YEAR IN REVIEW

aim

Defining Today's Technology Standards; Empowering Tomorrow's Solutions.

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Resources | View or download items by visiting the AIM Store online.

Automatic Identification and Data Capture Industry Direction Report

AIM commissioned a market research report on the commercial outlook for AIDC technologies, including the leading technology purchasing influences, priorities and obstacles for clients and prospects in leading AIDC markets. This global report provides insights on the growth, challenges, and opportunities of current and emerging technology innovations across multiple vertical markets. Purchase your copy here.

Industry Publications

- **Strategic Plan** – The AIM Strategic Plan describes a desired vision and represents a compass by which AIM will support their current stakeholders as well as engage new members and partners.
- **Preventing Food Waste with IoT Technologies Whitepaper** – Addresses the food waste regulatory landscape, the keys to creating a more resilient food supply chain and gives specific examples of food sustainability success through IoT technologies.
- **RFID FAQ** – Web based document reviewing the most frequently asked items on RFID and implementation of the technology.

Technical Specifications

Extended Channel Interpretations (ECI) Part 3: Register International Standard – This update lists all currently assigned ECIs whose use is described in Part 1. It includes Interpretative ECIs (which include Character Set ECIs) and Transformation ECIs (excluding Closed System ECIs).

AIM Webinar Series

With the help of our valued members, we provide free webinars to all interested in the AIDC community on numerous technology-related topics. The goal of these webinars is to showcase the benefits of AIDC technologies. Watch them live on the AIM YouTube Channel.

- The Role of Data in Scaling Circular Economy
- Top Label Industry Trends and Predications
- Insightful Data Analytics with Applications
- Connecting the Physical to the Digital - Parts Provenance with Blockchain and DLT
- Optimizing Hydropower Generators Passive RFID Sensor Tags
- Blockchain Offers Secure Supply Chain & Brand Value Through NFTs
- Vision and Reality of the UDI Medical Device Regulation

AIM North America also hosted more than 15 webinars focused on four key areas: food supply chain, UDI in medical devices, cannabis, and pharmaceutical. Check out the AIM NA YouTube Channel.

Hear & Know Podcast Series

AIM interviews key executives and gains insights into their careers as well as thoughts on the latest trends, technologies, and innovations. These podcasts can be heard on the AIM Podcast Channel.

- Labelexpo Event Director Tasha Ventimiglia
- University of Memphis President Dr. Bill Hardgrave
- Digimarc Executive Vice President, Chief Legal Officer and Corporate Secretary Joel Meyer
- CYBRA's Sheldon Reich
- RFID Journal Founder Mark Roberti
- FLEXcon North America President Aimee Peacock
- Applied Image Owner Glenn Jackling
- NetObjex Founder and CEO Raghu Bala
- TEKLYNX Global Marketing Director Jenna Wagner

News Publications

- **AIM Insider** – Bi-monthly newsletter that highlights industry executives, key AIM initiatives and industry news.
- **AIM News** – Must read annoucements that will implact your business.
- **AIM Solutions Showcase** – A spotlight of members' latest technicalogical innovations and applications.

Liaison Relationships

- **CEN/TC 225 |** European Committee for Standardization - AIDC Technologies
- **ETSI |** European Telecommunications Standards Institute
- **IIC |** Industrial Internet Consortium
- **NFC Forum |** Near Field Communication development, application & solutions
- **MHI MH10 |** Unit-Loads and Transport-Packages
- **ISO/PC 308 |** Standardization in the field of Chain of Custody for products
- **ISO/TC 122 |** Packaging
- **ISO/TC 104 |** Freight Containers
- **ISO/IEC JTC 1/SC31 |** Automatic identification & data capture techniques
- **ISO/IEC JTC 1/SC 41 |** Internet of Things & related technologies

> "AIM provides the opportunities to connect with global insights in the forms of Latest News, Newsletters, Podcasts, Webinars and Potential Opportunities from around the globe in AutoID industry domain.
>
> Anurag Kulshrestha
> President & CEO
> Anantics

AIM Virtual Summit

The AIM Summit provided a meaningful forum for leading traceability and supply chain professionals to connect with their peers, engage with industry experts, and learn cutting-edge traceability and supply chain strategies.

Sessions discussed increasing profitability by mapping your supply chain, the world's first farm-to-store intelligent supply chain, why restaurants are transforming their inventory management with item-level traceability, how RFID for inventory and traceability helps combat labor shortages in QSRs, how AIDC reduces the burden of compliance and AIDC in the cannabis industry.

Gold*

ACSIS helps enterprises build more agile and responsive supply chains to improve efficiencies, increase profits, and deliver better experiences. ACSIS provides cloud-based best-in-class product traceability and reusable asset management solutions to optimize business operations driving improved profitability, better-informed decisions, and increased customer satisfaction.

Avery Dennison is a materials science and manufacturing company specializing in the design and manufacture of a wide variety of labeling and functional materials. Our expertise and global scale enable us to deliver innovative, sustainable, and intelligent solutions to customers all over the world.

Every year, the world's largest and most dynamic supply chains in every industry trust BarTender to create and manage over 40 billion of the labels, barcodes, documents, and RFID that keep their products moving, traceable and safe.

BlueStar is the leading global distributor of solutions-based Digital Identification, Mobility, Point-of-Sale, RFID, IoT, AI. AR, M2M, Digital Signage, Networking, Blockchain, and Security technology solutions. BlueStar works exclusively with Value-Added Resellers (VARs) to provide complete solutions, custom configuration offerings, business development, and marketing support.

Ecartes is a leading provider of tailored turnkey solutions for identification and tracking. We bring a wealth of experience and boast of in-house manufacturing and personalization facilities, and dedicated IoT application development team, enabling deployments across the globe, including a 10 million RFID based file tracking solution for a leading bank

FOX IV manufactures automated labeling and packing slip solutions. Our equipment is sold globally and includes label print/apply, applicators, label finishing systems. All of our labeling solutions are designed for reliable operation while being easy to operate and maintain. Integrated labeling systems are available through FOX IV's in-house engineering group.

Innovatum is a regulated labeling software and consulting services company; a prolific innovator in its industry, tightly focused on life sciences labeling for more than two decades. As regulatory compliance experts, Innovatum provides specialty, configurable labeling software to fit any life sciences need for its global customers. Innovatum has championed many of the most significant innovations in the industry.

iTRACE 2DMI is an Anti-Counterfeit and Supply Chain Security Solution that helps companies stop Production Overrun, Diversion and provides secure product authentication to global brands and manufacturers. iTRACE has deployed blockchain and traditional track and trace solutions through a suite of desktop, integrated, on-product and cloud-based security applications.

* Discover more about these AIM sponsors & industry leaders by clicking on the company logo.

Gold*

Loftware is the world's largest cloud-based Enterprise Labeling and Artwork Management provider, offering an end-to-end labelling solution platform for companies of all sizes. We help companies improve accuracy, traceability, and compliance while improving the quality, speed, and efficiency of their labeling.

ScanSource, Inc. is at the center of the technology solution delivery channel, connecting businesses and providing solutions for their complex needs. ScanSource sells through multiple, specialized routes-to-market with digital, physical and services offerings from the world's leading suppliers of point-of-sale (POS), payments, barcode, physical security, unified communications and collaboration, telecom and cloud services. ScanSource enables its sales partners to create, deliver and manage solutions for end-customers across almost every vertical market.

SICK manufactures intelligent sensors for industrial automation and is recognized as the premier supplier of automatic identification solutions for material handling and supply chain operations. Its image, RFID and laser-based solutions maximize tracking efficiency and are backed by world-class support that ensures professional project oversight, commissioning, and service.

A global leader in condition-indicating solutions, SpotSee helps customers spot and see changing conditions to protect life sciences and ensure supply chain integrity. SpotSee's solutions include temperature, impact, tilt, vibration, humidity, and liquid detection monitoring devices, available via visual, RFID, QR Code, cellular or satellite connection.

Terry Burton Consulting provides consultancy, analysis, and software development in AIDC and standards setting. We would like to help with your project, whether you are implementing DotCode, rMQR, adding support for ECI, or undertaking something truly unique. Contact us to find out how we can make a difference.

TSC Printronix Auto ID is a leading designer and manufacturer of innovative asset tracking and identification label printing solutions including mobile, desktop, industrial, and enterprise-grade barcode label printers, RFID printers, barcode label inspection systems, print engines, and genuine supplies. With one of the widest selections of barcode label printers in the industry, we serve in all major markets and industries.

Wiliot is an Ambient IoT company whose SaaS platform connects the digital and physical worlds using its IoT Pixel tagging technology, computers the size of a postage stamp that power themselves in revolutionary ways. Our mission is to make every single thing an agent of change.

Zebra Technologies is an innovator at the edge of the enterprise with solutions and partners that enable businesses to gain a performance edge. Zebra's products, software, services, analytics and solutions are used to intelligently connect people, assets and data to help our customers in a number of industries make business-critical decisions.

* Discover more about these AIM sponsors & industry leaders by clicking on the company logo.

Silver*

ANANTICS

BALLUFF

GLOBERANGER
a Fujitsu company

GS1 US

PLM TrustLink

SATO Powered On Site

Voyantic

Bronze

BARCODE TEST
GETTING IT RIGHT

DIGIMARC

Lyngsoe Systems
elevating logistics

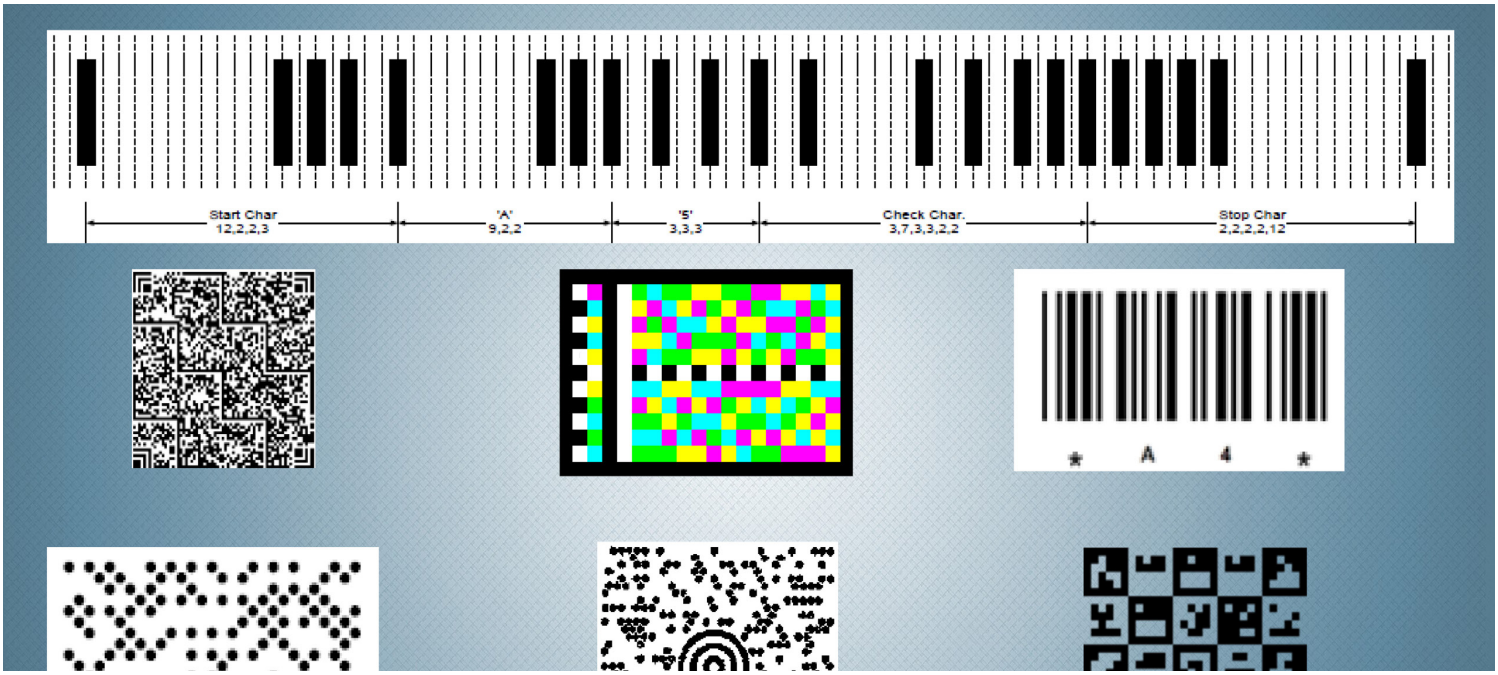
SCHNEIDER KENNZEICHNUNG

TEKLYNX
Barcode Better

* Discover more about these AIM sponsors & industry leaders by clicking on the company logo.

Industry Groups

AIM industry groups are established by our members to create, learn and share information to help stay at the front of the line with the latest processes in automatic identification and data capture technologies. Initiatives these groups partake in include standards development, technical reports, educational materials, advocacy and insights around the latest industry trends. Many symbologies and standards published as AIM specifications have been adopted by the international community via the ISO standardization process. Participation in these groups bring members together from all parts of the industry and vertical markets and create a unique atmosphere that solves many of the shared challenges and opportunities members face.



Technical Symbology Committee (TSC)

Chair | Ray Delnicki, Emeritus

TSC members actively work to ensure that complete technical specifications are available to the market.

Key Initiatives:

- Provided insight to the ISO/IEC JTC1/SC31/WG1 on their Direct Part Marking project; ISO/IEC TR24720 Information technology — Automatic identification and data capture techniques — Guidelines for direct part marking (DPM). These insights provided a focused report on the use of direct part marking as it relates to AIDC and includes a wide variety of machine-readable methodologies (e.g., barcode imager, optical detection). TSC comments added a greater focus on usability and incorporating the latest DPM technologies for any user to come in and quickly be able to review their DPM concerns.

- Ultracode Standard is being revised for eventual ISO consideration. The Ultracode symbology is a family of colour multi-row, variable size two-dimensional matrix symbols incorporating both structural rules for symbol damage detection and Reed-Solomon error control for error detection and correction. The Ultracode symbol is designed to be printed with any colour printer or displayed with sRGB compliant electronic display. It may be read with any standard sRGB-compliant scanner, colour digital camera or smartphone.

- Collaborated with ISO/IEC JTC 1/SC 31/WG 1 on recommendations on symbology identifiers within their third edition draft of ISO/IEC 15424 Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers). The TSC added several new symbology identifiers to the document. The TSC also recommended when the Symbology Identifier is not transmitted by the reader, the default interpretation by the application shall be the ISO/IEC 8859-1:1998 Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1 character set with no special features. The TSC lastly added to the Modulated Height Postal in the draft document.

Industry Groups

Radio Frequency Identification Experts Group (REG)

Chair: Claude Tételin, GS1 Global

Known by members as the REG, this industry group focuses on addressing the issues and standards associated with all radio frequency identification (RFID) technologies.

Key Initiatives:

- Creating a RFID-enabled sensors in a material handling setting whitepaper. The paper addresses sensors used for predictive or preventative maintenance along with product protection. The paper dives into how these types of sensors come together to create a more efficient supply chain.
- Revising the AIM Global RFID Guideline: RFID chips and transponders — Verification and qualification of design and manufacture Part 1: Tires (AIM REG 396). The goal of this project is to gain guidance from those in the industry for REG 396, making sure it remains a useful guideline to all in the automated data capture and tyre industries. With your support we believe this can be achieved.
- Updating the AIM Technical Guideline: Guidance On Data Content and Structure in Passive RFID Tags Version 1.1. The guideline attempts to answer the questions that commonly arise in developing an RFID application.
- Updating RFID Frequently Asked Questions (FAQ) document. Document is reworked to address new concerns and amend questions based on the latest happenings in RFID. An accompanying interactive video series is also being created based around this online document.

> “Through thought provoking collaboration outside of formal meetings, we explore ways of automating data ingestion with RFID to drive value and enable supply chain efficiencies. AIM members include seasoned Subject Matter Experts who are also pioneers in their respective industry and know how to add value to digitize supply chain processes.
>
> **Guilda Javaheri**
> **Chief Technology Officer**
> **Golden State Foods**

Industry Groups

AIM's Internet of Things (IoT) industry group provides a forum for members to understand and help shape the rapidly changing landscape of the interconnected world of products, services, and information.

Key Initiatives:

- Developing the Impact of IoT on Food Waste Whitepaper. The paper addresses the use of IoT technologies that help create a sustainable management of food. The paper addresses the worldwide food waste regulatory landscapes, the keys to creating a more resilient food supply chain and specific examples of food sustainability success through IoT technologies.

- Creating the IoT in Robotics and Artificial Intelligence (AI) Whitepaper. The IoT's role within AI and robotics is addressed; explaining how together they achieve intelligent exchange of information between sensors, devices and machines in factories, in order to achieve more with less. The paper taps into how executives and trading partners can access critical data, how this can evolve technology further in the future and how workers can utilize these technologies to create a more efficient work environment.

- In a joint project with AIM's Track and Trace industry group, the teams are implementing a primer on carbon footprint. The primer will address the importance and benefits of knowing the carbon footprint of a product and how AIDC can be used to measure a product's carbon footprint for any point of its life.

Industry Groups

Track and Trace

Chair: Don Durm, PLM Fleet

The Track & Trace Industry Group develops, educates, promotes and aides in the adoption of automatic identification strategies designed to support compliance of global regulations related to product traceability.

Key Initiatives:

- Created a whitepaper on counterfeiting. The paper addresses multiple AIDC solutions to help prevent fraud. No single solution is perfect for all counterfeiting situations, but often AIDC technologies can be used together to create a multi-layered barrier to would-be criminals. Some of the technologies discussed here are barcoding, particularly 2D bar codes (e.g., DotCode), digital watermarking, NFC, RAIN RFID and blockchain. Armed with one or more of these technologies, brand owners can move to improve their efforts in product authentication and anti-counterfeiting.

- Revising the Fundamentals of Track & Trace Whitepaper. This document defines and details the necessary steps for tracking and tracing regardless of the commodity or system that is finally adopted. The revision dives into the fundamental parts of a track and trace system so that an individual company can understand how to build a system to improve itself or comply with upcoming and new regulations and industry norms.

- Developing a calculator to showcase the benefit of a track and trace system. The calculator looks into top drivers of ROI and focuses on these items. The calculator is being fleshed out by several vertical markets to give examples of the benefits a traceability system can have for an organization in the long run.

> AIM supplies members with exclusive insights into the latest technology trends which further allows us to cater to the evolving needs of our end-users. The networking opportunities enable collaborative efforts between those in the industry that otherwise would not be possible, and Socket Mobile will continue to benefit from the assets that AIM provides.
>
> **Len Ott**
> **Chief Technical Officer and Executive Vice President of Engineering**
> **Socket Mobile**

Standards & Compliance

Standards remain critical in today's world. Without proper development, implementation or compliance, they can impact the success or failure of a new technology, product or business and affect consumer safety. As a leader in AIDC industry standards, AIM works with ISO (International Organization for Standardization) and ANSI (American National Standards Institute) to develop, revise and educate both companies and users to ensure compliance in the global marketplace.

ADC1 Technical Advisory Group (TAG)

Chuck Evanhoe, Aware Innovations

AIM acts as the administrator of the U.S. Technical Advisory Group (TAG) to the International Organization for Standardization (ISO) Sub Committee SC 31. The TAG serves as the delegate of the American National Standards Institute (ANSI) responsible within ISO for all work on standardization in automatic identification and data capture in the U.S. Members of ADC1 represent companies with technical knowledge in AIDC who work together providing input during the process of standardization to ensure both U.S. involvement and consensus on standards.

2022 Highlights

- Review and response to work on all standards related to:
  - Data carriers (TG1)
  - Data & structure (TG2)
  - Radio & communications (TG4)
  - Application of AIDC standards (TG8)

Registration Authority (RA)

In addition to its role as a U.S. TAG administrator, AIM also acts as the international Registration Authority (RA) for several ISO standards, including ISO/IEC 15459 Information Technology – Unique Identification which saw increased interest as the result of new European Union and Chinese regulations passed that require all tobacco and alcohol products to carry a unique identifier. As the RA for ISO/IEC 15459, AIM is responsible for the approval of applications from organizations requesting Issuing Agency Codes that are guaranteed to be unique and compliant with all aspects of the standard.

2022 Highlights

- Working with ISO/IEC 15961 Registration Authority AFI Registration Committee to update register as it relates to recent inquiries.
- Enhanced operating procedures for approval of Issuing Agency Codes (IAC) for ISO/IEC 15459 to ensure uniqueness of each code issued.
- Worked on approval for status as Registration Authority for additional ISO standards.

Chapters

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As the role of regional chapter in Asia Pacific, AIM Asia has alliances with the country chapters in the Asia pacific region. To continue to promote and advocate AIDC to our industry, AIM Asia has arranged 6 free webinars followed by the networking sections together with our regional Country Chapters, AIM Japan, AIM China, AIM Korea, and AIM India. We also had our chapter member companies present their innovative AIDC technologies and challenges faced to AIM members and the other association members such as IEEE, GS1, RAIN, UTC Global and academic researchers. AIM Asia also participated in the IEEE event as the invited speaker to present in the industry leader forum.

AIM Asia participated in RFID Journal Live in May, attended the AIM breakfast, and attended the RAIN RFID meeting in June to meet the members and potential members in Las Vegas and Helsinki. After Singapore gradually opened, AIM Asia arranged a physical committee meeting in August. A new workgroup of AIM Asia RFID Standard and Performance testing has also been setup.

AIM China

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Affected by the Covid-19 epidemic and China's epidemic prevention and control policies, other large-scale activities of AIM China such as industry exhibitions and communication meetings are difficult to carry out smoothly. So, most of our activities have changed from offline to online.

AIM China organized and held the first online meeting of the association's standard project. The meeting conducted a project review of the two association standards. Seven experts from the National Standards and Technology Evaluation Center, China National Institute of Standardization, China Jiliang University (CJLU), and Heilongjiang Standardization Research Institute attended the meeting and listened to the reports of representatives of the three application units which applied the 2 standards. The experts questioned the technical content of the standard, put forward their opinions and suggestions, and actively discussed and reached consensus on relevant issues.

AIM China and AIM Asia jointly held the 10th AIDC webinar. AIM China invited its member—Newland AIDC company, which brought wonderful sharing to AIM Asia's members and industry insiders. At the webinar, Luka Chen, senior product manager of Newland AIDC, introduced the latest automatic acquisition equipment developed by itself and shared his experience in product development and sales. The participants actively discussed the development prospects of the AIDC industry market in China and Asia, which got a good response.

AIM China held a project seminar on the preparation of the "China AIDC Development Report". Fang Fang, secretary general of AIM China presided over the seminar, and communicated with other project members through online meeting. Participants fully exchanged their views and opinions, drafted the outline of the report, and the division of labor was also determined. This report will mainly introduce the development situation and development trend of China's AIDC technology and industry in the past 5 years and the next 10 years. It also introduces the status quo of China's barcode technology, RFID technology, biometric identification technology, our independent R&D products, standardization process, future development trends, application fields and related solutions.

AIM Denmark

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Main activity and highlight of the year was the annual 'RFID & IoT in the Nordics' Conference which was cancelled in both 2020 and 2021 due to Covid-19. It was great on 1. June 2022 to again organize and host the largest RFID Event in the Nordics. It was a successful event with good presentations, good exhibition, a lot of networking - and everyone was very energetic and happy to finally meet again.

Member activities the last year included general meetings for all members, meetings in the Serialization of Pharmaceuticals Forum, as well as in the Special Interest Group for BLE/UWB RTLS standards and guidelines.

In addition, the chapter has developed its own AIDC Maturity Model which will be further developed in the years to come.

AIM Europe

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AIM Europe is engaged in various standardization projects within CEN and ETSI. CEN, the European Committee for Standardization, is an association that brings together the National Standardization Bodies of 34 European countries. ETSI is a European Standards Organization (ESO) for telecommunications, broadcasting and other electronic communications networks and services.

Members provided expertise in the publication of EN 302 208 V3.3.1 "Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W; Harmonised Standard for access to radio spectrum," which has been consequently endorsed by the European Commission with the publication in the Official Journal of the European Union L258 Volume 64.

AIM Europe has established a relationship with the "Holy Grail Project". Starting at Copenhagen's Amager Resource Center in Denmark, they have partnered with the European Brands Association to trial newly developed sorting units at semi-industrial scale. The objective is to assess the technical and economic viability of digital watermarks and their positive impact on increasing the recycling of plastic packaging.

AIM Europe is also busy planning for AIM's 50th anniversary celebration for the European Region that will be held in Germany in 2023.

AIM Germany, Austria and Switzerland

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After 2019 AIM-D e. V was more than happy to join LogiMAT the end of May as a live event again. The AIM community booth was nearly sold out and the show was a great success. Furthermore AIM-DACH was running two Experts Forums at Empack 2022 and FachPack.

For the second year the international show RFID & Wireless IoT tomorrow 2022 took place in the RMCC in Wiesbaden. AIM members were present as experts, speakers, sponsors, and exhibitors – and, again, AIM-D e. V had a booth at the show which was a great success.

AIM-D e. V is working on the following two new projects:

- GPos: Global Positioning Group (founded May 2022): The three associations (AIM-DACH – OMLOX & PNO/PI – OPC Foundation) have joined forces to develop a new OPC UA Companion Specification "Global Positioning". The goal is to define geometric positions in space on a local and global level to ensure a seamless transition between production, intralogistics, and logistics.

- WIPANO-II / SPOQ: Funding project on AutoID & Security: Standardised processes to guarantee product security and anticounterfeiting based on AIDC technologies – in cooperation with VDE, universities, and companies.

AIM India

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AIM India became an official chapter of AIM, Inc. in December 2021.

AIM India will Increase business understanding of AIDC processes and technologies with the Government, Industrial Bodies, Organizational Associations, Professional Colleges, etc. to adopt the use of AIDC technologies and rally with statutory bodies to make use of AIDC mandatory.

AIM India has successfully completed the initial Governmental of India statutory requirements and is now a legal entity. Further registration processes are at various stages of completion.

AIM India was formally introduced to the AIDC fraternity at the Annual AIDC Technologies Association of India Summit held at Hyderabad where more than 125 AIDC companies from all over India participated. An introduction to AIM India was given which was received with a lot of enthusiasm by one and all.

The next phase of Government of India registration is expected to be completed soon. Following this, AIM India would open its doors for membership and move ahead with its mission of promote AIDC technologies with the Government of India and Other Industrial & Non-Industrial bodies in India.

AIM Japan

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AIM Japan was chartered in 2019. Since inception, AIM Japan is continuing educational and training programs for students and companies.

Despite the COVID-19 multiple waves restricting activity for almost a year, AIM Japan online and offline programs deepened partnership even more. Relating to research programs, AIM Japan and members had dozens of presentations and papers at conferences and applied for patents. This is a small but good step in the COVID-19 era.

AIM Japan also continued the survey of the Japanese AIDC market with related parties, implementation of Bar-symbol/Coding, SCM/Traceability, RFID performance testing and Radio interferences.

AIM Korea

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AIM Korea (Korea Auto-ID Industry Association) became an official chapter of AIM in 2021. The addition of AIM Korea is a key step toward connecting industry leaders in the Asia Pacific region with the broader network that is already an advocate for AIDC technology and innovation around the world.

Signed an MOU for business cooperation with the AIM Korea and the Korea Smart City Society. This agreement contains the contents of active cooperation between the two organizations for the use of automatic recognition technology in the right place for the successful implementation of smart cities. Through this, it is expected that various AUTO-ID technologies can be utilized in the implementation of smart cities.

AIM North America

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AIM North America continued to see increased member participation. The chapter maintains active work groups to address the needs of the members including food supply chain, cannabis, UDI for medical devices, and pharmaceutical. These work groups meet monthly, published whitepapers/Quick Guides, developed position papers, and responses to the U.S. Food and Drug Administration (FDA), conducts monthly webinars on their respective topics, launched a hackathon competition, collaborated with like-minded vertically focused organizations, and identified speaking, exhibiting, and networking opportunities for members. AIM North America continues their member outreach effort, both verbally and electronically. Targeted partnership breakfasts and Solution Showcase special editions were also initiated.

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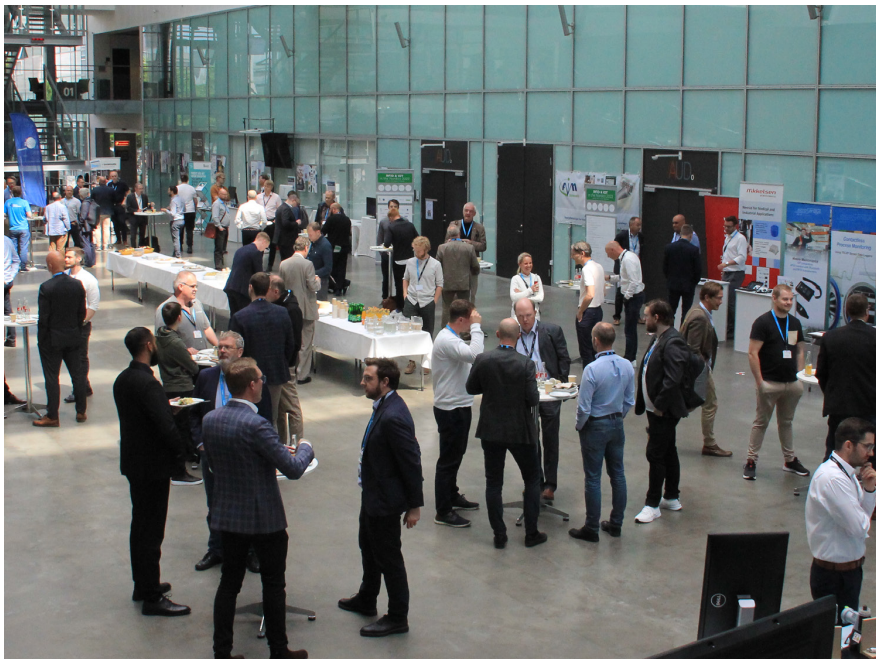
AIM Russia

AIM Russia saw a slight increase in membership and continued with standardization, advocacy and education activities.

AIM Russia, in conjunction with GS1 Russia, provides Secretariat to Russian and CIS Technical Committees on AIDC, and represents the Russian National Standards Body (GOST R) in ISO/IEC JTC1/SC 31. Over the past 12 months, three CIS standards and one national standard were developed by experts from AIM Russia member companies, based on corresponding ISO standards, including Direct Part Mark (DPM) Quality Guidelines.

AIM Russia hosted a virtual meeting of Technical Committee 355 “Automatic Identification and Data Capture Techniques”, SC2 “Optical Data Carriers” and SC4 “Radio Frequency Communications”, attended by 29 participants from 22 organizations, which approved standardization plan for 2023-2025.

In cooperation with GS1 Russia, AIM Russia continues to provide expert support to the national project on the use of AIDC technologies for the identification of goods to ensure traceability and optimize business processes in the logistics supply chain. The scope of the project is expanding continuously and currently covers a wide range of food and non-food product categories such as dairy products, bottled water, alcoholic beverages (including beer), tobacco, perfumery, pharmaceuticals and dietary supplements, medical devices, apparel, footwear, photo cameras, bicycles, wheelchairs, tires, and certain types of textiles. AIM Russia provides regular consultations and trainings for users involved in the project.



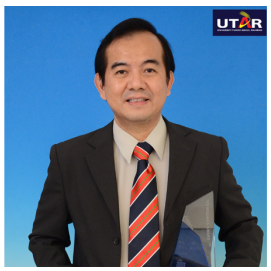
AIM Awards

Each day AIM members and partners make unique contributions to the industry and world marketplace that positively impact business and consumers alike. Annually, AIM recognizes those individuals and organizations which not only promote the advancement of automatic identification but demonstrate significant contributions to enhance new technologies. Meet the Class of 2022 winners:

Richard Dilling Award

2022 Recipient | James Springer, EM Microelectronic

Since 1984, the Richard Dilling Award is the highest award given in the Automatic Identification and Data Capture (AIDC) industry. Named for Richard R. Dilling, an industry pioneer and former Vice President of AIM, it is presented to executives, scientists, and engineers in recognition of outstanding contributions that have furthered the growth of the industry.



Ted Williams Award

2022 Recipient | Eng-Hock Lim, University Tunku Abdul Rahman, Malaysia

Named in honor of Ted Williams, an industry innovator, collaborator, and long-time member of the AIM Global Technical Symbology Committee, the award was introduced in 2007 and is presented annually in recognition of innovative and exceptional contributions to the development of the automatic identification industry that can further the growth of the industry through their work as a teacher, researcher or entrepreneur.

Clive Hohberger Technology Award

2022 Recipient | Chuck Bolen, Zebra Technologies

Created in 2018 to honor the lifetime contributions of Dr. Clive Hohberger, this award recognizes the scientists, engineers, software developers, or systems integrators for outstanding contributions that have furthered the growth of the industry through important applications and new technological developments.

Bert Moore Excellence in Journalism

2022 Recipient | Edson Perin, Netpress Books

In 2007, the Bert Moore Excellence in Journalism Award was established to recognize a journalist or media representative in the automatic identification industry whose work exemplifies the qualities of honest, educational and unbiased reporting of the automatic identification and mobility industry. The award was renamed in 2012 to honor the late Bert Moore, long-time AIM contributor and industry expert.

Paul Bergé International Business Development Award

2022 Recipient | Dr. Romano Volta, Datalogic

The Paul Bergé Award, established in 2020, recognizes the extensive international AIDC business development efforts spearheaded by Paul Bergé throughout his career. Presented each year, the Paul Bergé Award will distinguish an individual or an organization that demonstrates an international impact on expanding AIDC technology awareness and implementation.

AIM Case Study Competition

The AIM Case Study Competition honors leading organizations within the global AIDC community that are contributing to the faster adoption of new and innovative technologies, as well as to engage international industry collaboration while sharing success stories around applications commercially available in the marketplace today. To learn more, click on the company logo.

Blockchain Winner | iTRACE Technologies

iTrace Technologies worked with a large US based aircraft equipment manufacturer in the used and refurbished parts business to protect the data from hackers and to ensure the parts are authentic.

IoT Winner | Coresonant Systems

Coresonant Systems worked with a dock complex in India to develop an effective cargo clearance processing system for faster cargo movements and higher port productivity.

RFID Winners | Identiv and HID Global

Identiv worked with CVS and the American Council for the Blind to provide improved accessibility for blind and visually impaired customers to read their prescription labels properly.

HID Global and Asygn worked with General Electric Hydro to develop a rugged RFID tag that would reliably monitor, collect, and manage data performance and integrity in harsh environments.

AIDC Winner | reath

Reath worked with their customer, Bower Collective, a home and personal care consumer goods company, on a traceability solution for their new sustainable, reuse packaging product.

AIM'S OUTLOOK & PREDICTIONS

Some of the most respected thought leaders in the industry offer their predictions on what's in store for 2023.

As you read through the following commentaries, you'll note that, of course, the current economic situation is addressed by the majority of our thought leader contributors. However, while most mentioned this factor, they also offered their own insights on how the industry can work together to move past these trying times.

Avery Dennison

Jeanne Duckett
Senior Manager, Food Technology Solutions - Connecting Physical to Digital in the Smarter Food Supply Chain

A significant driver of AIDC technology in 2023 and beyond will be the continued focus on e-commerce and the growing demand for transparency from consumers, stakeholders, and regulators. This was a growing trend that was accelerated when COVID-19 lockdowns arrived, and more people swapped to shop online. There are now even more orders to process and deliver, with fast and super-fast delivery, to multiple locations including business offices, homes, stores, and lockers. Some 80% of retailers say they are under pressure to offer a variety of delivery options and speeds, while shipping volumes have increased more than 20% on average, for both B2B and B2C orders since 2019.[1]

To meet these objectives, there needs to be better streamlining and integration of processes and systems, which is the underpinning of creating better workflows and supply chain visibility. It is important that warehouse management system (WMS) solutions include an industry-standard way of communication to other applications. The gaps between the transport management system (TMS) and the WMS need to be minimized to reduce business risk and data silos.

We are also increasingly seeing technologies such as real-time location solutions (RTLS) and radio frequency identification (RFID) being implemented to complement the WMS and TMS and automate larger and more complex operations. The bigger picture is that more data is being created and processed at the edge. One estimate by Gartner says by 2025, 75% of data will be generated and processed at the edge, and only 25% in the cloud[1], so investing in data capture and devices at the edge will be increasingly important.

In addition, front-line workers, assets, and data will need to be more connected, for an accurate, real-time view of what is happening in terms of inventory, warehouse, and manufacturing operations and across the supply chain. Healthcare, food & beverage, and pharmaceutical manufacturing are three industries where traceability is particularly important.

What to do to prepare? Create a data-driven strategy driven by the overall business goals that aligns your data strategy with the business strategy by building a forward-looking data collection strategy. Bridge the data trust gap by investing in creating trusted, verified data capture. Revamp your data landscape by prioritizing value streams and decommissioning legacy infrastructure in phases. Activate by driving data-powered decision making and actioning plans that drive business results.

Businesses clearly grasp the value of data, but those that are able to leverage it will drive sustainable growth in this decade.

[1] - What Edge Computing Means for Infrastructure and Operational Leaders, Gartner, October 3, 2018

Bartender® by Seagull Scientific

Harold Boe
President & CEO

Global business is in a time of dynamic, complex change, and this presents opportunity for AIDC. During recent disruptions, we learned that companies who were agile, who were able to base decisions on data and analysis, were able to pivot quickly and come out on top.

Organizations are realizing that if they haven't embarked on their digital transformation journey, the time is now. And it's the data carrier — the barcode, RFID and NFC — that's at its foundation.

Expect more investment in AIDC technology as the economy flirts with recession. Historically, in times of economic downturn, companies spend more on automation technology, systems, and processes to create business improvements.

For example, AIDC can help alleviate some of the pressures of the global labor shortage. According to the US Chamber of Commerce, there are more job openings in manufacturing than there are people to fill open roles[1]. Companies are looking for ways to make their reduced workforces more efficient.

Mobile devices are one way to improve productivity. Frost and Sullivan found that workers gained a 34% productivity boost from using smart devices, for an average of 58 extra minutes of worktime daily.[2] AIDC in tandem with mobility can enable barcode, label, and RFID printing at the source of work — in the field, in the warehouse, at bedside — saving time, saving steps, and increasing accuracy.

The future of the workforce is decentralized and distributed, and access to AIDC technology must be, too. Cloud technology allows companies to create connected, digital-first experiences. Cloud makes business continuity simpler, ensuring that employees always have access to the most up-to-date data, wherever they are. Cloud technology is agile and adaptable and reduces infrastructure and IT costs.

And there's more on the horizon that will continue to catalyze growth for AIDC. The EU's new Digital Product Passport relies on AIDC data carriers to mark and track individual items. E-labeling is a growing trend driven by consumer and commercial demand and made possible by AIDC. There are new standards, like GS1's Digital Link codes and Scan4Transport.

"The pace of change has never been this fast, and it will never be this slow again."[3] By helping global business adapt in the face of shifting commercial, technological, and regulatory trends, the AIDC industry will see continued growth and opportunity in 2023 and beyond.

[1] Understanding America's Labor Shortage: The Most Impacted Industries, US Chamber of Commerce, 7 September 2022.
[2] Samsung Insights, Frost and Sullivan, 2016.
[3] Justin Trudeau, Davos, 2018.

BlueStar

Dean Reverman
VP of Marketing

John Martin
Content Marketing Manager

As we look forward to 2023 and beyond, existing and new threats will challenge our reseller channel and AIDC solution providers, but every challenge also presents opportunities.

Ongoing consolidation within the industry, among dealers/resellers and manufacturing partners, can limit available offerings and competitive pricing. That makes it more critical than ever to stand out with exceptional service, end-to-end solutions, and a truly consultative sales approach that emphasizes specific end-customer needs over pre-packaged offerings.

Rising costs are also impacting the channel. Operating capital costs grow as the US Fed raises interest rates, and inflation pushes up wages and energy costs associated with business operations. While these forces are likely to stabilize or even decline over time, a best practice now and in the future is to lean into automation, analytics, and data-driven process improvement to maximize operations and minimize the effects of such fluctuations when they occur.

Finally, while we've moved into a new phase of the COVID pandemic, its impact is still felt, particularly in Asia, where recent waves are affecting the labor pool for hardware manufacturing. Ideally, more of that production will occur domestically in the future. Still, until that happens, dealers & distributors alike must carefully monitor inventory, secure expected order commitments sooner, and be flexible with offerings to minimize lead time impact.

At BlueStar, we see this as the pivotal moment for our VAR partners to embrace new business models, specifically those driven by recurring revenue, "as-a-Service" solutions, and OpEx financing. It's time for the next generation of solution providers…what we call VAR 2.0. Achieving that next iteration means embracing a partner-enabled ecosystem, where no one is simply a hardware reseller, installer, web store, tech support, etc. The AIDC solution provider of the future recognizes its core strengths and uses those as a foundation to expand out and explore new trends, technologies, industries, and opportunities outside of the comfort zone by developing partnerships with software companies, service providers, manufacturers, and distributors that will help them build a go-to-market tech stack that genuinely makes them an invaluable and trusted partner for all needs.

FoodLogiQ

Julie McGill
VP of Supply Chain Strategy & Insights

Regulatory requirements such as FSMA 204 and ever-increasing trading partner and consumer demand for product visibility are major drivers bringing change to the food industry in 2023.

The past few years have been a time of adversity and disruptions, but also a period of innovation and discovery. Companies are seeking solutions that support operations and address issues such as staffing shortages through automation to create much needed operational efficiencies. Solution providers are leading the way with innovative solutions and trading partners are piloting new technologies that are pushing current boundaries.

Food companies manage multiple operations across their organizations and FSMA 204 requires more rigor around data collection for those who handle foods on the FDA's Food Traceability List (FTL), adding new challenges to strained processes. There are many ways to address this, and those best prepared will collaborate with trading partners, associations, and solution providers to create automated, compliant, interoperable systems.

Ways to Engage:

Workgroups: AIM, GS1 US, PTI, GDST, FMI and others are discussing ways to advance traceability through standards, including GS1-128, 2D, RFID, and EPCIS.

Initiatives: Sunrise 2027 moves from 1D to 2D barcodes at point-of-sale (POS), enabling greater product information and transparency. PTI promoted the use of GS1-128 barcodes to capture GTIN, lot and date, is now exploring a move to 2D barcodes. Complexities in the use of RFID for food spurred the new standard TDS 2.0.

Pilots: Trading partners are utilizing RFID, TDS 2.0, and engaging in interoperability pilots between traceability platforms utilizing EPCIS.

Webinars: Associations are hosting webinars with industry experts educating on food traceability, the benefits of standardization, and how technology can support enhanced recordkeeping. As regulations such as FSMA 204 are finalized, we will see more content, including webinars from the FDA.

Similar to how barcodes transformed the consumer experience at POS through the use of unique identification and automated data capture with UPC barcodes, we have an opportunity to affect transformative change through traceability. In our digitized world, capturing accurate, complete, and enhanced event data is critical. It is an exciting time to be a part of the food industry as we all have a hand in creating safer, more transparent supply chains which allow us to rapidly respond to outbreaks and ultimately bend the curve of foodborne illness.

GS1 US

Melanie Nuce
Senior Vice President of
Innovation & Partnerships

Digital transformation needs to be the top priority for businesses in 2023 and beyond. Companies that have invested in digital transformation efforts and now consider themselves 'digitally mature' are better equipped to deliver a truly seamless and optimized customer omnichannel experience in order to win in today's marketplace.

In retail for instance, a digitally mature retailer can blend physical and digital retail operations to create a frictionless, 'physical' experience for consumers. This is only possible when retailers, trading partners and all links throughout the supply chain are leveraging data standards where products and locations are identified consistently and shared in an automated way. When supply chain data is digitized and by leveraging technologies like RFID and 2D barcodes, retailers have that next level of inventory visibility and can see and sell what's in stock, down to the last item, across all channels and locations. This level of visibility allows for the retailer to fulfill the order how the customer prefers – curbside, BOPIS, home delivery, etc.

Barriers to digital transformation and maturity can come in many forms. They range from having legacy/manual, paper-based record keeping systems in place that aren't set up for today's digital world, to a lack of senior personnel committed to digital transformation – in fact, a study from McKinsey[1] indicated that 70% of change programs fail due to employee resistance and lack of support from management. In order to overcome these challenges, buy-in on digitalization needs to come from the top down in an organization.

To create the seamless experience for customers, brick and mortar and e-commerce need to be integrated. Control what you can control, invest in digital technology that will build a more resilient supply chain for your business and actually have a change management/migration strategy that will take the business into the digital age. Maturation only occurs if the entire team – top-to-bottom – is aligned.

[1] - Boris Ewenstein, Wesley Smith, and Ashvin Sologar; McKinsey.com - Changing Change Management; July 1, 2015

Impinj

Carl Brasek
Vice President Device OEM Sales

In 2021, 29 billion RAIN RFID tag chips were sold enabling delightful experiences worldwide. Retailers like Zara and Decathlon provide their customers with better omnichannel and self- checkout experiences. Delta Air Lines provides travelers with real-time updates on the location of their bags. TopGolf provides players' stats and a fun, engaging game.

In the future, we expect RAIN RFID will expand beyond these business environments into consumers' homes, enabling devices, apps, and products to connect and interact in new and exciting ways as brands create new experiences that drive greater brand loyalty.

Imagining the consumer experience with RAIN RFID
Imagine this: You buy a stylish new twill shirt with a care label that says, "Connected by RAIN RFID." You open the brand's smartphone app and it says, "Wash twill shirt now." You put your "smart shirt" into your smart washing machine, which digitally reads the RAIN RFID tag in the label and automatically configures the correct wash setting for the shirt. Meanwhile, you can't figure out what pants to wear. You open the app's virtual wardrobe assistant. It scans your closet and detects khaki pants hanging on the bottom rack. A perfect pairing!

A month later, your app shows you've worn the shirt 12 times and washed it six times. Four years later, it's time to retire the twill shirt. You use the app to arrange for proper recycling by the retailer. The label on your old twill shirt is worn and unreadable but the retailer reads the instructions from the embedded RAIN RFID tag and properly recycles it. The retailer suggests a new Oxford shirt and digitally transfers ownership to you, guaranteeing brand authenticity.

The embedded RAIN RFID revolution
With these features, it's not hard to imagine embedded RAIN RFID enabling digital pantries, assistants, doorbells, thermostats, virtual reality devices, and smartphones. As RAIN RFID moves into our homes and lives in ways we couldn't have imagined a few years ago, we will see an enormous digital transformation the world over.

RAIN RFID is the foundation for a future in which not only electronic devices will be connected but everyday, unpowered, items – trillions of them. RAIN RFID will give every item a complete digital life – from manufacture to enterprise to consumer to recycle. It has the potential to enable a more efficient and circular economy, help the environment and, in the end, improve lives.

iTRACE Technologies

Mark Manning
Founder & CEO

Track, trace and unit identification are becoming more important every day, especially in the fight against sanctions avoidance, counterfeit and product diversion. With technologies like blockchain driving new applications, automated data capture for unit track and trace is essential. Data capture technologies need to become cost effective and ensure a secure connection between a physical item and the digital ledger or blockchain. Creating a highly secure, low-cost connection between a product and its data is a big opportunity in 2023.

The best way to capitalize on this is to help companies identify the new applications that will drive additional business. One trend that is getting attention is parts provenance in the circular economy. Capturing the provenance information about a product is going to require data capture technologies to collect the movement and transactions of items.

Hackers and scammers have taken over technologies like QR-Codes that have traditionally been used to provide connections between products and consumers. This will erode the trust in these technologies and applications as people get scammed and counterfeits get through. Data capture solution providers need to look at secure and layered implementations to help protect consumers and users that interact with these solutions.

Blockchain has been hyped as solving many of the world's challenging problems, but the real business applications are starting to evolve. As the hype dies down and the crypto scammers move on to other opportunities, the real business applications and value will start to emerge. These applications will bring greater trust and transparency to many applications and have a huge impact on the way business is transacted. They will also create new problems that will need to be addressed such as the privacy of personal and business data. One of the biggest impacts that blockchain will have on the deployment of these solutions is the ease of deploying the blockchain infrastructure into all aspects of the supply and distribution chains. The second piece that will drive new applications and trust is the immutability of the data and the trust that will come from that.

One of the biggest challenges facing solution providers will be to create trust in the real business applications of these applications. In 2023 companies need to focus on helping clients see through the hype to understand the value of these technologies. Helping companies realize the real and simple benefits that can come from these new blockchain based applications will be key for widespread adoption.

Loftware

Josh Roffman
SVP Marketing & Product Management

With supply chain challenges showing no signs of abating any time soon, companies of all sizes will look to accelerate their digital transformation programs in order to optimize costs and gain a competitive advantage in 2023 and beyond.

As part of this endeavor, companies are seeking an all-in-one digital ecosystem that can meet the full scope of their requirements for bringing products to market quickly, efficiently, and more competitively. These organizations are beginning to think more broadly about their labeling and how to automate printing across production lines irrespective of brand or technology.

So, what does this mean for businesses? It's no secret that customers are thinking differently right now. They not only want orders faster than ever, but those orders must also be accurate, personalized, and customized to specific needs. An evolution of the market has resulted in a demand for more products, shorter production runs, and faster turnaround. It doesn't stop there, with an increased demand to print on anything from a smooth card to a flexible or hard plastic, to a curved surface, to a board, or even wood. As a result, companies are recognizing that marking and coding devices – which provide the ability to print on almost any surface – present a great opportunity by offering savings through eliminating the cost of labels and pre-printed inventory. And this trend is backed up by the research: our Top Trends survey, which surveyed over 1,000 professionals from organizations across all major industries and 55 countries, revealed that 78% of businesses believe requirements for marking and coding technology will increase over the next three years, while 96% see an advantage of using a single platform to support thermal transfer as well as direct marking and coding.[1]

Fortunately, the labeling software space is undergoing an exciting transformation as manually operated, disconnected printers get connected, integrated, and controlled by intelligent systems. Now companies can utilize a standardized platform for Enterprise Labeling, which offers integration capabilities to manage output for all their devices from thermal and color laser printing to coding and marking devices, visual inspection systems, serialization solutions, and more. By adopting such a solution as part of a cloud-first digital transformation program, businesses will gain printing flexibility, accuracy, and efficiency to improve their bottom line, meet consumer demands, and support global growth.

1 – Loftware 2022 Top 5 Trends in Labeling and Packaging Artwork Survey

Metalcraft

Colynn Black
RFID Business Development Director

Data capture solutions providers today face threats that previously would not have risen above simple nuisances with the biggest threat being supply chain delays in both materials and Integrated Circuits (ICs). The pandemic certainly left its mark on the economy and nearly every industry around the world, and the data capture space was no different. From material delays in transportation, to union strikes, to demand greatly exceeding the supply and capacity, there is almost no product immune to the supply chain disruptions.

The RFID industry has been affected specifically by the shortages of IC's stemming from silicon material shortages and then compounded by the lack of fabrication houses to meet the increasing demand. Additional material shortages with adhesives and paper liners create a ripple effect for the data capture solutions providers. Inevitably 2023 will be another year of extended lead times and price increases favoring those solution providers who proactively flex their process to combat a dynamic supply chain.

There is, however, a silver lining in all of this for data capture solutions providers. The pandemic certainly proved the need for tracking and traceability throughout the supply chain. It's no longer enough to know when a package label is created and shipped. Instead, users want real-time updates, analytics and data showing product exposure effects, and less human/manual interaction today than ever before. It takes data capture to track the components that go into data capture solutions. The IoT world we live in today is pushing the adoption of AIDC technologies beyond the "proof-of-concept" stage, and demanding implementation into a diverse spread of industry ecosystems. RFID specifically is seeing significant demand in areas extending beyond strictly retail into Healthcare, Aviation, IoT, Automotive and Smart Manufacturing.

Only time will tell how long supply chain bottlenecks will hinder AIDC growth, but market research bodes well for data capture solutions providers.

Mojix

Marc Hoster
Senior Vice President, Global Sales

Food safety is a growing brand reputation and regulatory concern. With European Commission initiatives, such as Farm to Fork, and the Proposed Rule for Food Traceability unveiled by the FDA, there is widespread concern on the fronts of both public policy and public opinion. Restaurants and grocery stores in the US and around the world are facing both regulatory and customer pressure to have visibility into their supply chains from the point of origin all the way to the store. Data capture solutions will need to provide unprecedented levels of visibility into food product lifecycles and supply chains, bringing significant improvements in key areas like customer safety, authentication, waste reduction, operational efficiency, inventory accuracy, and stock optimization. They will also need to fully support the requirements of the FDAs Food Safety Modernization Act (FSMA 204).

Data capture solution providers will need to develop reliable platforms to address specific areas such as:

Customer Safety - Identification of recalled and expired items during receiving and inventory operations.
Inventory Visibility - Required track-and-trace in regulatory compliance. The capability to pinpoint specific locations in a recall through unified stock visibility and to trigger actions to remove these products from stock.
Waste Reduction - Identification of short shelf-life items to enable FEFO (First Expired First Out) or promote items before expiration.
Operational Efficiency – Fast receiving (5 minutes or less) - optimize labor within stores and DC's. Accuracy and speed are essential for the preservation of foods.
Stock Optimization/Omnichannel - Audit of inbound and outbound shipments - increasingly important with the new trends shaping the restaurant of the future, including the achievement of meeting responsible sustainability goals.
Authentication and/or Provenance - Counterfeit foods, illegally labeled and grey market goods jeopardize health and safety and cost the industry an estimated $10-15B in the US alone.

OpsSmart Global, Inc.

Sharmeen Khan
Chief Strategy Officer

The adoption of digitized food traceability is much more than just recalls. Traceability is being able to establish the origin of products and their attributes from the farm through food processing and to retail and food service and into the home. Digitizing the production of goods is no longer a matter of opportunities or threats, it's a matter of survival.

The companies who want to cling to the way they have "always" done business will be left behind. Their slow and inefficient methods of gathering information, and their disconnected systems will cause them to lose their market share. Digitization has accelerated the pace of business in many industries including food. Transactions and sharing of information, also known as interoperability, are done in real time. It affects profit margins, supply chains and the bottom line. Companies must accelerate their pace of doing work or be left behind and fighting for left over scraps.

The Food Safety Modernization Act (FSMA 204) gives companies the perfect opportunity to digitize their supply chains. Proposed FSMA 204 also called the FDA's New Era of Smarter Food Safety Blueprint will require companies for the first time to standardize their approach to traceability and recordkeeping while utilizing a digital, tech-enabled traceability system. FDA will require standardized Key Data Elements (KDEs) for quantity of product shipped/produced/received, etc. with units of measure, lot codes, etc. FDA will also require Critical Tracking Events (CTEs) that occur anywhere in supply chain for products that are created, harvested or transformed (including cooling) and combined with other products without a kill step. Proposed FSMA 204 applies to almost all foods that are consumed raw with very few exceptions.

The biggest challenge facing the food industry in 2023 is to read the writing on the wall. Digital traceability is no longer a concept. It is an actual requirement being enforced by Federal Government agencies all over the world. Business must remember that their supply chain is only as good as its weakest link.

SICK Sensor Intelligence

Mike Colby
Head of Logistics Automation

The material handling industry has seen amazing transformations the past few years; SICK is no exception to this. For example, mobile robot platforms continue providing added value by providing more flexibility in operations. Also, the industry now faces a 365-day peak season to meet customer service levels, versus the former three-month peak season. These new norms will continue to transform and drive our industry forward.

These transformations have not come without their complexities. SICK, like everyone globally, has worked through significant challenges in the last few years. The two major challenges at the forefront of planning are: supply chain and labor availability. We anticipate the industry will continue to battle a volatile global supply chain, as well as an ultra-competitive labor market for the foreseeable future. We see automation as a necessary relief valve to keep our customers performing and, in turn, meeting their customers' expectations.

Sensor technology is playing a huge role in end user customers' material handling processes. One of the most emerging data capture technologies is Radio Frequency Identification (RFID). This technology uses radio waves to automatically identify objects. It supports traceability initiatives necessary for enhancing production.

There are numerous benefits to using RFID technology for tracking goods and shipping units and tote/pallet identification. Because this technology requires no line of sight, speed and non-singulation are not a problem. Multiple tags can be read at once on high-speed conveyors. This provides end users with greater inventory control to increase throughput and enhance efficiency in production processes.

Going forward, it is not only necessary to focus on solving the challenges, but breaking them down in the simplest form with a keen eye on speed.

SpotSee

Tony Fonk
CEO

As the risk of a global recession mounts so too do opportunities for the field of automatic identification and data capture (AIDC) technologies.

As shippers rethink their use of package monitoring solutions, application providers are developing a mix of technologies and price points to expand access and add value in ways that go beyond simply tracking and authenticating cargo.

Incorporating condition monitoring into RFID and QR labels is one example. With it, logistics professionals throughout the supply chain can know whether the product being shipped has experienced impacts or temperature excursions that exceed established thresholds. If a product becomes too hot, too cold or suffers an extreme shock, that condition is automatically entered into the logistics management system whenever the RFID or QR tag passes the appropriate reader.

Cost consciousness is growing, too, prompting providers to innovate around common technologies like smartphones. The rollout of powerful 5G networks, for instance, makes smartphones the device of choice for data display and data capture for QR codes and near field communication RFID (NFC-RFID).

In the not-too-distant future, even RFID tags will be read by smartphones that can upload data about the condition of the product to the manufacturer or carrier. Some of the most interesting technologies will include RFID chips that incorporate RAIN RFID and NFC or QR codes into one solution. When that happens, access to last-mile condition monitoring data will be ubiquitous. Customers will be able to use an app to scan the tag and know, for example, whether the food or medications they ordered were maintained at safe temperatures during transit.

Near term, there are opportunities to mix multiple, interoperable solutions to enable actionable insights throughout the supply chain. That includes QR and NFC-RFID for low-cost readings, as well as traditional condition monitors using passive ultra-high frequency RFID (RAIN RFID) for detailed data that often is reported in real time.

Expanding the capabilities of track and trace solutions adds value that helps reduce overall costs for shippers. Benefits include automated record-keeping, increased accuracy, fewer defects, and more efficient product recalls, as well as more careful handling, which further reduces damage.

The best products of 2023, I believe, will be those that extend the value proposition of a QR code or RFID tag to include condition monitoring, tracking and authentication of packages, all at competitive costs.

TEKLYNX International

Doug Niemeyer
President/General Manager

The biggest threat facing this industry is the economy. There is uncertainty being faced around the threat of recession, while also facing inflation, which is creating pause for businesses in where, when, and how to invest.

Technology and automated data capture is a critical necessity that has proven ROI. The introduction of more automated labeling processes is helping companies save money, reduce overhead, increase sustainability, and move products more quickly and accurately through the supply chain. Many data capture companies are helping fight against budget constraints by providing more SaaS and subscription-based licensing options to help with lower upfront costs while maximizing ROI for their customers.

Manufacturing businesses are more rapidly turning to technology advancements for overcoming labor shortages to meet the demand for faster turnaround times while maintaining elevated levels of quality and productivity.

Businesses looking to capitalize on technology to help advance their production should seek out guidance from experts. Often, as part of the sales process, data capture companies will offer free assessments of current environments and proposals on areas that could be improved; this could be leveraging the existing technologies in a better way, or proposals on technology that would better support business goals and needs. Asking for an assessment is a great first step that helps to educate and create awareness of the possibilities that may never have been considered.

We expect to see RFID technologies have a significant impact on end-user customers (and their customers). With the recent mandate launched by Walmart for their suppliers to have RFID labeled products, and others following suit, we expect to see more infrastructure around RFID technologies and further advancements in this form of product tracking and data capture.

Along with the necessary labeling software, many technology partners are advancing their scanners and printers for RFID enablement and promoting them at price points that help make the business case for quicker adoption. The benefits, standards, data collection, and speed that RFID brings into the supply chain will prove to be significant.

Continued approaches around recovery from supply chain disruptions and the economic climate will remain our biggest challenges into 2023. However, we also see these challenges as some of our biggest opportunities to step in to help manufacturing companies navigate these unchartered waters. The data capture industry, and all those involved, are collaborating more than ever to help develop wholistic solutions that highlight heightened automation, standardization, and centralization for optimized supply chain speed and quality now, and well into the future.

TSC Printronix Auto ID

Chris Brown
RFID Subject Matter Expert

The most obvious threat facing data capture solution providers will be continued shortages of solution components. Data capture solutions require multiple hardware components, “pieces of the puzzle”. In turn, these pieces of the puzzle are also made of components: computer chips, metal, paper, etc. If any critical component is unavailable, then the puzzle cannot be completed.

Most experts would advise solution providers to get their orders in now and stockpile some kind of buffer. I prefer the approach of learning about alternative solutions and products. There is an art to learning, for example, which printers, inlays and chips can substitute for unavailable products in an application

Another challenge for data capture solution providers is often a lack of clarity on standards that data capture solutions may rely on. For example, a solution provider working with a pharmaceutical distributor is and will continue to be challenged on which data standards apply.

If you are a data capture solution provider, let’s assume that you have made a career decision and want to learn about alternative products and relevant standards. Although daunting and complex topics, plenty of opportunities to educate yourself exist, and you can put more “Value Added” into your reseller offerings. Join organizations like AIM, RAIN and GS1 and participate actively in their workgroups

Big Box retailer mandates and initiatives are generating an excellent opportunity for solution providers. They are being increasingly tasked with RFID labeling of their goods. But these suppliers do not want to expend a lot of resources learning about RFID. Data capture solution providers already have established relationships with these suppliers for barcoding; now the solution providers can step in and easily “bolt on” RFID.

We are firm believers in RFID, specifically RAIN RFID, as a technology that will have a significant impact on users of AIDC. RFID will not displace barcodes, rather it will be a complementary technology that brings many additional benefits. The idea that the time and resources needed for an inventory count can be cut by over 90% while increasing accuracy from 60% to the high nineties is seriously transformational.

RFID also has the unique ability to cheaply, efficiently, and easily generate huge quantities of data that are important for other technologies and services. The more data we can feed to cloud-based solutions, AI and machine learning, the better the solutions.

Wiliot

Steve Statler
SVP of Marketing & ESG

The touchpaper on what could be the biggest driver of Auto-ID adoption yet was lit in 2022 when 3GPP, the standard body that drives what "the Gs" are, decided that 5G Release 19 and the 6G will embrace Massive IoT and within that Ambient IoT. Following that move, telcos will go from tracking cars, appliances, and containers, to tracking the multitude of things inside them.

The money spent by the telecommunications industry, the global wireless carriers, handset and base station infrastructure companies, and the software companies that feed them, dwarfs that of our our Auto-ID ecosystem. In the world of Auto-ID we wring our hands about whether the ROI on the use-cases we focus on is so good that enterprises can't fail to cautiously pull the trigger on pilot projects. When telcos decided we were all going to upgrade from 4G to 5G, a huge disruptive upgrade, the marketing machine started, and billions of us did it. Who can really quantify the ROI of 5G versus 4G? Who has a 5G handset? If you don't have one already, it's only a matter of time.

Ambient IoT embodies much of what we as an industry have been working on for years computing elements and sensors that extend the reach of IoT systems to all the things that surround us. We can argue about that definition, but for sure this will drive the awareness of a new world where more things are scanned and "connected" to the cloud. It will take years for the standards to be defined and deployed, but we should relish the opportunity to get on the CEO agenda as the industry figures it out.

6G has the potential to bring Auto-ID to every powered device in our work and our home, eliminating the infrastructure friction that has held the Auto-ID industry back from its true transformational potential. 2023 is the year we should help the rest of the economy get ready, by: a) building a comprehensive strategic plan, b) joining up a digital infrastructure that supports it, and c) getting more experience with Auto-ID projects today.

Zebra Technologies

Alan Melling
Sr. Director, Strategy and
Market Development

2022 has been both a challenging and exciting year for the automatic data capture industry. On the exciting side, we have seen continuing high levels of demand based on the value of ADC as a business driver. On the challenging side, we have seen lingering supply chain shortages that have limited the industry's ability to meet that demand. The good news is that these shortages are clearly improving, with an expectation that they will resolve – hopefully fully – in 2023.

Beyond these immediate concerns, the most robust trend Zebra sees in 2023 is continuing growth in ADC use cases across the spectrum. For an industry that has its roots in the 70s, ADC in 2023 sometimes feels more like a startup, with a swath of new opportunities to meet emerging customer needs. This is true across a range of technologies, and a range of verticals.

On the barcode front, the clear trend is the increasing adoption of 2D barcodes. 2D has been a staple of barcoding in the last decade, but the vast majority of barcodes scanned have been linear 1D barcodes. We are starting to see signs of that change – with 2D showing up everywhere from digital coupons to pharmaceuticals to cigarette packaging to medical devices. Moreover, newer standards like GS1 Digital Link have opened the possibility of 2D barcodes eventually replacing 1D marks in their core application – retail point of sale.

On the RFID front, we continue to see rapid double-digit growth as the number of EPC tags in the world grows by tens of billions every year. Changes in how customers buy products – and Buy Online Pickup In-Store (BOPIS) in particular – have fundamentally changed how retailers view the inventory process. When you are fulfilling from store, every single erroneous item count is an opportunity to disappoint a customer, and old ways of doing business are just not good enough. The bar is higher – as close to 100% accurate as possible – and only EPC RFID has been shown to consistently come close to achieving that goal.

In summary, Zebra looks at 2023 as a year of opportunity – opportunity to fundamentally impact our customers' businesses with technologies both new and old.

Zugang Technology Connections

Scott Austin
CEO

If COVID wasn't enough to change the landscape of trusted supply chains, then the Ukraine conflict and the geopolitical landscape of 2022 has highlighted the increased scrutiny that provenance and the use of data capture to support supply chain trust and transparency will have in 2023 and beyond. If silicon is to go by, the recent US Government heightened restrictions on some high-level silicon chips represents a supply chain compliance level that needs to be supported by efficient processes that indeed validates compliance or otherwise – sort of providing an effective GO/NO GO layer of intelligence. Efforts over recent years by the US Department of Labor and major brands to support compliance and transparency pertaining to no human rights abuses in the supply chain and even the determination of source for key grain exports by some major governments, has used data capture, IoT and forensic identification to assure trust.

So, the biggest threat is non-compliance in 2023 – the risk to brand equity of wrong decisions, the wrong supplier selection or indeed an incorrect declaration may see businesses scatter to find solutions to supply chain trust and compliance and this is where automatic data capture comes in - it won't be on its own however!

The future of compliance will not only mean strong and secure data capture methods and processes are required but these will most likely need to be supported by Artificial Intelligence, web 3 initiatives supporting physical and logical security and indeed, smart contracts, contractually embedding trust and compliance protocols in across chain transactions! The opportunity to the data capture industry will be in innovation hybrid solutions that utilize technologies in unison creating highly efficient solutions to generate true trust in supply chains whilst not sacrificing, but enhancing, security and privacy / confidentiality.

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