EURODATA COUNCIL

ISO/IEC JTC 1/SC 31
Automatic identification & data collection
Report on continued standardization of Bar Code & RFID

Figure 1) Plenary meeting

18 of 32 Nations attended the ISO/IEC/JTC 1/SC 31 Plenary Meeting

Australia	Austria	Belgium	China	Canada	Switzerland	Germany	Finland	France
Japan	Singapore	S. Africa	S. Korea	Sweden	NL	Russia	UK	USA

and contributing institutions

AIM	CEN TC225	DOD	EDC	ETSI	GS1	IATA	HIBC	ISO TC122	ISO SC17	ITU-R	UPU

(and others such as IEEE)

Editor:
Heinrich Oehlmann
E.D.C. TC

in co-operation with AIM, DIN, EDIFICE, EHIBCC and Liaisons
Beijing May 28, 2010
Rev. 2010-09f

EURODATA COUNCIL

Introduction

Fig.2) The flag from the host

Occasionally a recent query of DIN on the importance of normalization approximately 70% of the respondents agreed that standards are a key prerequisite for the competitiveness of their company. This realization has apparently also reached China, as the national standards institute „Standardization Administration of the Peoples Republic of China“ invited the AutoID committee ISO/IEC JTC 1/SC 31 to Beijing for the „Plenary 2010“. ISO/IEC JTC 1/SC 31ISO / IEC JTC 1/SC 31 is the organization responsible for worldwide standardization of techniques and methods for automatic identification and data capture (AIDC). „Optical Readable Media (ORM)“ with Bar Code and „Radio Frequency Identification (RFID)“ are the key technologies addressed by it. The first Plenary Meeting took place in 1996. At that time, the specific working groups (WG's) were established (Table 1).

Table 1) Structure and working groups of ISO/IEC JTC 1/SC 31 Auto ID

International Standardization Organization, **ISO**|**IEC**, International Electrotechnical Commission						
ISO & IEC formed the “Joint Technical Committee **ISO/IEC JTC 1”** with Subcommittee 31 for Automatic Identification & Data Capture (AIDC)						
ISO/IEC JTC 1/SC 31 Automatic Identification and Data Capture Techniques						
WG 1	WG 2	WG 3	WG 4	WG 5	WG 6	WG 7
Optically Readable Media (ORM)	Data Structures for Item Management	Confor-mance	RFID for Item Management	RTLS Real Time Locating Systems	Mobile Item Identification & Management (MIIM)	Security on Item Management
Symbol specifications, Conformance e.g. Code 128, Data Matrix, QR	Application- & Data Identifiers, Syntax	moved to WG 1	RFID Air Interface, Application Interface Protocols, Conformance, legal aspects	*Localization with RFID*	*Bar Code & RFID for Mobile phones and services*	*Safety aspects Interface & Protocols*

Since the establishment of the committee, all key standards for Bar Code & RFID and related data structures have been published. Now some are already subject to revisions and amendments, but there are new and innovative projects in work as well. Each year a different country is getting the chance to host the experts from around the world. After Beijing the next plenary sessions will be held in Austria (2011) and in the U.S. (2012). Each of the six active working groups is responsible for the implementation of the given projects until publication of the relevant standards. In the "Plenary Meeting", each convener reports on the progress of the work, progress is discussed, and, after completion, the specifications are passed to the secretariat for administrative processing as standards through the ISO office in Geneva. The SC 31 Secretariat is provided by GS1 Global. The processes within SC 31 are typical for the global standardization work: A proposal for a desired standardization project by one country must be supported by at least 5 other countries. This is the vote. If this is successful, the project is assigned to a work group, or a new work group, if needed. The business plan is updated at the annual Plenary to include the new work. This allows the work group to start the development of the standard. The business plan includes the new projects and also contains the routine updates to the existing standards in the 5-year sequence. All interested parties in global standards for AutoID and “Item- & Supply Chain Management” applications are invited

Fig. 3) WG meeting. Source: Zhang Cao, GS1-China

to participate. All interested parties are invited to submit their requirements to the working groups, or better yet, to collaborate to create effective global specifications. In Germany, it is the job of DIN NA 043-01-31 AutoID to coordinate the national tasks with the work of ISO. Also CEN TC 225 provides additional projects to fill potential gaps. The final standards are available from the national institutions working with ISO and those are pretty much all countries in the world.

Fig.4) Agenda for the week

The ISO/IEC JTC 1/SC 31 committee meetings

The plenary meeting has more aspects than being just a formal standards meeting for developing technical specifications. In the days before the plenary, several working group meetings are held on specific projects. Here the opportunity is provided to exchange information on national practices, trends and specific solutions. About 60 delegates from 18 countries visited Sydney in 2009, to attend the meetings. In Beijing in 2010, there were a little less delegates. But this was compensated by the host country and their experts looking for the opportunity to find their place on the international scene. The number of specialized experts in one place shows the great importance which the ISO standards imply.

Mission for the delegation

The report was written by the delegate of the national body from DIN. The focus of the delegation was that it represents the interest of DIN NA 043-01-31 AIDC, specifically supported by AIM-Germany, CEFIC, EDIFICE, EHIBCC, EDC and liaison members:

- Maintaining the current flexibility of the structure for unique ID numbers (License Plates) for items, returnable units, transport units, groups of items.
- Representation of the interests for open specifications for cross-sectoral functionality avoiding license fees wherever possible.
- Contribution to application guidelines on how to use data structures with AIDC media (Bar Code & RFID).
- Accelerate the standard for the RFID Emblem, which is to be included in the European standard.
- Lobbying for new solutions to close gaps of unique markings, such as for a "globally unique personal ID" in conjunction with bar code and RFID.
- Bringing back the information to the user groups for implementation of the standards.

The groundwork for the mission was prepared by DIN-043-NA 01-31 AIDC and its Members.

The meeting schedule

The full week of meetings covered the actual work and summed up with the full plenary meeting at the end of week.

Table 2) Agenda pre-meetings and plenary

SC 31/WG 7	SC 31/WG 4-RFID	SC 31/WG 2	SC 31 Plenary
Security on Item Management / File Management & Security for RFID	RFID Air Interface, Application Interface Protocols, Conformance	Data Structures for automatic identification and item management ---------- **HOD** meeting (Head of National Delegations)	Full Plenary Meeting Voting Members, National Bodies, Liaisons, Conveners

Table 2 shows the distribution of the individual WG meetings being held prior to the summarizing plenary meeting on the last day

Topics of specific interest

There were the many individual issues. The key tasks of the mission are reflected in these highlighted topics, discussed in detail below:

- Update of the key standard “ISO/IEC 15459 Unique Identification” as the common base
- Upgrade of the RFID standards specifically for UHF ISO/IEC 18000-6 with parts 61-64
- Further access to the "Internet of Things" by ITU-T X.500/LDAP
- Security addressed by WG 7 “Security on Item Management”
- News to the RFID Emblem: ISO/IEC 29160
- Progress on “Guidelines for using AIDC media (BC & RFID)”
- Mobile Item Identification & Management (MIIM) by mobile phones
- Report on the update of the global BC & RFID application standards with additional ID for Reusable Packaging
- Developments in China – a new 2D-symbol, RFID solutions
- Exchange in addition to the meetings

Update the key standard "ISO/EC 15459 Unique Identification"

"Unique identification" is a basic function specified. This topic has the highest priority within the WG2. The ISO/IEC 15459 standard is the prerequisite for any unique ID mark at all, regardless if it is encoded in Bar Code, 2D symbols or RFID. Due to the importance of that standard, a specific ad-hoc committee was established for preparing the revision. Mikael Hjalmarson (Sweden), head of the ad-hoc, presented the new parts and revisions for meeting the requirements for global tracking and tracing systems. Subdivisions of the 6 parts (See Table 3) include the addressing of unique identification of „Groups of Items“ and for „Returnable Transport Items – RTI“. Illustrations show differences between „reuse“ and „recycling”. All parts of the standards are completed with unique identifiers for Bar Code and translated as Object Identifiers (OID) for use with RFID as well.

Table3) The parts of the key standards for global uniqueness

ISO/IEC 15459 Information technology — Automatic identification and data capture techniques — Unique identification					
Part 1	Part 2	Part 3	Part 4	Part 5	Part 6
Individual Transport Units	Registration Procedures	Common Rules	Individual Products and Product packages	Individual Returnable Transport Items (RTI)	Groupings

Note: The originally planned parts 7 and 8 are intended to be integrated into part 1 to 6

Marked according to ISO/IEC 15459 structure, each item (product) becomes unique, regardless of where in the world the marking or identification takes place.

Forthcoming projects will include the revision of ISO/IEC 15418 as the reference to ASC Data Identifiers and to GS1 Application Identifiers, as well as the revision of “ISO/IEC 15434 Syntax for High Capacity Media”. The latter gains importance for two-dimensional symbologies, such as Data Matrix, as well as for Applications specifically in areas with large volumes of data, such as the so-called "PaperEDI“, the solution for automatic data capture by shipment papers or labels. Here, too, standardization makes possible communication via AutoID between any partners anywhere in the world.

Upgrade of the RFID standards specific to ISO/IEC 18000-6 UHF

SC 31 "WG 4" is responsible for the RFID technology for item management. This WG enjoys very high popularity in the context of international developments. The responsibility of the WG 4 - RFID covers the entire field of technology of RFID: RFID Air Interfaces, Application Interface Protocols, Conformance, including legal aspects and patents. All key RFID technology standards are handled by this expert team. When voices get loud for immediate

RFID standards, then one must recognize that the standards are available. The group worked closely with the national expert groups (e.g. DIN NIA 31.4, etc.). The standards are publicly available for the protocols and for the RFID Air Interfaces for frequencies from <135KHz up to 2,4 GHz. These standards are available through ISO or through the national bodies. The upgrade of the UHF standard, ISO/IEC 18000 Part 6C, was subject to delays caused by late contributions, patent declarations and its complexity. However, the key milestones have been set for this important area as well. In connection with the extension of battery power and sensor technology, ISO/IEC 18000-6 for UHF became so large that the standard has to be split into subdivisions. The new structure has been established in accordance with Table 4.

Fig. 5) Experts meeting. Source: Zhang Cao

Table 4) New structure for RFID UHF standard

ISO/IEC ▼	UHF ▼
18000-6	general
18000-61	Type A
18000-62	Type B
18000-63	Type C
18000-64	Type D

Further access to the Internet of Things: Ad-Hoc committee „RFID support for ITU-T X.500/LDAP“

Fig. 6) ITU-T opening access for RFID

The Working Group of the International Telecommunication Union - ITU-T/SG 17 developed a solution that takes into account a unique item identification (UII) of an RFID chip as a reference pointer for access to directories on the net. This is similar to the solution for access by an EPC code, but, as an open system for all participants that have received a unique Company Identification Number (CIN) Code from one of the 30 Issuing Agencies in accordance with ISO/IEC 15459-2. The actual ITU specification uses the SC-31 definitions for UII's, converting the ID to the X.500 structure, making it compatible. The Ad-Hoc Committee will coordinate with the ITU subcommittee by phone conferences to harmonize the definition (successful telecon took place in the meantime). With the help of the ITU, the door for further access to the Internet of things will be opened (Fig.6).

Safety is addressed by SC31/WG 7 “Security on Item Management”

The theme of "security", specifically "RFID & Privacy”, plays an increasing role in the normalization as well. At the meeting of the SC 31/WG 7 - Security for Item Management - at least 30 experts from 12 countries joined, of which 10 were from China. The convener of WG 7 is Dan Kimball, USA. The work on "RFID Security" requires coordination with other groups, which also addresses the subject of security under the umbrella of ISO. These external groups include ITU-R, ITU-T, IEEE, CEN TC and 225 others. There are papers and recommendations addressing the issues originating from these groups, like the draft “ITU-T X.1171, Threats and requirements for protection of personally identifiable information in applications using tag-based identification (SG7_200905_023)”, the EU recommendations, “Privacy (2009/387 EC)” and “Authenticated Encryption”. The first project of the WG 7 is as follows: “ISO/IEC 29167, Air Interface for file management and security services for RFID”. This international standard will define the data management and security parameters for the first ISO/IEC 18000 Air Interface and related RFID equipment. The results, as technical specifications, should also be helpful for other forums that will develop extended user guidelines.

Fig. 11) Contributions to global issues

Subjects will be the Unique Item Identifier (UII) and the safety of the user memory of a transponder as safety methods with safeguards against unauthorized access. There is room for specific requirements. For example, separate passwords for individual storage areas for consignor, consignee, carrier, etc. China proposed the installation of a protective system by using automated queries over the network, as is common in smart cards. However, warnings were immediately raised that this would affect the performance of RFID systems negatively specifically for fast processes of logistics. Additional security aspects of a technical nature will be covered by the WG 4 - subgroups, such as "Transponder security" itself.

RFID software system infrastructure and security

Another project, under the responsibility of WG 4, includes security aspects as well. ISO/IEC 24791 software system infrastructure and security parts 1 to 6 addresses the infrastructure that covers the system operations between the ERP application and the RFID interrogators. Specifically, part 6 targets security. It includes a list of threats that can effect both system software and infrastructure. With this knowledge, system engineers will be enabled to learn how to install security features for protection of functions and data. It involves RFID readers (interrogators), database functions, software and hardware. Security solutions for data management in the RFID chip itself, e.g. password protection, is the subject of current projects of WG 7.

RFID Emblem ISO/IEC 29160

Fig. 7) ISO RFID emblem. Source:AIM

RFID shall be made visible for the users. This requirement for visualization of a basically "invisible" technology comes not just from areas of consumer protection, but also from very practical considerations of whether an RFID tag is present or not, and what is the working frequency of the tag. This is in order to tell operators or technicians “RFID tag - read here”. The problem of many different emblems for RFID is solved with ISO/IEC 29160. It is based on the emblem developed by AIM Global. In the final phase of the project, EPC Global Inc. asked to have consideration of the EPC emblem, as well, as an option. The NFC emblem of the Near Field Communication forum with mobile phone manufacturers might be the third option, if this community has interest in it. Nevertheless, the key logo contains optional characters indicating the kind of tag and the purpose. Fig. 7 shows the emblem displaying „A0“ in it, which stands for a 433MHz tag. A UHF tag for transport units would carry an emblem with “B3” inserted. The „ISO/IEC 29160 RFID Emblem“ has been finalized by the committee and passed through the ISO Secretariat in Geneva for immediate publication. The emblems are part of the RFID application standards for supply chain management, ISO 17364 through 17367. The specification of the emblem with options and dimensions is available via the AIM Global web page:

Fig. 8) ISO/IEC 29160 RFID emblem applied to a container tag. Source: www.Elmicron.de

www.aimglobal.org/standards/RFIDEmblem

In consideration of the efforts within the EU to search for a RFID emblem for application in the public, AIM and liaisons recommend wherever possible that manufacturers and system integrators apply the ISO RFID emblem (Fig. 8.), in order to show its active use. This is to promote the ISO emblem as the first choice within the EU for markings:

„Where RFID is in it – RFID shall be displayed on it”

Note: In the meantime the EC agreed to take the ISO RFID Emblem as the base for European RFID signage and CEN TC 225 decided Oct. 12, 2010 to adopt ISO/IEC 29160 as European Norm.

“Guidelines for using AIDC media (Bar Code & RFID)”

The project "ISO / PDTR 29162 Guidelines for using data structures in AIDC media" has been assigned to WG 2. The focus is on interoperability and shall illustrate how data information is embedded within either Bar Code, 2D or RFID in a fully compatible manner. Implementations where new data sets had to be developed just for RFID applications have proven to be expensive and partly impractical. Moreover, there is no necessity for different data sets between Bar Code and RFID tags applied to same item since “ISO/IEC 15459 Unique Identification” specifies one ID only regardless of AIDC media. This applies to products such as transport units and returnable items, which have got one part each within ISO/IEC 15459. In essence, the standards prepare the most efficient choice for implementing RFID in existing systems – which is just to use the Bar Code infrastructure instead of generating new references to tagged items. Taking the existing references reduces the investments in front end installations where the ERP system may even ignore how the data is being captured from Bar Code or RFID. Experts from Japan, USA and DE put together principles and facts resulting in the guideline as a Technical Report. It describes how this method can be realized most easily for efficient systems. In addition to guidance for interoperability, it will include solutions on how data can be stored in an RFID chip most compactly to save space and to accelerate reading speed. These will meet the requirements from user groups, such as the "Joint Automotive Industries (Europe, Japan, US)“ and many others where a bar code infrastructure is in place but RFID is integrated. Interaction of Bar Code & RFID implements a migration path from one technology to the other, but also supplies a back-up using hybrid solutions (Fig. 9).

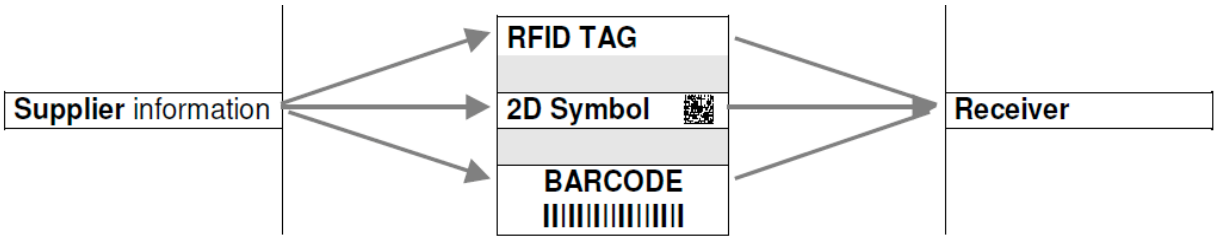

Fig. 9) Hybrid solutions with AIDC Media: Same data information – different AIDC media

Specific features of RFID technology, such as writing/reading, data logging, sensors, are, of course, not covered by Bar Code. Therefore interoperability can be achieved for functions only supported by both technologies. In any case, these are the basic features of unique identification required at every logical level from product though packaging to transportation.

Mobile Item Identification & Management (MIIM) – data capture by mobile phones

The project „MIIM“, being attractive for applications in many areas, as well as for the public, was assigned to SC31/WG 6. The scope of the project reads: *„Standardization of automatic identification and data collection techniques that are anticipated to be connected to wired or wireless networks, including sensor specifications, combining RFID with mobile telephony, and combining optically readable media with mobile telephony”.* The term „*O*ptically readable media“ categorizes the reading of linear Bar Code as well as 2D symbols, like Data Matrix and QR Code. The convener of WG 6 is Craig Harmon (USA). He reported at the plenary on the rapid development of the current nine specifications, which are the modules for MIIM systems: ISO/IEC 29143 and ISO/IEC 29172 to 29179.

Fig. 10) MIIM practice in Japan: Scanning QR code with a mobile phone. Source: Akira Shibata

The specifications cover the integration of Bar Code and RFID readers into Mobile phone devices, including specifications related to applications and service brokers. Since the solution will be specifically attractive for use in the public, it also contains security aspects within ISO/IEC 29176, Information technology — Automatic identification and data capture

techniques — Mobile item identification and management — Consumer privacy-protection protocol for Mobile RFID services.
One of the drivers for the standard is the national standardization institute of Korea focusing on the use of RFID by the public. The input from Japan concentrates to interoperable use of ORM, based on their outstanding experience with QR code for public use.
Even in Germany, there is already QR code on advertising media. For example, QR Code is used on posters, bus stops, even at the CeBit 2010 for linking the scanning of the QR Code to an internet connection to specific information ("routing"). In order to implement global solutions, of course, international standardization is necessary so that this can be used everywhere.

Report on the update of global bar code & RFID application standards

Whereas technical specifications are subject of SC 31, application standards for AutoID are dedicated to ISO TC 122, WG 10. The chairman, Craig Harmon, reported to the Plenum on the status for both the application standards for Bar Code and RFID.

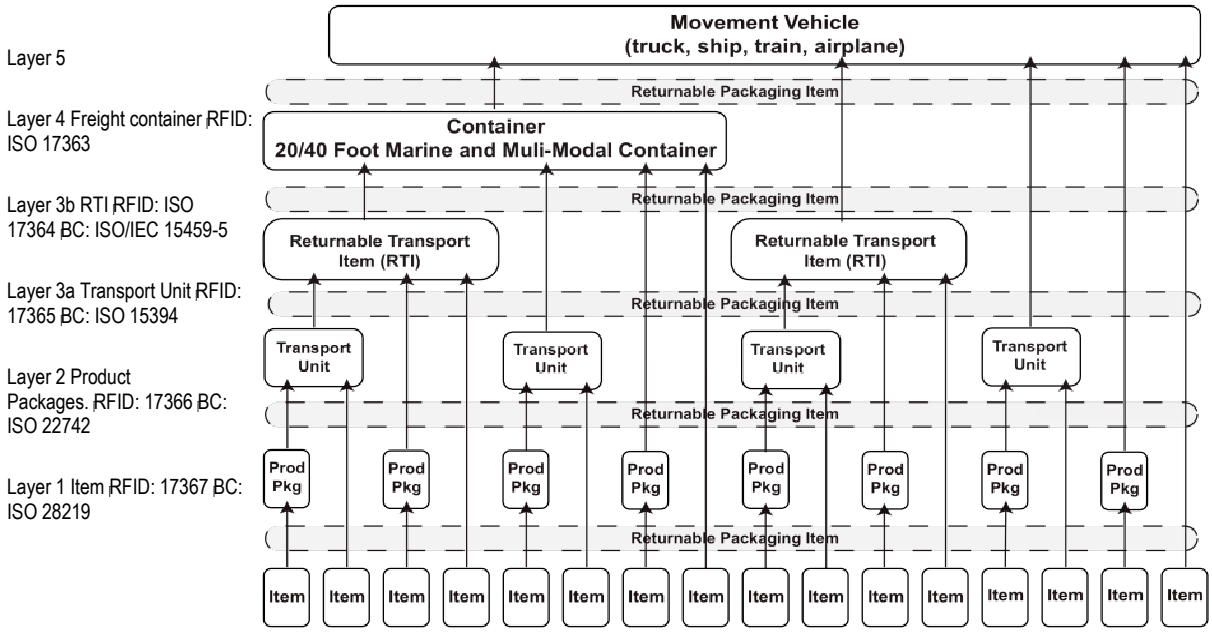

Fig12) Outline of the ISO standards for the layers of a supply chain covered with application standards for both Bar Code and for RFID. Source graphic : ISO 1736x

Figure 12 shows the layers from item to container, where each layer has one standard for Bar Code and equivalently one for RFID. During the update, an additional layer was introduced, the "Returnable Package ID (RPI)". In conjunction with this development, the need for a new Data Identifier crystallized for this specific layer. Immediately after the meetings, the application for that new DI was passed to the ASC DI Maintenance Committee. It took just a few day's to get the new DI registered, the ASC DI 55B for a „Globally Unique Returnable Packaging Item – RPI“ (see info box). The application standards use the technical specification for data and carrier, and bundle it in accordance with the implementation. Both ISO 15394 “Bar Code for Transport Units“ and ISO 17365 “RFID for Transport Units” use the same unique ID the as mandatory data element, the „License Plate“ according to ISO/IEC 15459-1 of SC 31/WG 2. Technology which depends on the Data Identifier „J“ is used for Bar Code in a 1:1 relationship, but for RFID, it is translated into Bit structure according to the RFID data protocol. A similar principle applies if the AI „00“ is chosen for a License Plate. It is translated to an EPC code in this case. In both cases, the ISO conforming decoders and interrogators are programmed to automatically interpret any combination correctly. The revisions of the RFID application standards, ISO 1736x, contain a harmonized Bit structure of 6 bit's over all layers and link to Bar Code and are interoperable with it. Furthermore, it contains the RFID-Emblem

ISO/IEC 29160 for visualization of invisible RFID tags for users. The state of standardization constitutes a comfortable situation across industries and countries.

It answers the call for more standards but it minimizes it to „one standard only“ per layer and technology. Together, these standards provide the necessary flexibility for meeting the requirements of open supply chain processes and offer the capacity for individual numbering schemes of variable length for unique identification whereever needed.

Developments in China – new Bar Code with capacity of 7829 digits

Fig. 13) Han Xin Code

Since China is actively involved in the standardization of AutoID, national developments could be introduced on ISO level. Thus, China established itself as an active member of the International Standardization Organization (ISO) specifically with SC 31 AutoID. In Beijing, the delegates of AIM-China launched a new two-dimensional bar code, the „Han Xin for optical markings. "Han Xin code" falls into the category of 2D codes, in addition to such 2D codes as Data Matrix and QR Code. With the capacity of 7829 digits "Han Xin" surpasses the 7089 digits of QR code as theoretical maximum value. For error correction „Han Xin Code“ has 4 levels in comparison to QR Code with 3 levels and Data Matrix with continuously increasing error correction by data volume. AIM China reported on applications with „Han Xin“ for magazine logistics and distribution, for „Health care Management“ and for the „Railway Industry“. In this context, the AIM China representatives showed laser edged „Han Xin“ codes on metal parts. „Han Xin“ is sponsored by AIM-China, the Association of Auto-ID manufacturers and integrators, together with GS1 China, which acted as sponsors for the plenary session in Beijing.

Further contributions from China

In addition to AIM and GS1 China, key contributors participated in the meetings to a high extent, including the "Shandong Institute of Standardization", the China Electronic Standardization Institute, universities and companies. As part of the contributions, a concept was introduced with Interactive RFID Communication (IRFID) for potential access to the „Internet of Things (IOT)“ and based on WLAN (IEE 802.15.4f 2.4GHz), similar to „Zig-Bee“ communication. The system features „Low Cost“, „Long Distance“ (100m to 1500 meters possible), and connecting sensors. Even remote control and process monitoring (temperature, etc.) would be feasible with this solution. It was reported that practical tests are in process and the developer in China declared interest in an open standard for its general use.

Exchange between the experts to individual AutoID solutions

The meetings of the AutoID experts often leave enough time for the participants to exchange ideas on specific subjects, in addition to what is covered at the formal meetings. Discussions often lead to new projects and solutions. So, for example, a discussion on requirements for a unique identification mark referring to a person. Getting input from different experts on how to solve solutions can be developed very quickly. In this case, it led to short term registration for a new Data Identifier: ASC DI „25H Globally Unique Personal ID“. The requirement was originated from the health care area for a unique patient ID originally, but it turned out to be useful for any other area as well, where a globally unique ID for a person is required. The immediate solution is based on ISO/15459 using existing unique Company Identification Codes (CIN) and including the internal reference to the specific person. The health care association, EHIBCC, will adopt this solution for an add on to the Health Care Bar Code (HIBC) standard in order to supply additional tools for increasing patient safety.

Fig. 14) Unique Personal ID

EURODATA COUNCIL

Intelligent access key:

Among other points of discussion, outside the meetings, was a request for an „intelligent“ serialized access key to information in a data base. Often that consists of several modules, e.g. with concatenated information for products with Company product reference, serial no., Lot, etc. If concatenated as one data element, such modules cannot be identified as a single item anymore but a database link is needed to get access to the data elements and related information. This may concern the use of any kind of serialized data elements. The problem is not just how to get the distinguished meaning of the concatenated sub-modules at any time, but how to use an intelligent solution without interface to a database. Similar requirements can be found everywhere where access key's to databases need to be short but shall be reconstructed again. An example is the construction of a Unique Item Identifier (UII) for RFID tags, which needs to be as short as possible but also carry potential sub-information within the UII data string. Another request is how to get embedded sub-information if access to a database fails and information is not accessible anymore. An „intelligent“ access key could solve the problem. AIM Germany took an action item to propose an update of a „sleeping“ solution, which will be discussed with a TC of AIM Global in order to come up with a recommendation. These discussions outside the meetings resulted in immediate actions and in potential solutions.

New ASC DI „(55B) Global Unique Returnable Packaging Item (RPI)“ registered

The Accredited Standards Committee „ASC“ being charged with maintenance of the Data Identifiers ISO/IEC 15418, part ASC DI's, consists of members from ASIA, Europe & USA. The most important task is the inclusion of new DI's listed with the document ANS MH 10.8.2. Requests for new DI's can come from any user area but require justification for global use. One of the last requests came from ISO TC 122, WG 10, in conjunction with the update of RFID application standards, series ISO 17364 to 17367, initiated by Japan. It was found that an „AI“and a „DI“ exist for Returnable Transport Items (RTI), but nothing equivalent to a "Returnable packaging (RPI) is available. After verification of the potential global usage and unique definition, the registration succeeded promptly 10 days after the request. The new ASC DI is registered as „55B“and is available for immediate use in open environment. This is an example of the rapid response to market requirement by the ASC DI consortium.
The update of the ASC DI list can be viewed by contacting the author.

Coverage under this report

This report has been written to provide an overview of the current standardization work at ISO/IEC JTC 1/SC 31 to AIDC, where some selected detailed information has been added for those with specific technical interest. Certainly not every project of potential interest of specific user groups could be touched on, such as the project “Real Time Location Systems (RTLS)”, the subject area of WG 5. Nevertheless, although there are new developments progressing, such as a standard for the so called “CHIRP“ technology, a localization principle similar to Radar. Even this example shows the wide range of AIDC. Those who may not find the desired information or need specific details may contact either the author or the committee, DIN NA-043-01-31.

Author: Heinrich Oehlmann
EHIBCC TC
Chair DIN NA 043-01-31
hotline@hibc.de, www.hibc.de
Tel.: +49(0)3445 78114 0

Tutor for the English version:
Robert H. Fox, Telcordia Inc.

Encl.: Annex 1-5

Fig.15) flags show international significance

EURODATA COUNCIL

Annex 1 to: "Guidelines for using data structures in AIDC media"

The project „Guidelines"shall provide information for understanding how the same data information can be carried by either Bar Code or RFID, that is printed or loaded into a chip. Basic information will include how data elements will be constructed for guaranteed uniqueness within open supply chain systems. Below are some excerpts of contributions to the draft guidelines.

The hierarchy of unique codes

Companies can only supply unique codes to partners if the structure has worldwide agreement. The highest level possible for obtaining this agreement is ISO. One group alone can never guarantee that numbering schemes will not overlap with others, but ISO can by its power over the global network. The specification for supplying unique codes is developed by WG 2 and named "ISO/IEC 15459 Unique Identification". It defines the rules for how unique codes shall be constructed. The base hierarchical distribution of responsibilities goes to multiple partners. Where the responsibility for the number itself (product code, serial number, Lot, etc.) remains with the labeler. The labeler gets protection from the next higher level, the Issuing Agency, by assignment of a unique Company Identification Code (CIN) just assigned exclusively to him. The Issuing Agency gets its authority from the Netherlands Standards Institute (NEN) on behalf of CEN & ISO. A unique code always consists of the elements „What is it - Who is responsible - What are the data". The information „What is it" is provided by the proper Identifier defining a product or transport unit or returnable container or just a LOT or a Serial number. „Who is responsible" is defined by the combination of an Issuing Agency Code (IAC) with an assigned Company Identification Code (CIN). Finally the data follow. In conjunction with the prefix Identifier, IAC-CIN, that data is unique regardless what media will be used. A common term for a unique data element, which is serialized, is the „License Plate" or, in case of RFID it is called the "Unique Item Identifier" (UII) for same thing. To ease understanding of the hierarchy figure 16), I will illustrate the structure:

(A) ISO/IEC and CEN authorize (B) NEN, Delft (Netherlands) to register "Issuing Agency Codes (IAC's)" for (C) organizations qualifying for it. Such a registered Issuing Agency (IA) is entitled to register Company Identification Codes. (D) A company having got such a „CIN" are in the position to make any internal numbers (E) globally unique. Simply, the labeling company puts the CIN with IAC and pre-fixing identifier in front of their own references and the number gets distinguished from any other companies number in the world, even if it is the same reference value. The pre-fixing identifier, either an AI or DI. provides for identification of the category of the item as serial number or product, Transport Unit, etc. For illustration purposes, fig. 16 shows a unique data element, with its proceeding data identifier (25S) for globally unique serial numbers.

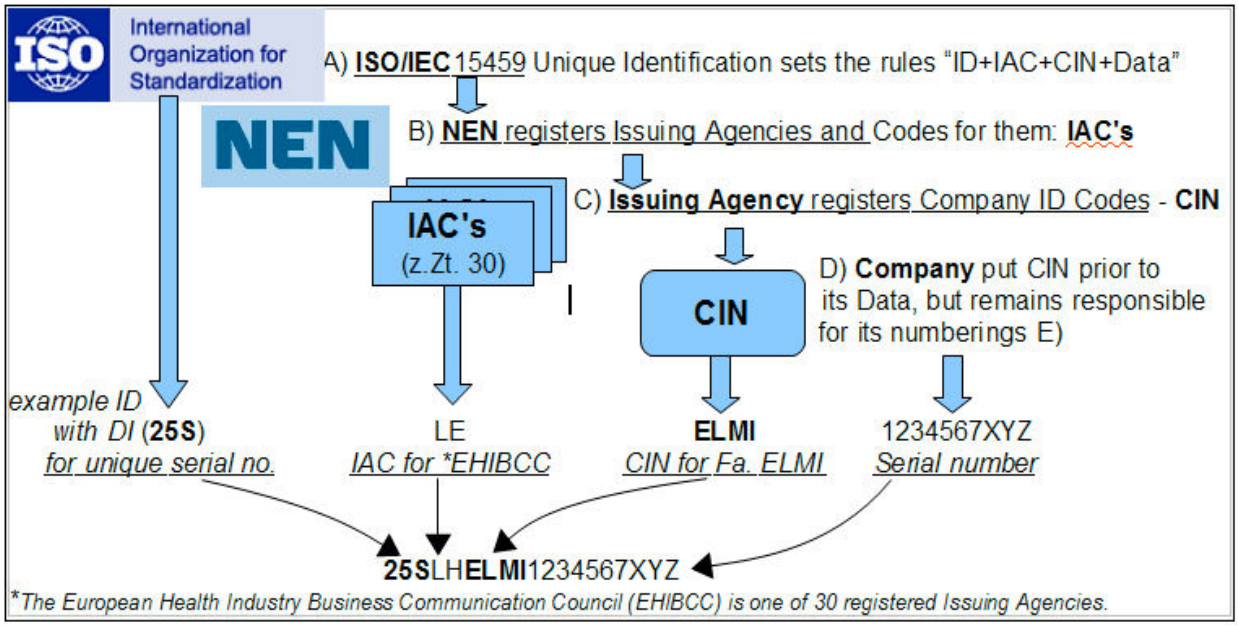

Fig. 16): Hierarchy of distinctiveness for unique Automatic Identification & Data Collection (AIDC)codes

The following chapter will show the relation between Issuing Agency Codes, supported data structures and their capacities.

Annex 2

Limitations by agencies for Company ID Codes and code capacity

Each Issuing Agency (IA) specifies their own formats for Company ID Codes and defines the data structure to be used for embedding a company's data. The Issuing Agency, GS1, requires the use of GS1 Application identifiers when used with trading partners using the GS1 system, the other 29 Issuing Agencies use ASC Data Identifiers. This is just a definition by the Issuing Agencies but does not affect the interoperability of the different coding schemes. Companies can choose any Issuing Agency. The choice by a company can be determined by whether their internal coding schemes fit and which do not to the structure of the Issuing Agency's code. To make such a decision, it is helpful to know the data capacity of data structures supported by Issuing Agencies prior to the choice. Table 5 shows a selection of IA's and supported CIN structure. It shows the data structure type and specifically for key data elements for products and transport units.

Table 5: Issuing Agencies, IAC's and support of data structures

Excerpt of the list of Issuing Agencies for Company ID's (CIN) ▼	***IAC*** ▼	***Length of a CIN*** ▼	***typical CIN, e.g.*** ▼	***[1]Support for structure & code capacity***		
				Data structure ▼	***Product code 2-20an*** ▼ ***(max. 50)***	***Transport code 2-20an*** ▼ ***(max. 35)***
CEFIC Chemical Industries Ass.	QC	4an	CPRO	ASC	YES	YES
DUN Dun & Bradstreet	UN	9n	123456789	ASC	YES	YES
GS1 and EPC Global	0-9	3-7	1212345	GS1 (EPC)	3-5n	9n
EDIFICE European Electronic Industries Association	LE	3an	IBM	ASC	YES	YES
EHIBCC European Health Industries Assoc.	LH	4an	ELMI	ASC, HIBC	18	YES
ODETTE European Automotive Industry	OD	4an	A2B3	ASC	YES	YES
TELCORDIA ANSI ATIS-0300220 Telecom. Equipment	LB	4an	CSCO	ASC	YES	YES
UPU Universal Postal Union, etc.	J	6an	D00001	ASC	YES	YES

Note: The complete list of registered Issuing Agencies and its codes can be seen in "ISO/IEC 15459 Register for Issuing Agencies" under URL:
http://www.nen.nl/web/Normen-ontwikkelen/ISOIEC-15459-Issuing-Agency-Codes.htm

---

Annex 3 Identifiers give the code its significance - examples for 6 categories

A "unique code" must be named as such in order to be identified. This is achieved in machine-readable symbols by leading Application Identifiers (AI's) or Data Identifiers (DI's) conforming to ISO/IEC 15418. GS1 Application Identifiers are always relevant if a GS1 CIN is used, but ASC Data Identifiers with any of the other CIN's *(see Table 5)* or when using alphanumeric product or transport codes. Table 6) shows AI's & DI's for 6 selected categories and data capacities involved.

Table 6) ID categories and related DI's & AI's and capacity

ID for ▼	***DI / capacity*** ▼	▼	***AI/capacity*** ▼	▼
Unique serial no.	25S	2-20(50)	8004	2-22
Unique product code	25P	2-20(50)	01	3-5n
Unique transport code	J	2-20(35)	00	9n
Unique RTI code	25B	2-20(35)	8003	14n+16
Unique Returnable Package Code (RPI)	55B	2-20(47)	-	-
Partner location code	25L	2-20(35)	414	13
Option 3d location code	11L	Lati- +Longi- +Altitude		

[1] to „YES" for 2-20 characters: This is the general recommendation but the maximum length is 50 for product codes and 35 for Transport ID codes. Exceptions are the shorter codes of the GS1 structure.

The complete set of “ASC Data Identifiers” available today is listed and described in detail in the document, ANS MH10.8.2. The ISO reference is ISO/IEC 15418. In addition to Application & Data Identifiers, it contains the System Identifiers (SI) for inter operable sub-structures, such as the Health Industry Bar Code (HIBC), where the distinct SI is the character „Plus (+)“. In addition to showing DI/AI-applications in Table 6, Figure 17 illustrates sequences for unique data elements applied with sample data. For illustration purposes, the same data reference „**0246359X12“** is used for all of the categories below, in order to show how the identifiers distinguish themselves and also make them interoperable.

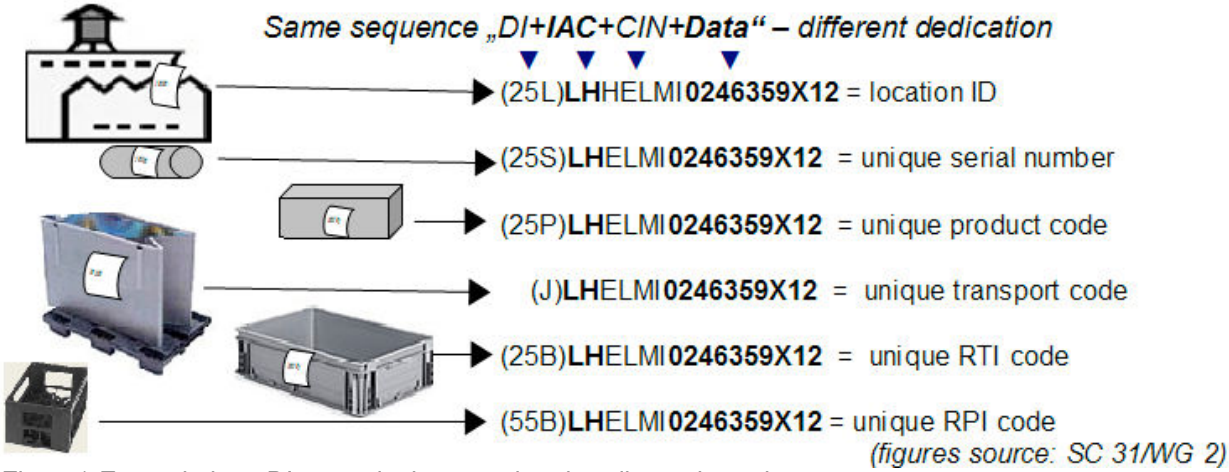

Fig. 17) Example how DI's supply the meaning, heading unique data sequences

ANNEX 4 to ISO/IEC 15459-part 5 – different cycles for return, reuse, recycling

In the update, it was discussed how to better differentiate between cycles of return, reuse and recycling of items, objects and features involved. A container will not change ownership for return but a returnable bottle will potentially change, especially when entering in a recycling process, where other processes apply. Returnable Packaging Items may merge into the cycles as well. Part 5 of ISO/IEC 15459 has an illustration (Fig. 18) attempting to show the context between item and process and which part of standard would apply for automatic identification.

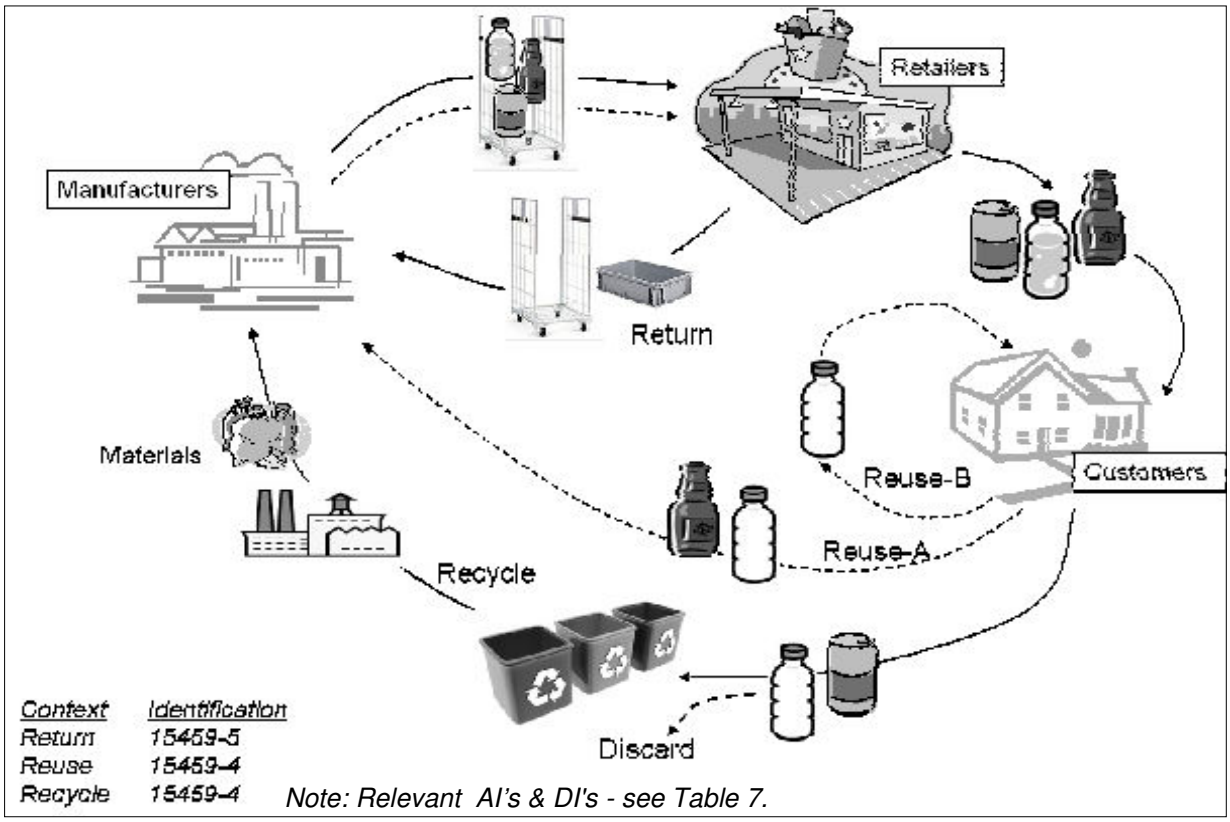

Fig. 18) Overview of multiple processes „Return, Reuse, Recycle“ (Source: SC 31/WG 2)

Table 7) AI's/DI's for multiple processes

Returnable-	***Process***	***Owner***	***AI***	***DI***	*ISO/IEC 15459*
-Container (RTI)	Return	1	8003	25B	part 5
-Container	Reuse	undetermined	8004	25S	part 4
-Package	Reuse	1		55B	*
Recycling	New provision		8004	25S	part 4

*see ISO 17364 RFID for Returnable Transport Items - RTI

The newly defined ASC DI (55B) „Global Unique Returnable Packaging Item - RPI" was added in conjunction with updating the RFID application standard „ISO 17364 RTI".

Annex 5 Selection of technical documents subject to current committee work

(key documents)

Documents of ISO/IEC JTC 1/SC 31/WG 2 Data Structure"
ISO/IEC 15418 GS1 Application Identifiers and ASC Data Identifiers
ISO/IEC 15459 Unique Identification, Part 1 to 6
ISO/IEC 29162 Guidelines for using ADC Media (Bar Code & RFID)
Documents of SC 31/WG 4 RFID for Item Management
ISO/IEC 18000-1 REV 1 (including Battery Assistants, Sensor functions)
ISO/IEC 18000-2 AMD 1 (including Battery Assistants, Sensor functions)
ISO/IEC 18000-6, part 61 to 64 REV1 (incl. Battery Assistants, Sensor functions)
ISO/IEC 18000-7 REV 1 (including Battery Assistants, Sensor functions)
ISO/IEC 15963 Tag ID: applied with the list of IC manufacturer ID's
ISO/IEC 29160 RFID Emblem
Documents of SC 31WG 4/SG 1 RFID Data Protocol
24791-Part 1 to 6 Software System Infrastructure (SSI)
ISO/IEC 24791-1: Architecture
ISO/IEC 24791-2: Data Management
ISO/IEC 24791-3: Device Management (incl. reader configuration commands)
ISO/IEC 24791-4: Abstracted Application interfaces (open)
ISO/IEC 24791-5: Device interface
ISO/IEC 24791-6: Security (based on pr-work of AIM Global)
ISO/IEC 24753: RFID & Sensors with reference to IEEE 1451.7
ISO/IEC 15961, 15962: RFID Data protocol – Update
ISO/IEC 15961-4: Sensor commands (NP)
Documents of SC 31WG 5 MIIM
ISO/IEC 29172-19179 Mobile item identification and management
ISO/IEC 29143 Air Interface Specification for Mobile Interrogators
Documents of SC 31WG 7 Security on Item Management
ISO/IEC 29167 Air Interface for file management and security services for RFID
Documents of liaison ISO TC122/WG 10 to BC & RFID applications:
ISO 22742 Linear bar code and two-dimensional symbols for product packaging
ISO 28219 Labeling and direct product marking with linear bar code and 2d- symbols
ISO 15394 Bar code and 2d- symbols for shipping, transport and receiving labels
ISO 17363 Supply chain applications of RFID – Freight containers
ISO 17364 Supply chain applications of RFID – Returnable transport items
ISO 17365 Supply chain applications of RFID – Transport units
ISO 17366 Supply chain applications of RFID – Product packaging, and
ISO 17367 Supply chain applications of RFID – Product tagging.

Note: For further information, contact the author <heinrich.oehlmann@eurodatacouncil.org> or DIN NA 043-01-31 or any national standards institute.