June 21, 2021

Dr. Melissa R. Bailey
Agricultural Marketing Service
USDA
Room 2055-S, STOP 0201
1400 Independence Avenue SW
Washington, DC 20250-0201

Re: **Initial Comments** of AIM North America on: **Docket No AMS-TM-21-0034**
Supply Chains for the Production of Agricultural Commodities and Food Products
Federal Register, Vol. 86, No. 75, pages 20652-20654

To Whom It May Concern:

We are pleased to submit the enclosed comments regarding the above referenced docket and regulatory information number appearing in Federal Register Federal Register, Volume 86, Number 75, pages 20652-20654.

These comments were prepared by members of the AIM North America (NA) Food Safety Committee, all of whom are subject matter experts of the design and application on automatic identification technology. Founded in 1970, AIM is an industry trade association that represents the providers and users of technologies, systems, and services that capture, manage, and integrate accurate data into larger information systems that improve processes enterprise-wide. AIM NA is a chapter of AIM, Inc. In this role we advocate, educate, and coordinate with other subject matters experts including the USDA, GS1, MHI, AIAG to further the adoption of AIDC usage in industry.

AIM serves as the secretariat for the U.S. Technical Advisory Group (TAG) ISO/IEC JTC 1/SC 31 | Automatic Identification and Data Capture Techniques. This group formulates the U.S. position on all work related to the standardization of data formats, data syntax, data structures, data encoding, and technologies for the process of automatic identification and data capture and of associated devices utilized in inter-industry applications and international business interchanges and for mobile applications.

AIM NA appreciates this opportunity to submit comments in response to the Food and Drug Administration's (USDA) Notice in the above-captioned docket, seeking comment on the agency's approach to Requirements for Additional Traceability Records for Certain Foods

As subject matter experts in asset tracking technologies including Barcodes (1D & 2D Symbols), Radio Frequency Identification (RFID), Real Time Location System (RTLS), Internet of Things (IoT), and other technologies. AIM NA will be happy to respond to any technical support requests from the USDA about the value of standards or the implementation of the rule.

Sincerely yours,

Jeanne Duckett
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Chair, AIM North America Food Safety Committee

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INTRODUCTION AND SUMMARY

AIM North America (NA), as an industry recognized advocate for standards development and advocacy of AIDC technologies meets the requires of a non-governmental organization identified in section 1 of the executive order, appreciates this opportunity to submit comments in response to the United States Department of Agriculture's (USDA) Notice for request to comment for Supply Chains for the Production of Agricultural Commodities and Food Products.

AIM NA supports USDA's focus on resilient, diverse, and secure supply chains to help ensure U.S. economic prosperity and national security. The Executive Order (EO) looks to enhance the accessibility, availability, and quality of critical goods and materials underlying agricultural and food product supply chains. Under section 6(b) of E.O. 14017, "critical goods and materials" means goods and raw materials currently defined under statute or regulation as "critical" materials, technologies, or infrastructure. Challenges addressed in this paper will include recommendations for new technology evaluation and adoption related to food supply chain resilience as authorized by the Clean Air Act of 1970 and the Agricultural Risk Protection Act of 2000.

I. Capacities of the United States, including the ability to modernize to meet future needs, including food processing (such as meat, poultry, and seafood processing) and safe distribution.
II. Gaps in domestic manufacturing capabilities, including nonexistent, extinct, threatened, or supply chains with a single point of failure, single or dual suppliers, or limited resilience.
III. Address risks posed by climate change to the availability, production, or transportation of critical goods and materials capacity, improve efficiency, and have a climate benefit due to lower energy use, less food waste, or hasten capture of by-products and co-products.
IV. Address the visibility of natural, market, economic, geopolitical, human-rights or forced-labor risks or other contingencies that may disrupt, strain, compromise ore eliminate the supply chain including risks posed by supply chains' reliance of digital products.
V. Developing domestic supplies developing workforce capabilities, strengthen market transparency, including traceability, consumer connection, brand protection, inventory management and supply chain visibility.
VI. Review on the Government-wide effort to strengthen supply chains, including identification for opportunities to coordinate actions with ongoing efforts that could be considered duplicative of the work of Executive Order, "America's Supply Chains" (86 FR 11849) (E.O. 14017), dated February 24, 2021.

One of the most significant challenges to achieving actionable and reliable food supply chain information that drives resilience and transparency is the absence of a clearly defined minimally viable product data set of critical tracking events and key data elements. Additionally, formal validation of the minimum viable product data set by authorized certification bodies may be necessary when appropriate.

- Focus on the fundamentals of supply chain visibility: Globally Unique Identifier contained in a Data Carrier (i.e. 2D Barcode, RFID, NFC, digital watermark, Bluetooth® etc.) attached to item and captured automatically at defined points (i.e. Commission, Receiving, Shipping, Transformation, Consumption) with an agreed upon set of attributes.

- Clearly defined protocol for recall of product from the industry – what information will be provided – Brand, Location, Item Number, Lot, Expiration Date and what are the responsibilities of the receiving party.

- Define standardized data syntaxes and format for an interoperable exchange of information between the parties exchanging it.

It is important to note the core technologies referenced herein are mature and stable, demonstrated value-add technologies; some of which have been in use since the 1970's. The USDA needs to encourage the adoption of a common "language" to share information between the supply chain partners, thus removing barriers, increasing speed

of deployments, and eliminating different interpretations. Clear examples of what and how information is shared and will help eliminate errors and drive adoption.

- Handwritten documents and keying have a couple percentage points of error, whereas barcode scanning is 99.9999+% accurate. On average, the accuracy of barcode scanners is 1 error for every 70 million pieces of scanned information. (MultiChannelMerchant: 11 Ways Barcode Can Improve Your Ecommerce Fulfillment Operations; July 22, 2019)

- Brand owners and retailers who used RFID technology to optimize inventory management and reconcile product shipments were capable of achieving 99.9% order accuracy. Retailers who do not validate 100% of inbound shipments are susceptible to greater inventory inaccuracy. When RFID was not implemented, 69% of inbound orders (shipped from brands and received by their retailer partners) contained errors. These errors were revealed in picking, shipping, and receiving, resulting in inventory inaccuracies and potential costly chargebacks from the retailers to the brand owner. (GS1 US: New Study from Auburn University RFID Lab and GS1 US Confirms RFID Enables Nearly 100% Order Accuracy for Retail; October 10, 2018)

- Raises Inventory Accuracy from 63% - 95%. Reduces out of stocks (OOS) by 50%, Cuts cycle time by 96% (GS1 US EPC/RFID Data Exchange Study; 2018)

- Digital watermarks facilitate the encoding of identifiers redundantly on labels and packaging without impacting aesthetics or production costs. This is accomplished through traditional and emerging print technologies used in existing packaging and supply chain workflows. Through this redundant encoding, digital watermarks have shown substantial improvement of scan ease and scan performance (on average >24% in fixed position scanning environments), as well as improved readability of damaged and irregular shaped items with manual or automated scanning (>99%). (International Journal of Industrial Ergonomics 72 (2019) 80 - 85: An Imperceptible Barcode Can Reduce the Muscle Activity Required to Scan Common Consumer Packaged Goods)

I. CAPACITIES OF THE UNITED STATES, INCLUDING THE ABILITY TO MODERNIZE TO MEET FUTURE NEEDS, INCLUDING FOOD PROCESSING (SUCH AS MEAT, POULTRY, AND SEAFOOD PROCESSING) AND SAFE DISTRIBUTION

AIM NA encourages USDA to adopt policies to facilitate the use of technology to address supply chain capability by requiring or incentivizing the use of global unique identifiers that can be used to trace each end-consumption item; specifying the minimum content to be tied to global unique identifiers; and requiring the use of technology to capture and share required information electronically. Technology providers will need to create viable solutions that address different company's capabilities, from low to high tech, exploring a range of systems from existing technologies such as EDI and barcodes, to RFID, blockchain and cloud technologies. With enhanced, technology-driven data management and automation, we can greatly increase the amount of data about the supply chain, action food safety issues quicker and with more precision, reduce food waste, and build more transparency between trading partners and end consumers. AIDC technologies not only enable a safe, stable, and efficient supply chain, but will enable companies to be more profitable, by reducing operating costs and enabling new services to end customers.

Increasingly globalized, complex supply chains have resulted in less visibility into food sourcing for customers and regulators. These trends are driving the need for digital transformation through the adoption of technology to bring automation, integrity, and data management solutions to supply chain traceability. Digital technology can enhance the ability to identify, respond to, and prevent food safety issues such as outbreaks, fluctuating market demand, target product nearing life to minimize waste and labor or resources utilized in the production. For example, the time it takes to identify the source of a contaminated food product can be drastically reduced compared to the status quo processes for recalls. Given recent food incidents, the use of digital technology has become even more needed, as it

can help to make full product data accessible throughout every stage of the food supply chain in the event of a recall. In addition to being able to implement precision recalls, the supply chain visibility quickly locating all impacted products from trace backs and trace forwards.

Neither a single method for collecting all food supply chain data nor a single repository for holding and sharing such information is feasible. Accordingly, interoperability is necessary (though not sufficient) to creating a traceable food supply chain. AIM NA believes interoperability requires USDA-backed global ISO based standards for both physical and digital identities to facilitate a system that allows supply chain participant's flexibility of approach in capturing and sharing supply chain content that is universally recognized by others in the supply chain. Such standards must support and encourage the use of technology [and automated collection] and be designed to last by facilitating the adoption of emerging technologies. Given the diversity that exists in the food supply chain, interoperability is necessary for achieving scalability, lowering adoption costs, and preventing the exclusion or elimination of smaller supply chain participants.

The use of standards for data carrier, data format and defined protocols to manage the exchange of information steers the enlargement of an ecosystem of companies specialized in the design and market of those standardized components, thus bringing down the total cost of the solution since multiple choices are available for market adoption. The federal government should adopt standards to set the baseline content – or data points – needed to facilitate a food supply chain that is both visible and actionable. These standards should require such baseline content to be physically or digitally tied to each end-consumption item entering the food supply chain in a manner that can be digitally captured. By establishing universal baseline requirements, each supply chain participant should be able to collect and share the same information (e.g. unique identifier, lot, batch, etc.) regardless of the technology or platform used.

On average, the typical American meal travels 1,500 miles from source to plate. The data about this food is stored on up to 12 different IT systems, only 3 are interoperable. (National Center for Approprate Technology: Food Miles: Background and Marketing)

Without interoperability, a vast amount of critical food supply chain data remains in silos, preventing a visible supply chain. Additionally, the producers and growers at the start of the food supply chain tend to be small businesses, particularly as compared to the large distributors and retailers participating down the line. Often these smaller participants are asked to comply with multiple different transparency and traceability demands, which can be too burdensome to meet, particularly in the aggregate. Industry collaboration driven by interoperable standards is necessary to lower the technological and financial barriers to adoption and participation, particularly for smaller players. Standardization will also reduce the need for customization allowing for a more seamless and scalable onboarding processes for participants deploying transparency and traceability solutions.

To help demonstrate the scalability that can result from harmonized standards, USDA can take certain actions, such as conducting large-scale pilots with multiple participants from NGO's, supply chain members and technology partners.

Once standards are in place to ensure physical and digital identities are being utilized to tie universal baseline content to each end-consumption item, USDA should mandate the capture of such content at each critical event in the supply chain where the product either changes states or owners. To ensure actionable transparency, USDA must move beyond the one-step-forward, one-step back approach to ensure that baseline content is captured from end-to-end, or farm-to-fork. Missing information resulting from non-participation can cause dangerous delays in responding to food safety incidents and limit the ability of participating stakeholders to fully-capture the benefits of supply chain transparency. Any USDA traceability requirements should facilitate the use of technology to capture and share the required information electronically and easily. As food supply chains become more globalized and complex, paper (and non-automated) records have become increasingly inadequate tools for tracking supply chain data.

As described in further detail below, a significant part of the business case – or incentive – for investing in traceability technology is responding to rapidly growing consumer demand for greater product information. Combined with advances in consumer technology (i.e., smart phones and constant internet access), consumers are demanding far more information than can be stored on a label or packaging. Intelligent, connected labels are the way of the future. To ensure regulations do not become obsolete before they can even be implemented, and to allow interested parties to maximize the benefits of deploying traceability solutions, USDA should ensure that its focus on specifying required data to be collected and points in the supply chain to collect the data not on specific technology, this approach will make regulations evergreen evolving with technology.

For example, automatic logging of product movement through the supply chain creates an electronic trail that can make it more difficult to introduce forgeries into the supply chain. However, to realize the full potential of end-to-end security and efficiency through automation we need uniformity of adoption at scale. USDA should focus on incentivizing and fostering the adoption of these existing and emerging technologies to realize those benefits. (as is being done in the Strengthening Organic Enforcement; USDA)

II. GAPS IN DOMESTIC MANUFACTURING CAPABILITIES, INCLUDING NONEXISTENT, EXTINCT, THREATENED, OR SUPPLY CHAINS WITH A SINGLE POINT OF FAILURE, SINGLE OR DUAL SUPPLIERS, OR LIMITED RESILIENCE.

Having real-time visibility into your supply chain can help build resilience in several ways, such as better inventory control, the ability to track supply chain performance, and access to historical inventory and order data. At the ECRLoss center in the EU, it was demonstrated that Retailers inventory was inaccurate to a significant extent, 63-73%. (ECR Community Shrinkage & On-Shelf Availability Group: Inventory Inaccuracy in Retailing: Does it Matter? Report; October 2019) Correcting this inventory inaccuracy could potentially provide a 4%-8% sales uplift. As one of the retailer members of ECR shared, their board regularly pour over and inspect new ways to grow retail sales that most often require big investment and high risk, yet here we have new research that shows that by just improving the accuracy of their inventory records they can drive sales, with little risk and potentially, a low level of investment. This is important because 70% of Americans consistently respond that the availability of fresh food is important to them. Inaccurate inventory can potentially lead to panic buying and food waste with the result that retailers need to increase their safety stock. With the increase in buy online pick up in store (BOPIS) and other ecommerce purchases, inaccurate inventory leads to great customer dissatisfaction.

Not only is supply chain visibility important to meet ecommerce objectives, but it is also important to meet consumer expectations for food product recalls. A survey of consumers from FMI and Label Insights found that consumers expect a one- to two-day turnaround in addressing a recall and they care a great deal about clarity in food labeling: 57% want to see as much information on a label as possible. This includes country of origin, allergen information and identification of genetically modified ingredients. (FMI Report: The Transparency Imperative: Product Labeling from the Consumer Perspective; 2018). With the consumer's expectation for a 48-hour turnaround time for recall and NPR reporting the Federal Government response time is 57 days – there is clearly a disconnect.

Clearly the United States food system can be improved. At the same time what is the response of other countries is documented by the IFT Global Food Traceability center, 13 countries including several in the EU, Asia and Australia/New Zealand scored better than the US in food traceability laws. (IFT, Food Technology Magazine, Global Food Traceability: Harmonizing Regulations and Best Practices; October 1, 2014)

III. ADDRESS RISKS POSED BY CLIMATE CHANGE TO THE AVAILABILITY, PRODUCTION, OR TRANSPORTATION OF CRITICAL GOODS AND MATERIALS CAPACITY, IMPROVE EFFICIENCY, AND HAVE A CLIMATE BENEFIT DUE TO LOWER ENERGY USE, LESS FOOD WASTE, OR HASTEN CAPTURE OF BY-PRODUCTS AND CO-PRODUCTS

Food supply chain participants stand to benefit from implementing technology-driven food traceability systems. Two of the most significant benefits categories are operational efficiencies related to inventory and labor and market access in the form of brand power and customer satisfaction. The public simultaneously stands to benefit from investment in a traceable food supply chain through improved outbreak prevention and response, reductions in food waste, and consumer protection.

Addressing Inventory Management & Food Waste

By making every product visible in a business's electronic inventory management system, companies are able to have greater efficiency and agility of operations, substantially reducing understocking and overstocking challenges. In the retail context, electronic product tracking can provide detailed data on demand for individual products in specific stores and regions, enabling more efficient ordering, planning, and pricing. In many cases, the savings from reduced labor costs would offset the investment in such a system.

Every year, approximately 1.3 billion tons of food are lost or wasted around the world—an amount that could feed almost half of the world's population, according to a report from the North American Initiatives on Food and Organic Waste study completed in 2018

In North America, approximately 168 million tons of food are wasted every year—with Americans wasting 915 lbs. per person; Canadians, 873 lbs. per capita; and Mexicans, 549 lbs. per individual—according to a new study from The Commission for Environmental Cooperation (CEC) in Montréal.

Food production uses 25 percent of all fresh water consumed in the United States, requires 80 million acres of farmland, and accounts for 13 percent of total carbon emissions. About 40 percent of the food produced in the United States goes uneaten — costing more than $200 billion annually and 1 trillion dollars globally. Eliminating food waste in the grocery and food service sectors are an important step toward mitigating the unsustainable impacts of our food system on water, air, climate, and wildlife.

ECRLoss academic center in the EU has conducted extensive research into waste. Two of the primary drivers of food waste can be addressed by correctly inaccurate inventory records and driving consumer trust by having inventory available when needed and reducing safety stock. The goal of the study was to understand the amount of waste generated at the retail level, improve performance of the fresh supply chains by creating awareness, create benchmark tools and a priority implementation list.

The retailers involved in the study believed if they could impact retail waste by increasing on shelf life by 1 day it not only reduced waste at the retailer but in the home by providing more shelf life. Eliminating food waste in the grocery sector could have a ripple effect across society that could help address hunger, save money, conserve water and land, create more efficient agricultural systems, reduce greenhouse gas emissions and protect endangered species. Customers have taken notice of the massive problem of wasted food in the United States and want responsible businesses to act.

> -- 3 retailers (9 stores each), 27 stores and 2400 items monitored for 1 year. Each store provided the case pack size, store shelf life (produce shelf life on the moment the produce enters the store) , daily sales, waste and supply - promotional items were filter out as aberrations for this study - reported waste included discounted items that close to the expiration date measured in consumer units. Waste was calculated based on a percentage of sales.

The environmental and socioeconomic impacts of food, loss, and waste (FLW) across the food supply chain are significant. Using multiple recent studies, including FAO's Food Wastage Footprint (FAO 2013), Commission for Environmental Cooperation (CEC) in Montréal's research team derived estimates of the impacts of FLW for North America per year. A few examples include:

- 193 million tons of greenhouse gas (GHG) emissions or equivalent CO2 for lifecycle of landfilled FLW; this is equal to 41 million cars being driven continuously for a year.
- 17.6 billion cubic meters of water used
- 22.1 million hectares (54.6 million acres) of cropland used
- 3.94 million tones of fertilizer used
- 38.6 million cubic meters of space used in landfill
- $1,867 million spent in tipping fees
- $278 billion in market value of FLW lost
- 217 trillion kilocalories in potential energy lost

The ECRLoss centered achieved the following results

- Increase Product Shelf Life by one day – Waste Reduction 42.8% / On-Shelf Availability (OSA) Increase 3.4%
- Match Fulfillment to Demands – Waste Reduction 32.5% / OSA Increase 2.0%

IV. ADDRESS THE VISIBILITY OF NATURAL, MARKET, ECONOMIC, GEOPOLITICAL, HUMAN-RIGHTS OR FORCED-LABOR RISKS OR OTHER CONTINGENCIES THAT MAY DISRUPT, STRAIN, COMPROMISE ORE ELIMINATE THE SUPPLY CHAIN INCLUDING RISKS POSED BY SUPPLY CHAINS' RELIANCE OF DIGITAL PRODUCTS.

A. Human Rights or Forced-Labor Risks

Despite growing efforts by business, investors, civil society, and policymakers over the past two decades, workers in global supply chains continue to experience human rights abuses. The International Labor Organization (ILO) estimates that of the 24.9 million victims of forced labor in the world, about 16 million people are exploited in the private sector. (O, "Global Estimates of Modern Slavery: Forced Labour and Forced Marriage," 2017.)

An excellent report from HUMAN RIGHTS CENTER UC BERKELEY SCHOOL OF LAW entitled Technology Solutions for Advancing Human Rights in Global Supply Chains A Landscape Assessment 2019 made these points. Technology solutions exist to address the traceability of food from source to consumer they have spent less time focusing on the following components: Human rights risk assessment and due diligence, Supplier audit and compliance management, Consumer engagement (e.g., providing human rights–related information to customers or consumers). AIM NA and responsible solution providers need to advocate for the use of responsible design principles, such as the Worker Engagement Supported by Technology (WEST) Principles. The WEST Principles are a set of guidelines developed to maximize the impact of technology-driven efforts to engage workers in global supply chains. They give guidance on how to design and implement technological solutions that identify and address worker abuse and exploitation. Technology-driven approaches can enable stakeholders at all levels of global supply chains to act against human rights abuses and improve worker well-being.

B. Reliance of Digital Products

Technologies such as the ones below are emerging to protect data in the digital supply chain.

- The W3C has developed a specification for Decentralized Identifiers (DIDs) v1.0. Decentralized identity is an emerging concept that gives back control of identity to owner of the data through the use of an identity wallet in which they collect verified information about themselves from certified issuers.
- ISO 20248 Automatic identification and data capture techniques - Data structures - Digital signature meta structures.
- Global GAP (Good Agricultural Procedure) has a Chain of Custody Standard (CoC)

The above standards will help ensure permissioned accurate access of the data by authorized people in the supply chain. In the food supply chain, you have a physical product, a key tenet of traceability is to attach a data carrier with a digital identity to the physical product. There are various technics used to ensure the accurate contents of the data carrier from symbol verification to ISO 20248. This physical data carrier provides an "offline" method of obtaining information about a food product.

V. DEVELOPING DOMESTIC SUPPLIES WORKFORCE CAPABILITIES, STRENGTHEN MARKET TRANSPARENCY, INCLUDING TRACEABILITY, CONSUMER CONNECTION, BRAND PROTECTION, INVENTORY MANAGEMENT AND SUPPLY CHAIN VISIBILITY.

A. Brand Power & Consumer Demand

Direct digital interactivity between the consumer and the product is becoming a key means of encouraging brand loyalty and re-purchasing. In 2018, 75% of consumers would be willing to switch brands if another offered them more in-depth product information beyond the label, up from 39% in 2016. Similarly, consumers are increasingly demanding information about sustainability. More than ever, consumers are willing to engage with businesses that invest in food safety technology. Meeting this demand for ingredients and process transparency requires information to be collected, stored, and shared throughout each step of the supply chain. Some digital tags, such as RFID, enable end-users to access data about the product to which they are attached. Digital tags have massive advantages over inventory systems that rely on traditional barcodes because RFID chips have a unique identity, can be read at greater distances, read one to many, and do not require a direct line of sight for scanning.

Traceability requirements need to facilitate the use of customizable solutions. Providing a single solution that can satisfy regulatory requirements while also enabling businesses to connect with consumers will reduce potential resistance to adopting compliance measures. Additionally, investing in technology-driven traceability helps to create a food safety culture of trust and transparency.

VI. REVIEW ON THE GOVERNMENT-WIDE EFFORT TO STRENGTHEN SUPPLY CHAINS, INCLUDING IDENTIFICATION FOR OPPORTUNITIES TO COORDINATE ACTIONS WITH ONGOING EFFORTS THAT COULD BE CONSIDERED DUPLICATIVE OF THE WORK OF EXECUTIVE ORDER, "AMERICA'S SUPPLY CHAINS" (86 FR 11849) (E.O. 14017), DATED FEBRUARY 24, 2021

- FSMA 204
- New Era of Smarter Food Safety
- UDI
- DSCSA
- Feed the Future Enabling Environment for Food Security
- Strengthening Organic Enforcement Proposed Rule
- USDA Graded Cage-Free Eggs: All They're Cracked Up To Be
- International Trade Data System (ITDS): Helping Boost Trade
- USDA Study The value of traceability in the beef industry markets
- US Customs and Border Patrol conducting POC to identify products digitally as they enter the country

CONCLUSION

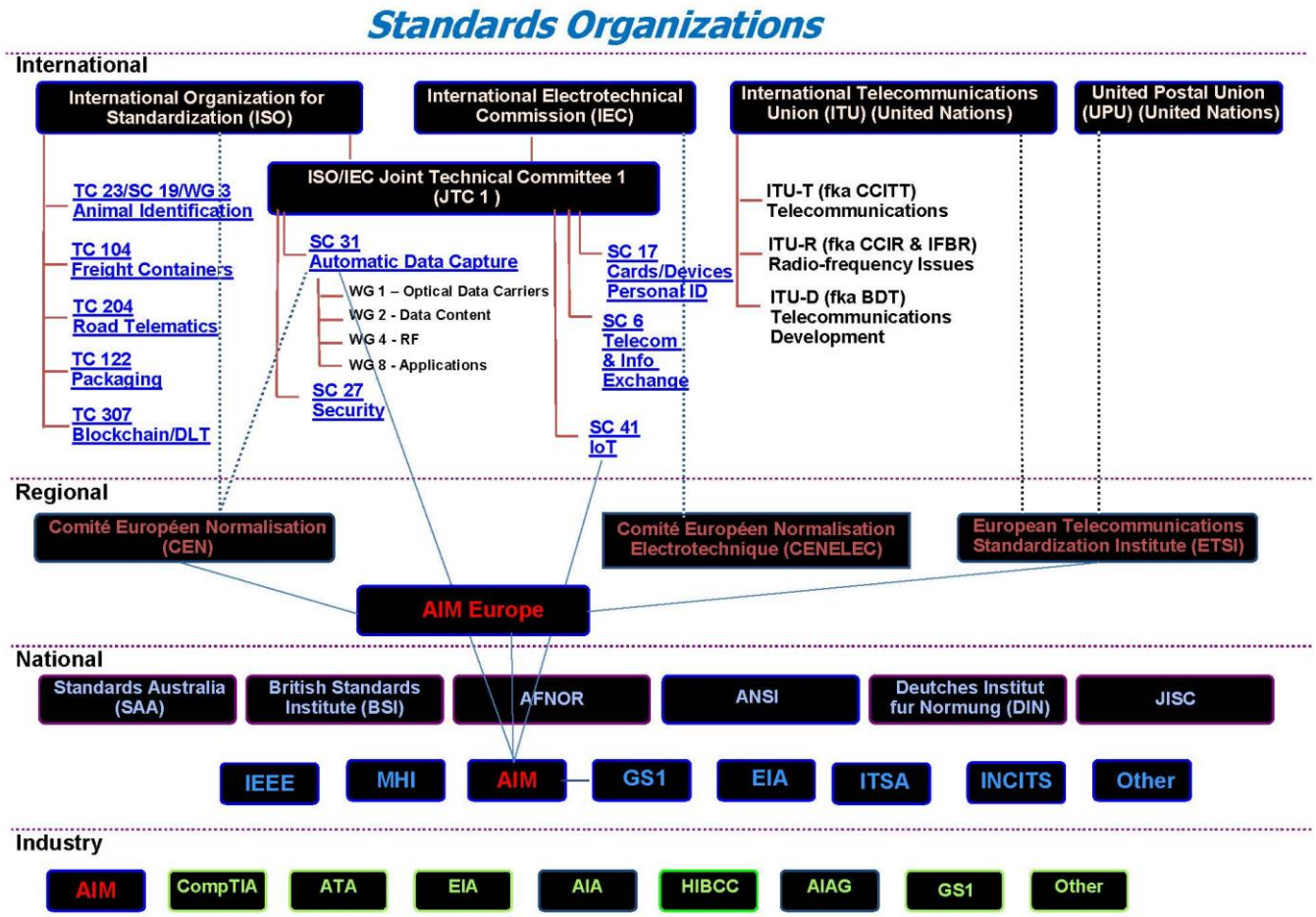
The United States needs resilient, diverse, and secure supply chains to ensure our economic prosperity and national security. Pandemics and other biological threats, cyber-attacks, climate shocks and extreme weather events, terrorist attacks, geopolitical and economic competition, and other conditions can reduce critical manufacturing capacity and the availability and integrity of critical goods, products, and services. Resilient American supply chains will revitalize and rebuild domestic manufacturing capacity, maintain America's competitive edge in research and development, and create well-paying jobs. They will also support small businesses, promote prosperity, advance the fight against climate change, and encourage economic growth in communities of color and economically distressed areas.

Resilient supply chains must focus on the adoption of technology to bring automation, integrity and data management solutions to supply chain traceability. The role of government in this arena is to facilitate the use of technology and establish standards that allow for new technologies to work together seamlessly.

The first step USDA should take is to establish rules for global unique identifiers, minimum content for those global unique identifiers, and the electronic capture and sharing of required information. Digital technology can accomplish many of the goals the EO outlined—building secure, resilient and secure supply chains to address the needs of the 21st Century.

AIM North America thanks the USDA for this very useful effort, and for its consideration of our comments. If we can provide additional information or answer any questions, please do not hesitate to contact the undersigned.

APPENDIX A


Standards Organizations
International
International Organization for Standardization (ISO)
International Electrotechnical Commission (IEC)
International Telecommunications Union (ITU) (United Nations)
United Postal Union (UPU) (United Nations)
TC 23/SC 19/WG 3 Animal Identification
TC 104 Freight Containers
TC 204 Road Telematics
TC 122 Packaging
TC 307 Blockchain/DLT
ISO/IEC Joint Technical Committee 1 (JTC 1)
SC 31 Automatic Data Capture
WG 1 – Optical Data Carriers
WG 2 - Data Content
WG 4 - RF
WG 8 - Applications
SC 27 Security
SC 17 Cards/Devices Personal ID
SC 6 Telecom & Info Exchange
SC 41 IoT
ITU-T (fka CCITT) Telecommunications
ITU-R (fka CCIR & IFBR) Radio-frequency Issues
ITU-D (fka BDT) Telecommunications Development
Regional
Comité Européen Normalisation (CEN)
Comité Européen Normalisation Electrotechnique (CENELEC)
European Telecommunications Standardization Institute (ETSI)
AIM Europe
National
Standards Australia (SAA)
British Standards Institute (BSI)
AFNOR
ANSI
Deutches Institut fur Normung (DIN)
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IEEE
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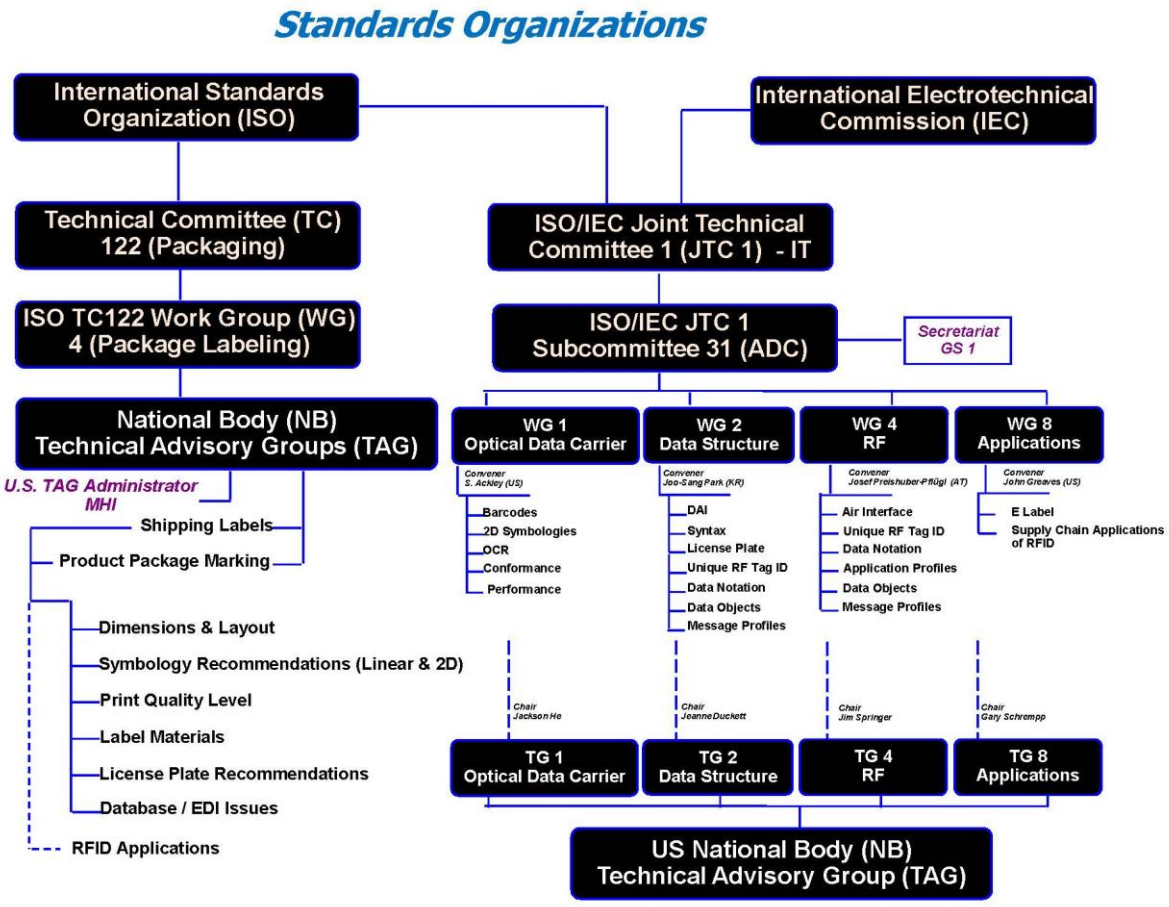
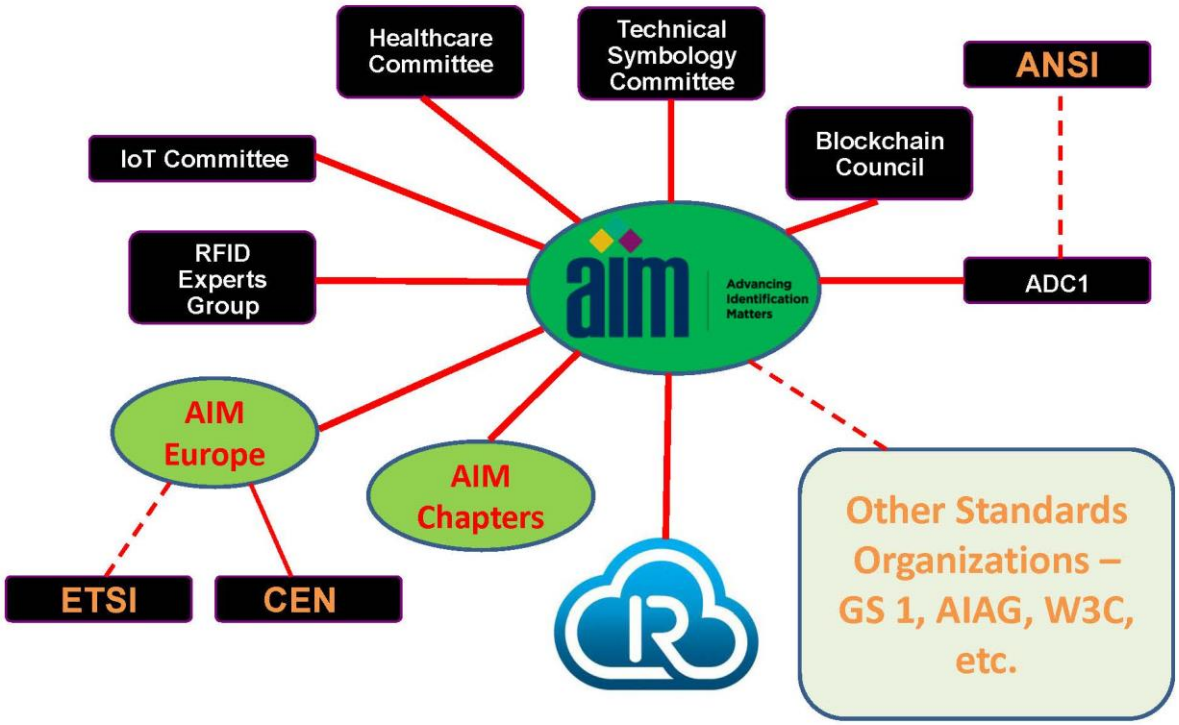
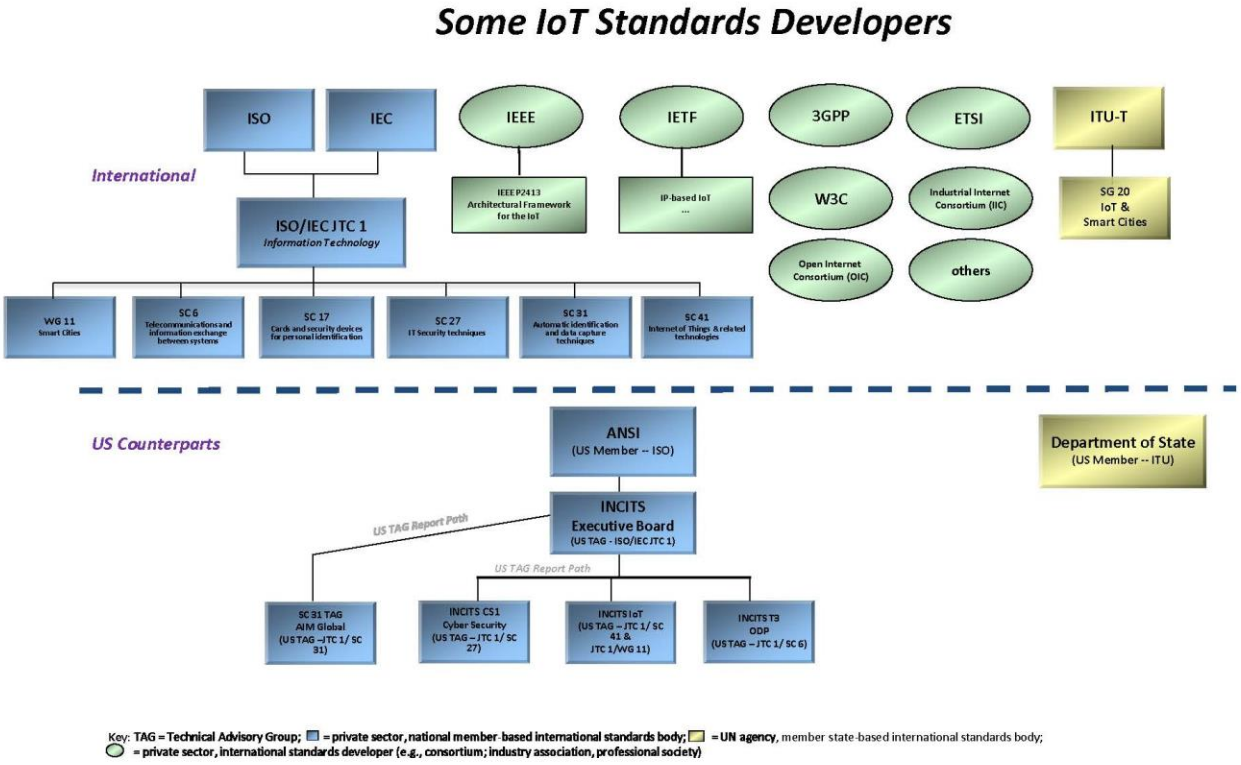

Standards Organizations
International Standards Organization (ISO)
International Electrotechnical Commission (IEC)
Technical Committee (TC) 122 (Packaging)
ISO/IEC Joint Technical Committee 1 (JTC 1) - IT
ISO TC122 Work Group (WG) 4 (Package Labeling)
ISO/IEC JTC 1 Subcommittee 31 (ADC)
Secretariat GS 1
National Body (NB) Technical Advisory Groups (TAG)
WG 1 Optical Data Carrier
WG 2 Data Structure
WG 4 RF
WG 8 Applications
Convener S. Ackley (US)
Convener Joo-Sang Park (KR)
Convener Josef Preishuber-Pflügl (AT)
Convener John Greaves (US)
U.S. TAG Administrator MHI
Barcodes
2D Symbologies
OCR
Conformance
Performance
DAI
Syntax
License Plate
Unique RF Tag ID
Data Notation
Data Objects
Message Profiles
Air Interface
Unique RF Tag ID
Data Notation
Application Profiles
Data Objects
Message Profiles
E Label
Supply Chain Applications of RFID
Shipping Labels
Product Package Marking
Dimensions & Layout
Symbology Recommendations (Linear & 2D)
Print Quality Level
Label Materials
License Plate Recommendations
Database / EDI Issues
RFID Applications
Chair Jackson He
Chair Jeanne Duckett
Chair Jim Springer
Chair Gary Schrempp
TG 1 Optical Data Carrier
TG 2 Data Structure
TG 4 RF
TG 8 Applications
US National Body (NB) Technical Advisory Group (TAG)

AIM Relationships



Some Key IoT Standards Developers



APPENDIX B

AIM Ultracode International Symbology Standard

AIM 7351731 Medical Electrical Equipment & Sys Electro Immunity Test for RFID Readers

AIM ISS DotCode Symbology Specification

Global Numeric Code Issuing Agencies in accordance with ISO 15459
https://www.aimglobal.org/uploads/1/2/4/5/124501539/register-iac-def_2019.pdf

ISO/IEC 15459-1:2014 Information Technology - Automatic Identification And Data Capture Techniques - Unique Identification - Part 1: Individual Transport Units

ISO/IEC 15459-2:2015 INFORMATION TECHNOLOGY — AUTOMATIC IDENTIFICATION AND DATA CAPTURE TECHNIQUES — UNIQUE IDENTIFICATION — PART 2: REGISTRATION PROCEDURES

ISO/IEC 15459-3:2014 Information technology — Automatic identification and data capture techniques — Unique identification — Part 3: Common rules

ISO/IEC 15459-4:2014 Information Technology - Automatic Identification And Data Capture Techniques - Unique Identification - Part 4: Individual Products And Product Packages

ISO/IEC 15459-5:2014 Information technology — Automatic identification and data capture techniques — Unique identification — Part 5: Individual returnable transport items (RTIs)

ISO/IEC 15459-6:2014 Information technology — Automatic identification and data capture techniques — Unique identification — Part 6: Groupings

ISO/IEC 15459-8:2009 Information technology — unique identifiers — Part 8: Grouping of transport units

GS1/ ISO Standards list

ISO Standard	GS1 Component
ISO/IEC 15459-6	GTIN (Global Trade Item Number
ISO/IEC 15459-4	SGTIN (Serialized Global Trade Item Number
ISO/IEC 6523	GLN (Global Location Number
ISO/IEC 15459-1	SSCC (Serial Shipping Container Code
ISO/IEC 15459-4 & 5	GIAI (Global Individual Asset Identifier
ISO/IEC 15459-5	GRAI (Global Returnable Asset Identifier
ISO/IEC 15418	GSRN (Global Service Relationship Number

ISO/IEC 15418	GDTI (Global Document Type Identifier
ISO/IEC 15418	GINC (Global Identification Number for Consignments
ISO/IEC 15459-6	GSIN (Global Shipment Identification Number
ISO/IEC 15418	GCN (Global Coupon Number
ISO/IEC 15418	CPID (Component / Part Identifier
ISO/IEC 15418	Application Identifiers
ISO 22274	Global Product Classification (GPC
IETF RFC 3986	EPC URI Syntax
ISO 9735	EANCOM syntax
UN/CEFACT UNSMs	EANCOM content
W3C XML	GS1 XML syntax
W3C XML	GS1 XML content
ISO/IEC 15424	Symbology identifiers
ISO/IEC 15420	EAN/UPC
ISO/IEC 16390	ITF-14
ISO/IEC 15417	GS1-128
ISO/IEC 24724	GS1 DataBar
ISO/IEC 16022	GS1 DataMatrix
ISO/IEC 24723	GS1 Composite
ISO/IEC 18004	GS1 QR Code
ISO/IEC 18000-63	UHF Class 1 Gen 2 /IEC 18000-63
ISO/IEC 18000-3	HF Class 1 Gen 2
ISO/IEC 15962	EPC Tag Data Standard
ISO/ICE 24791-5	Low-level Reader Protocol (LLRP)
ISO/IEC 24791-2	Application Level Events (ALE)
ISO/IEC 24791-3	Reader Management (RM)
ISO/IEC 24791-3	Discovery, Confguration, and Initialization (DCI)
ISO/IEC 19987	EPC Information Services
ISO/IEC 19988	GS1 Core Business Vocabulary (CBV)