The Vision of ISO TC 122/WG 12 and IoT in the Supply Chain

By: Craig K. Harmon,
TC 122/WG 12 Convenor

2013-02-11
Craig K. Harmon • President & CEO
Q.E.D. Systems

- Founder, ISO/IEC JTC 1/SC 31, *Automatic Identification and Data Capture Techniques*
- Chair, ISO TC 122/WG 12 – *Supply chain applications of logistics technology*
- Chair, ASC MH 10 and U.S. TAG to ISO TC 122 (Packaging and Distribution of goods)
- TC 122 Liaison Officer to SC 31, TC 104, TC 204, TC 145, ETSI ERM, ETSI M2M, OGC, 3GPP, IETF, and XMPP
- TC 122 & JTC 1/SC 31 Liaison Officer to the International Telecommunications Union (ITU-R & ITU-T)
- Chair, JTC 1/SC 31/WG 6 - *Mobile Item Identification and Management* (Convergence of Mobile Telephony, Mobile Computing, Sensors, and AIDC)
- Chairman & Project Editor, ANS MH10.8.2 (Data Identifiers & Application Identifiers)
- Four time chair, U.S. TAG to ISO/IEC JTC 1/SC 31/WG 4 (RFID)
- JTC 1/SC 31 Liaison Officer to TC 104, TC 122, ISO TC 204, TC 247, JTC 1/SC 6, JTC 1/WG 7, and ETSI
- Joint Automotive Industry Forum (JAMA/JAPIA/AIAG/ODETTE) – Returnable Transport Items & Item Level
- AIAG Bar Code, Applications, 2D, Tire, Returnables, & RFID Committees
- Founder, RFID Experts Group (REG)
- Member, EPCglobal HAG (UHFGen2), FMCG BAG, HLS BAG, SAG, TLS, TDS, AIWG, SBAC, HAT
- ISO TC 104 & 122 (Freight Containers / Packaging) Liaison Officer to JTC 1/SC 31
- Past Chair, ISO TC 122/104 Joint Working Group – Supply chain applications of RFID
- Organizer of the movement of IEEE 1451 (Sensors) and 802.15.4 (WPAN) to JTC 1/SC 31
- Original Project Editor, NATO STANAG 2233 (RFID for NATO Asset Tracking)
- Vocabulary Rapporteur to ISO/IEC JTC 1/SC 31, ISO/IEC 19762 - *Harmonized vocabulary*
- CompTIA RFID Subject Matter Expert and RFID Certified Professional (CRCP) - RFID+
- Recipient of the 2004 Richard Dilling Award
- Author, *Reading Between The Lines — An Introduction to Bar Code Technology*
- President & CEO. Q.E.D. Systems, the leading AIDC consulting company for the past 30 years
Why Standards?

• Fosters global recognition
• Provides global interoperability
• Provides sustained development and retention of investment
• Cost savings by optimizing operations
• Improve customer satisfaction
• Provides access to new markets
• Increases productivity and competitive advantage
• Reduces negative impacts on the environment
Types of Standards

- **Technology**
  - Symbology, RFID, I.C. Card, Sensor, GPS, WAN, 3G/4G

- **Data Content**
  - Semantics (DIs or AIs), Syntax, Unique Item Identification, Unique Device Identification

- **Conformance**
  - Print Quality, Test Specifications, Conformance, Resolution

- **Network**
  - Object-to-object communications, Sensor Networks

- **Application Standards**
  - Freight container, Returnable Transport Item, Shipping Label, Product Package, Product Mark/Tag, eSeal, Access to web services
International Standards Activities
There will be a short quiz at the end

International
- International Organization for Standardization (ISO)
  - TC 122 Packaging
    - WG 3 - Terminology
    - WG 12 - LogTech
    - WG 13 - LoIMTr
    - WG 14 - SPS
  - TC 104 Freight Containers
  - TC 8 Ships & Marine Tech
- ISO/IEC Joint Technical Committee 1 (JTC 1)
  - SWG/IoT
    - Automatic Data Capture
      - WG 1 - Symbology
      - WG 2 - Data Content
    - WG 4 - RFID
    - WG 5 - RFID
    - WG 6 - MIMI
    - WG 7 - Security
- International Electrotechnical Commission (IEC)
  - SC 31 Automatic Data Capture
  - ITU-T (fka CCITT) Telecommunications Standardization
  - ITU-R (fka CCIR & IFBR) Radio-frequency Issues
  - ITU-D (fka BDT) Telecommunications Development

Regional
- Comité Européen Normalisation (CEN)
  - ODETTET
  - ECMA
  - CENELEC
- Comité Européen Postal & Télégraph (CEPT)
  - BTSI

National
- Standards Assoc of China (SAC)
- British Standards Institution (BSI)
- KATS
- ANSI
- Deutsches Institut fur Normung (DIN)
- JISC

Industry
- DoD
- ATA
- ATIS
- AIA
- HIBCC
- AIAG
- GS 1
- IEEE
- INSITS
- T6 B10
- VDA
- EPCglobal
INTERNATIONAL ACTIVITY THAT AFFECTS YOU

ISO
- TC 122: Packaging
- TC 104: Freight Containers
- TC 8: Ships
- TC 204: ITS
- TC 247: Anti-Counterfeiting

JTC 1
- SC 31: AIDC
- SC 17: ICC
- SC 6: Network
- SC 27: Security
- WG 7: WGSN
- SWG IoT

IEC
- TC 3: Info Doc
- JTC 1: JT 1
- TC 106: Human EMC Exp
- CISPR Radio EMI

ITU
- ITU-R
  - WP 1A
  - WP 1B
  - WP 5B
- ITU-T
  - JCA-IoT
  - SG 16: e-Everything
  - SG 17: Security

IMO
- WCO
- UN/ECE
- IATA
- IETF
ISO TC 122
Packaging & Distribution of Goods
## TC 122 – Work Items managed by TC 122

<table>
<thead>
<tr>
<th>Work Item</th>
<th>Title</th>
<th>Stage</th>
<th>Ballot Period</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cancel date: 2013-06-15</td>
<td></td>
</tr>
<tr>
<td>3394</td>
<td>Packaging -- Complete, filled transport packages and unit loads -- Dimensions of rigid rectangular packages, 3rd Edition</td>
<td>2nd Ed IS</td>
<td>Approved 2012-10-05</td>
<td>1st Edition Published 1975</td>
</tr>
<tr>
<td>3676</td>
<td>Packaging -- Complete, filled transport packages and unit loads -- Unit load dimensions, 2nd Edition</td>
<td>2nd Ed IS</td>
<td>Approved 2012-10-05</td>
<td>1st Edition Published 1983</td>
</tr>
<tr>
<td>17350</td>
<td>Direct Marking on Plastic Returnable Transport Items (RTIs)</td>
<td>TR</td>
<td>Approved 2012-10-23</td>
<td>Graphics provided in ISO format Awaiting publication</td>
</tr>
<tr>
<td>17351</td>
<td>Packaging -- Braille on packaging for medicinal product</td>
<td>IS</td>
<td>Approved 2013-01-09</td>
<td></td>
</tr>
<tr>
<td>17370</td>
<td>Application Guideline on Data Carriers for Supply Chain Management</td>
<td>TR</td>
<td>Approved 2012-10-23</td>
<td>Graphics provided in ISO format Awaiting publication</td>
</tr>
</tbody>
</table>
## TC 122 – Work Items managed by TC 122

<table>
<thead>
<tr>
<th>Work Item</th>
<th>Title</th>
<th>Stage</th>
<th>Ballot Period</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>17451-1</td>
<td>Packaging -- Numeric Codification of Contents for Electronic Inventories and Manifests of Household Goods and Personal Effects Shipments -- Part 1: Messaging and coding of inventory numbers, locations and exceptions</td>
<td>NP/DI S</td>
<td>Cancel date: 2013-06-24</td>
<td>Sponsored by the International Association of Movers. Published ANSI standard. Recommended to TC 122 by ANSI.</td>
</tr>
<tr>
<td>18616-1</td>
<td>Returnable transport system -- Reusable, rigid plastics distribution boxes -- Part 1: General purpose application</td>
<td>NWIP</td>
<td>NP approved - 2013-01-28</td>
<td></td>
</tr>
<tr>
<td>18616-2</td>
<td>Returnable transport system -- Reusable, rigid plastics distribution boxes -- Part 2: General specifications for testing</td>
<td>NWIP</td>
<td>NP approved - 2013-01-28</td>
<td></td>
</tr>
</tbody>
</table>
# TC 122/WG 12 Work Items

<table>
<thead>
<tr>
<th>Work Item</th>
<th>Title</th>
<th>Stage</th>
<th>Stage Date / Ballot Period</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15394</td>
<td>Packaging -- Bar code and two-dimensional symbols for shipping, transport and receiving labels</td>
<td>2nd Ed IS</td>
<td>Published 2009-04-13</td>
<td>Formerly work of TC 122/WG 4 Next scheduled review: 2014-04-15</td>
</tr>
<tr>
<td>22742</td>
<td>Packaging — Linear bar code and two-dimensional symbols for product packaging</td>
<td>2nd Ed IS</td>
<td>Published 2010-12-15</td>
<td>Formerly work of TC 122/WG 7 Next scheduled review: 2015-12-15</td>
</tr>
<tr>
<td>28219</td>
<td>Packaging — Labelling and direct product marking with linear bar code and two-dimensional symbols</td>
<td>IS</td>
<td>Published 2009-01-15</td>
<td>Formerly work of TC 122/WG 7 Next scheduled review: 2014-01-15</td>
</tr>
<tr>
<td>17363</td>
<td>Supply chain applications of RFID – Freight containers</td>
<td>2nd Ed IS</td>
<td>Published 2012-12-07</td>
<td>Formerly work of TC 122/WG 10</td>
</tr>
<tr>
<td>17364</td>
<td>Supply chain applications of RFID – Returnable transport items (RTIs)</td>
<td>2nd Ed IS</td>
<td>Published 2012-12-07</td>
<td>Formerly work of TC 122/WG 10</td>
</tr>
<tr>
<td>17365</td>
<td>Supply chain applications of RFID – Transport units</td>
<td>2nd Ed IS</td>
<td>Published 2012-12-07</td>
<td>Formerly work of TC 122/WG 10</td>
</tr>
<tr>
<td>17366</td>
<td>Supply chain applications of RFID – Product packaging</td>
<td>2nd Ed IS</td>
<td>Published 2012-12-07</td>
<td>Formerly work of TC 122/WG 10</td>
</tr>
<tr>
<td>17367</td>
<td>Supply chain applications of RFID – Product tagging</td>
<td>2nd Ed IS</td>
<td>Published 2012-12-07</td>
<td>Formerly work of TC 122/WG 10</td>
</tr>
</tbody>
</table>
Supply chain layers with returnable packaging
Optically Readable Media (ORM)

- **Level 5**: Movement Vehicle Level
  - Movement vehicle
- **Level 4**: Freight Container Level
  - ISO 6346 (OCR)
  - (Freight containers)
- **Level 3**: RTI Level
  - ISO 15394
  - GS1 Gen Spec (GRAI)
  - (Tertiary packaging)
- **Level 2**: Transport Unit Level
  - ISO 15394
  - GS1 Gen Spec (SSCC)
  - (Tertiary packaging)
- **Level 1**: Product Package Level
  - ISO 22742
  - GS1 Gen Spec (GTIN)
  - (Secondary packaging)
- **Level 0**: Item Level
  - ISO 28219
  - GS1 Gen Spec (GTIN)
  - (Primary packaging)

Components, Parts, Materials, Subassemblies, etc.
Supply chain layers with returnable packaging
Radio-frequency Identification (RFID)

Layer 5
Movement Vehicle Level
Defined by Transport Mode
(Movement vehicle)

Layer 4
Freight Container Level
ISO 17363
433 MHz or 2.45 GHz
(880-15-4 or 18000-7 TPA)
(Freight containers)

Layer 3
RTI Level
ISO 17364
(Various 18000 with TPA)
(Tertiary packaging)

Layer 2
Transport Unit Level
ISO 17365
(Various 18000 with TPA)
(Tertiary packaging)

Layer 1
Product Package Level
ISO 17366
(860-960 MHz with TPA)
(Secondary packaging)

Layer 0
Item Level
ISO 17367
(860-960 MHz with TPA)
(Primary packaging)

Components, Parts, Materials, Subassemblies, etc.
1736x Revisions Address

• Inclusion of returnable packaging items within the standards

• Clarification of sensor interface at all levels supporting the SC 31 standards of
  – ISO/IEC/IEEE 21450
  – ISO/IEC/IEEE 21451-1
  – ISO/IEC/IEEE 21451-4
  – ISO/IEC/IEEE 21451-7

• Inclusion of a wireless sensor interface built on ISO/IEC/IEEE 8802-15-4 with communications to access point and infrastructure

• Sensor interface for sensor subject to the interfaces described in 2145x and 8802-15-4

• Six-bit encoding of 15434 data
## Six-bit ASCII (ISO 1736x & 29162)

<table>
<thead>
<tr>
<th></th>
<th>100000</th>
<th>0</th>
<th>110000</th>
<th>@</th>
<th>000000</th>
<th>P</th>
<th>010000</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;EOT&gt;</td>
<td>100001</td>
<td>1</td>
<td>110001</td>
<td>A</td>
<td>000001</td>
<td>Q</td>
<td>010001</td>
</tr>
<tr>
<td>&lt;Reserved&gt;</td>
<td>100010</td>
<td>2</td>
<td>110010</td>
<td>B</td>
<td>000010</td>
<td>R</td>
<td>010010</td>
</tr>
<tr>
<td>&lt;FS&gt;</td>
<td>100011</td>
<td>3</td>
<td>110011</td>
<td>C</td>
<td>000111</td>
<td>S</td>
<td>010111</td>
</tr>
<tr>
<td>&lt;US&gt;</td>
<td>100100</td>
<td>4</td>
<td>110100</td>
<td>D</td>
<td>001000</td>
<td>T</td>
<td>011000</td>
</tr>
<tr>
<td>&lt;Reserved&gt;</td>
<td>100101</td>
<td>5</td>
<td>110101</td>
<td>E</td>
<td>001010</td>
<td>U</td>
<td>011010</td>
</tr>
<tr>
<td>&lt;Reserved&gt;</td>
<td>100110</td>
<td>6</td>
<td>110110</td>
<td>F</td>
<td>001100</td>
<td>V</td>
<td>011100</td>
</tr>
<tr>
<td>&lt;Reserved&gt;</td>
<td>100111</td>
<td>7</td>
<td>110111</td>
<td>G</td>
<td>001111</td>
<td>W</td>
<td>011111</td>
</tr>
<tr>
<td>(</td>
<td>101000</td>
<td>8</td>
<td>111000</td>
<td>H</td>
<td>001000</td>
<td>X</td>
<td>011000</td>
</tr>
<tr>
<td>)</td>
<td>101001</td>
<td>9</td>
<td>111001</td>
<td>I</td>
<td>001001</td>
<td>Y</td>
<td>011001</td>
</tr>
<tr>
<td>*</td>
<td>101010</td>
<td>;</td>
<td>111010</td>
<td>J</td>
<td>001010</td>
<td>Z</td>
<td>011010</td>
</tr>
<tr>
<td>+</td>
<td>101011</td>
<td>;</td>
<td>111011</td>
<td>K</td>
<td>001111</td>
<td>[</td>
<td>011111</td>
</tr>
<tr>
<td>,</td>
<td>101100</td>
<td>&lt;</td>
<td>111100</td>
<td>L</td>
<td>001100</td>
<td>\</td>
<td>011100</td>
</tr>
<tr>
<td>-</td>
<td>101101</td>
<td>=</td>
<td>111101</td>
<td>M</td>
<td>001101</td>
<td>]</td>
<td>011101</td>
</tr>
<tr>
<td>.</td>
<td>101110</td>
<td>&gt;</td>
<td>111110</td>
<td>N</td>
<td>001110</td>
<td>&lt;GS&gt;</td>
<td>011110</td>
</tr>
<tr>
<td>/</td>
<td>101111</td>
<td>?</td>
<td>111111</td>
<td>O</td>
<td>001111</td>
<td>&lt;RS&gt;</td>
<td>011111</td>
</tr>
</tbody>
</table>

Values 100001 through 100111 and 011110 through 011111 reserved:
- <EOT> (100001)
- <FS> (100011)
- <US> (100100)
- <GS> (011110)
- <RS> (011111)
## TC 122/WG 12 Work Items (continued)

<table>
<thead>
<tr>
<th>Work Item</th>
<th>Title</th>
<th>Stage</th>
<th>Stage Date / Ballot Period</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>18574</td>
<td>Internet of Things (IoT) in the supply chain -- Containerized cargo</td>
<td>NWIP</td>
<td>NWIP Approved 2013-01-10</td>
<td></td>
</tr>
<tr>
<td>18575</td>
<td>Internet of Things (IoT) in the supply chain -- Products &amp; product packages</td>
<td>NWIP</td>
<td>NWIP Approved 2013-01-10</td>
<td></td>
</tr>
<tr>
<td>18576</td>
<td>Internet of Things (IoT) in the supply chain -- Returnable transport items (RTIs)</td>
<td>NWIP</td>
<td>NWIP Approved 2013-01-10</td>
<td></td>
</tr>
<tr>
<td>18577</td>
<td>Internet of Things (IoT) in the supply chain -- Transport units</td>
<td>NWIP</td>
<td>NWIP Approved 2013-01-10</td>
<td></td>
</tr>
</tbody>
</table>
# Proposed Schedule for 1857x

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Stage | Working Draft (WD) | Committee Draft (CD) | DIS | Comment Resolution | FDIS |

- **NP Approved**
  - 2013-01-12

- **WD >> CD**
  - <2014-01-12

- **CD Approved**
  - <2015-01-12
  - DIS Approved
  - <2015-07-12

- **FDIS Approved**
  - <2017-01-12
1857x Defines the IoT/SC

- **communication options for various settings**
  - Wireless Body Area Networks (WBAN),
  - Wireless Personal Area Networks (WPAN),
  - RFID Networks, including NFC,
  - Local Area Networks (LAN), and
  - Wireless Wide Area Networks (WWAN)
  - 3G, 4G, LTE, SATCOM

- **methods to secure localization and tracking**
  - GPS,
  - GPRS,
  - RTLS,
  - resolution, and
  - inertial navigation

- **appropriate devices for the standard**
  - linear bar codes,
  - 2D symbols,
  - RFID,
  - sensors/motes/actuators, and
  - smart phones
1857x Defines the IoT/SC

• methods of unique identification
  – byte-oriented,
  – bit-oriented, and
  – IPv6

• means to store and process the data
  – terminal applications,
  – resident device storage,
  – database storage, and
  – cloud storage

• security necessary to protect the data for
  – authenticity,
  – validity, and
  – privacy perspectives
What is the Internet of Things?
What is the Internet of Things?
What is the Internet of Things?
Ontology of Identity

- Person
- Object
- Location
  - Anything physical
  - Network element
  - Software or Content
  - Real person
  - Legal person

- Entity
  - Representation of Identity
  - Consideration of State Characteristic

- Primary Natural Feature Identifier
  - Derivation of electronic ‘Digital Signature’
  - When derived: Reference
  - When asserted: Authentication
  - Link to associated data and application information

- Secondary Data Carrier Identifier
  - Self Assigned
  - Assigned or registered
  - Registered
  - Captured
  - Authenticators or credentials
    - Self-issued
    - Authority-issued
    - Certificate or token
    - Numeric, Alphanumeric, or digital strings

- Associated ID Factors
  - Influenced or attended by
  - Environment
  - Application
  - Associated Attributes based on State Characteristic
QR Code & IoT – How it works
QR Code & IoT – How it works

URL for MSDS encoded in QR Code

Image Scanning Smartphone

Telecom Provider

MSDS Database / Cloud
QR Code and Novel Experiences
etPallet Electronics

- GPS
  Location Services
- Cellular
  Messaging/Location
- WPAN
  Messaging
- WiFi
  Messaging
- RFID
  18000-63/EPC
- Sensors
  2145x

User memory

Inductive Charging
Lithium Iride
etPallet Electronics

- GPS
  - Location Services
- Cellular
  - Messaging/Location
- WPAN
  - Messaging
- WiFi
  - Messaging
- RFID
  - 18000-63/EPC
- Sensors
  - 2145x

- Inductive Charging
- Lithium Imide

- User memory

Diagram details:
- Control
- Control
- Control
- Control
- 802.15.4
- SPI
- SPI
- SPI
- SPI
- SPI
- SPI
- SPI
- Internal RAM
- 128 kB
- Internal Flash
- 1024 kB
- >> user code
- System Power
- Battery Charger
- Fuel Gauge
- Kinetics
- K60 or K70
- Q.E.D. Proposal
- 1.0
- RB 22SEP11

Additional components:
- 2G / 3G / 4G / SATCOM
- e.g. Synapse SM700
- e.g. Qualcomm Adixen AR4100
- ISO/IEC 18000-63
- SPI UART
- I2C
- Analog voltages
- NVM (SPI)
- Serial EEPROM
- MRAM
- 16-bit ADC
- 4x differential
- 24x single-ended
- 12C Ø
- SDA
- SCL
- User memory
- Control
- IRQ
- TxD
- RxD
- USBOTG
- USBDP
- USBDN
- SPI Ø
- with 2 CS
- SPI Ø
- with 4 CS
- UART Ø
- UART 1
- UART 2
- SPI 1
- 12C
TC 122’s understanding and use of JTC 1/SC 31/WG 6 standards

By: Craig K. Harmon,
TC 122/WG 12 Convenor
SC 31/WG 6 Scope

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.

– Convenor: Craig K. Harmon, United States
– Secretary: Se Won Oh, Korea
SC 31/WG 6 Projects

- **ISO/IEC 29143**, Information technology — Automatic identification and data capture techniques — Air interface specification for Mobile RFID interrogator
- **ISO/IEC 29172**, Information technology — Automatic identification and data capture techniques — Reference architecture for Mobile AIDC services
- **ISO/IEC 29173**, Information technology — Automatic identification and data capture techniques — Mobile RFID interrogator device protocol
- **ISO/IEC 29174**, Information technology — Automatic identification and data capture techniques — UII scheme and encoding format for Mobile AIDC services
- **ISO/IEC 29175**, Information technology — Automatic identification and data capture techniques — Application data structure and encoding format for Mobile AIDC services
SC 31/WG 6 Projects

- **ISO/IEC 29176**, *Information technology — Mobile item identification and management — Consumer privacy-protection protocol for Mobile RFID services*

- **ISO/IEC 29177**, *Information technology — Mobile item identification and management — Object Directory Service for Mobile AIDC services*

- **ISO/IEC 29178**, *Information technology — Mobile item identification and management — Service broker for Mobile AIDC services*

- **ISO/IEC 29179**, *Information technology — Mobile item identification and management — Mobile AIDC application programming interface*

- **ISO/IEC 16480**, *Information technology — Automatic identification and data capture techniques — Reading and display of ORM by mobile devices*
<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Date</th>
<th>Next</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO/IEC/IEEE 21450</td>
<td>Information technology — Smart Transducer Interface for Sensors and Actuators — Common Functions, Communication Protocols, and Transducer Electronic Data Sheet (TEDS) Formats</td>
<td>IS Published 2010-05-20</td>
<td>No action required before revision</td>
</tr>
<tr>
<td>ISO/IEC/IEEE 21451-1</td>
<td>Information technology — Smart Transducer Interface for Sensors and Actuators — Network Capable Application Processor (NCAP) Information Model</td>
<td>IS Published 2010-05-20</td>
<td>No action required before revision</td>
</tr>
<tr>
<td>ISO/IEC/IEEE 21451-2</td>
<td>Information technology — Smart Transducer Interface for Sensors and Actuators — Transducer to Microprocessor Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats</td>
<td>IS Published 2010-05-20</td>
<td>No action required before revision</td>
</tr>
<tr>
<td>ISO/IEC/IEEE 21451-5</td>
<td>Information technology — Smart Transducer Interface for Sensors and Actuators — Wireless Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats</td>
<td>Pre-NP Awaiting Corrigendum from IEEE Email to IEEE 2011-08-01</td>
<td></td>
</tr>
<tr>
<td>ISO/IEC/IEEE 21451-7</td>
<td>Information technology — Standard for a Smart Transducer Interface for Sensors and Actuators - Transducers to Radio Frequency Identification (RFID) Systems Communication Protocols and Transducer Electronic Data Sheet Formats</td>
<td>IS Published 2011-12-15</td>
<td>No action required before revision</td>
</tr>
</tbody>
</table>
ISO/IEC/IEEE 2145x Maintenance Group (MG) Members from JTC 1/SC 31

- Craig K. Harmon (Q.E.D. Systems), JTC 1/SC 31/WG 6 – Co-chair
- Kang Lee (NIST), IEEE TC-9 – Co-chair
- William Miller (MaCT USA), IEEE MG Member
- Dan Kimball (SRA), JTC 1/SC 31 MG Member
- Josef Schuermann (JSC), JTC 1/SC 31 MG Member
- Claude Tételin (CNR RFID), JTC 1/SC 31 MG Member
- Don Ferguson (Lyngsoe), JTC 1/SC 31 MG Member
- Tony Capel (Comgate), JTC 1/SC 31 MG Member
- Dalibor Pokrajac, JTC 1/SC 31 MG Member
# ISO/IEC/IEEE 2145x MG Project Status

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>21450 (1451.0)</td>
<td>Common Network Services</td>
<td>Published</td>
</tr>
<tr>
<td>21451-0-1 (1451.001)</td>
<td>Signal treatment for smart sensors and actuators</td>
<td>PA 2012-02-06</td>
</tr>
<tr>
<td>21451-1 (1451.1)</td>
<td>Common Network Services</td>
<td>PA 2012-02-06</td>
</tr>
<tr>
<td>21451-1-1 (1451.1.1)</td>
<td>Network Interface – TCP/UDP services</td>
<td>Future work</td>
</tr>
<tr>
<td>21451-1-2 (1451.1.2)</td>
<td>Network Interface – HTTP services</td>
<td>Future work</td>
</tr>
<tr>
<td>21451-1-3 (1451.1.3)</td>
<td>Network Interface – SOAP services</td>
<td>Future work</td>
</tr>
<tr>
<td>21451-1-4 (1451.1.4)</td>
<td>Network Interface – XMPP services</td>
<td>PA 2012-02-06</td>
</tr>
</tbody>
</table>

PA = PAR (Project Authorization Request) Approved
## ISO/IEC/IEEE 2145x MG Project Status

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>21451-2 (1451.2)</td>
<td>Serial Point-to-Point Interface</td>
<td>PA 2011-12-07</td>
</tr>
<tr>
<td>21451-4 (1451.4)</td>
<td>Mixed-Mode Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats</td>
<td>PA 2011-12-07</td>
</tr>
<tr>
<td>21451-5 (1451.5)</td>
<td>Wireless sensor interface</td>
<td>Move to SC 31</td>
</tr>
<tr>
<td>21451-7 (1451.7)</td>
<td>Transducers to Radio Frequency Identification (RFID) Systems Communication Protocols and Transducer Electronic Data Sheet Formats</td>
<td>Published</td>
</tr>
</tbody>
</table>

PA = PAR (Project Authorization Request) Approved
ISO TC 204
Intelligent Transport Systems
Work Items for ISO TC 204

TC 204 – 343 Projects / JTC 1/SC 31 – 203 Projects

✗ ISO/NP 26683, Freight conveyance content identification and communication architecture -- Application profile

• ISO/DTS 26683-1, Intelligent Transport Systems -- Freight land conveyance content identification and communication -- Part 1: Context, architecture and referenced standards

• ISO/CD 26683-2, Intelligent transport systems -- Freight and conveyance content identification and communication -- Part 2: Application interface profiles

• ISO/NP TS 26683-3, Intelligent transport systems -- Freight and conveyance content identification and communication architecture -- Part 3: Handling of cargo stress information during road transport

• ISO/NP 26683-4, Intelligent transport systems -- Freight and conveyance content identification and communication architecture -- Part 4: Security profile
Border Crossing

**Today**
- Customs
- Fingerprint Reader
- Transportation Worker ID Card (TWIC) with Fingerprint Biometric ISO/IEC 14443
- Tractor Tag TC 204 Standard

**Proposed**
- Container Reader/Communicator
- On Board Unit (OBU)
- Chassis Tag TC 204 Standard
- Sensors
- 17364 Tags
- 17365 Tags

**Tomorrow**
- Customs
- Road Side Unit (RSU)
- Part of CALM Network
- 10891 Tag
- 17363 Intrusion Sensor
- 17363 Tag

*Customs*
Supply Chain Monitoring

- Transportation Worker ID Card (TWIC) with Fingerprint Biometric
- ISO/IEC 14443 Fingerprint Reader
- Tractor Tag TC 204 Standard
- Container Reader/Communicator
- On Board Unit (OBU)
- Satellite
- Cellular
- Sensors
- 10891 Tag
- 17363 Intrusion Sensor
- 17363 Tag
- 17364 Tags
- 17365 Tags

Cellular

Chassis Tag TC 204 Standard

Copyright © 2013 - Q.E.D. Systems
Thank you!!!