-Yale, two of the largest forklift manufacturers in the world. They also maintain extensive distribution networks and a global direct sales team. In contrast, Teradyne, ABB, and Toyota Material Handling obtain their autonomous forklift capability through acquisitions, which complement their existing portfolios and allow them to become key players in the AMR space. Seegrid went through a rough period in the past, leading to heightened discipline, and has onboarded corporate leadership with more business experience and focused on deepening ties with a select few customers.

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## MANUFACTURING DATA ANALYTICS

	Overall Leader	Leader	Top Innovator	Top Implementer
Altair	●		●	●
Sight Machine		●	●	●
PTC		●	●	
Seeq		●	●	●
Litmus		●	●	

Industrial equipment uses numerous communication protocols, and in order to provide customer value, suppliers must accommodate them in their solutions. Solutions need to be more than simply vessels for collecting data and customers need to make sense of the data by applying context (timestamp, batch numbers, shift numbers, etc.) to make sense of readings. In addition, customers do not want solutions that can only be used by data scientists; rather, the desire is to put the analytical tools in the hands of the technicians and operators on the production line. Suppliers need to enable customers to easily understand the findings, often via charts and dashboards. Furthermore, the data cannot remain in data silos. Instead, the data needs to be shared with other staff members with solutions providing APIs so that the data can be integrated into other industrial applications (e.g., ERP systems, Product Lifecycle Management (PLM) applications), contributing to customers' efforts to create digital threads to fully understand their operations and/or digital twins, and plan for operational changes.

### INNOVATION

Altair led the way with the firm able to accommodate and tag all sorts of structured and unstructured data that can be collected via a wide range of protocols, data historians, and industrial applications. Deep Learning (DL) and Machine Learning (ML) can be performed on the data as they are collected and then users can deploy dozens of analytical tools to perform what-if analyses, verify whether changes will meet business objectives, and perform trade-offs. The solution is provided with templates and designed as a drag-and-drop low-code/no-code interface. Users can tailor dashboards for different stakeholders and support customer efforts to create a digital thread with connections to industrial applications, such as Enterprise Resource Planning (ERP) systems, digital twins, and Augmented Reality (AR) interfaces; all via REST Application Programming Interfaces (APIs).

### IMPLEMENTATION

Seeq leads the way thanks to its growing client base and revenue, coupled with partnerships with leading tech companies and global System Integrators (SIs). The multilingual interface and templates matching customer workflows reduces customer time to value. Furthermore, users can take advantage of mentoring events and boot camps to maximize the benefits of their investment.

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## AUTONOMOUS VEHICLE PLATFORMS

	Overall Leader	Leader	Top Innovator	Top Implementer
Mobileye	●		●	●
Nvidia		●	●	●
Qualcomm		●	●	●

The market for autonomous driving is reaching an important tipping point, as years of prototyping and concept exploration give way to the realities of shipping applications in the real world. With the Level 2+ (L2+) trend finally providing a viable, global path to market for Autonomous Vehicle (AV) platforms, Original Equipment Manufacturers (OEMs) and other deployers are making important decisions regarding the supplier or suppliers that will underpin their brand in the autonomous age, often choosing from a number of development partners that have supported OEMs over many years of prototyping.

### INNOVATION

Mobileye played a pioneering role in the active safety ADAS market, leveraging its market-leading machine vision capabilities to enable the widespread proliferation of life-saving applications into passenger and commercial vehicles through low-cost, vision-centric approaches, and turnkey solutions that could be readily integrated into a variety of vehicle platforms. NVIDIA is at the forefront of the AI revolution, pioneering the adoption of AI in multiple end markets and verticals to solve a variety of problems, including in the automotive industry. NVIDIA has delivered the parallel computing power, Compute Unified Device Architecture (CUDA) platform, and other tools needed for the famously slow-moving automotive industry to deploy AI-driven autonomous driving applications. Accelerated by its 2021 acquisition of the Arriver, Qualcomm has a broad range of Intellectual Property (IP) proven in the mobile and Internet of Things (IoT) space to bring to bear on the enormous engineering challenge of passenger vehicle automation.

### IMPLEMENTATION

Mobileye has pivoted toward a more open approach in recognition of the prevailing customer preference to own and shape the more highly anticipated AV experiences that will define the future of its brands. Despite increasing competitive pressure from Qualcomm and NVIDIA, Mobileye retains a large number of OEM customers, including both high-volume brands deploying Mobileye technology in L2+ contexts, and premium OEMs targeting L4 automation. NVIDIA achieved the highest score of any vendor for its set of tools and services due to its comprehensive CUDA platform, simulation tools, virtual prototyping, and design environments. Qualcomm received high marks for its geographic reach, representing both the global scale and reach of Qualcomm in multiple industries and parallel automotive domains.

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## LEAD THE WAY IN 2023 AND BEYOND

With 2023 already in full swing, there are still ample opportunities to set yourself apart from your competitors in your market. Whether you are a technology innovator, implementer, or both, ABI Research has the expertise, data, and insight you need to gain a competitive advantage.

Since 1990, we have partnered with hundreds of leading technology brands, cutting-edge companies, forward-thinking government agencies, and innovative trade groups around the world. Through our leading-edge research and worldwide team of analysts, we deliver actionable insight and strategic guidance on the transformative technologies that are reshaping industries, economies, and workforces today.

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