Contactless Card Capabilities

The New Horizon
• ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused on microprocessor (µP) based cards, not Memory/Logic cards.
• µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.
• Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.
• The ability to locally encode and distribute cards is necessary.
• Whatever smart card is issued, it must be durable, reliable and secure.
• Magnetic, Memory/Logic and µP cards will co-exist for years to come.
• ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

• µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

• Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

• The ability to locally encode and distribute cards is necessary.

• Whatever smart card is issued, it must be durable, reliable and secure.

• Magnetic, Memory/Logic and µP cards will co-exist for years to come.

Looking Forward

• Regional Transit

• Financial

• US-wide Security

• World-wide Security (Borders and Ports)

• Interoperability Issues
•ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

•µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

•Readers need to read/write and comply to levels of supported Smart Card technology.

•The ability to locally encode and distribute cards is necessary.

•Whatever smart card is issued, it must be durable, reliable and secure.

•Magnetic, Memory/Logic and µP cards will co-exist for years to come.
**Contactless Smart Card Standard**

**ISO 14443**

<table>
<thead>
<tr>
<th>Part 1 - Physical Card Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 2 - RF Power &amp; Signal Char’s</td>
</tr>
<tr>
<td>(Type A and Type B)</td>
</tr>
<tr>
<td>Part 3 - Initialization &amp; Anti-collision</td>
</tr>
<tr>
<td>(Type A and Type B)</td>
</tr>
<tr>
<td>Part 4 - Protocol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application (i.e., fare collection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Card OS (Not Included in Standard)</td>
</tr>
<tr>
<td>Security (Not Included in Standard)</td>
</tr>
</tbody>
</table>

*Draft Submitted. Debates ongoing.*

*ISO Committee debating this.*

*ISO Committee vote complete.*

*ISO Committee vote complete.*
## Memory / Logic Cards

### State Machine Processor
- Card Authentication (Keys)
- Communications

### ROM
- 2kB
- (1kB)

### FRAM™ (EE Memory)
- Total 2kB

### Each Application Memory Usage
- 7 User Pages (16 bytes)
- 1 Key and Page Application Type

### RF
- ~ 0 - 6.5cm
  (Standard Antenna)

### Communication Details
- 13.56 MHz
- 10% AM (100% AM)
- 115 k Baud (106 k Baud)
- Single Carrier (Subcarrier)
- FCC Article 15
- Certified - GO CARD®

### Technology & Product Suite
- Back to technology & product suite
- click on Tri-Reader
Contactless Smart Cards

- Provides expanded flexibility over magnetic
- More memory and Higher Security
- Faster Transactions and Lower Maintenance
- Published Standards...Multiple Suppliers
- Better, Cheaper & Faster
The Production Process

- ASIC/Microprocessor Design
- Semi-Conductor Fabrication
- Wafer Processing
- Module Assembly
- Card Production
• ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

• µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

• Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

• The ability to locally encode and distribute cards is necessary.

• Whatever smart card is issued, it must be durable, reliable and secure.

• Magnetic, Memory/Logic and µP cards will co-exist for years to come.

The Players

• Production Process typically managed by 2 to 3 primary participants:
  • Semiconductor House (with or without ASIC designer)
  • Card Manufacturer
  • Operating Systems Developer
ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

The ability to locally encode and distribute cards is necessary.

Whatever smart card is issued, it must be durable, reliable and secure.

Magnetic, Memory/Logic and µP cards will coexist for years to come.

Leading Semiconductor Houses

- Philips
- ST Microelectronics
- Infineon
- Atmel
- Fujitsu
- Samsung
- Toshiba
ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

The ability to locally encode and distribute cards is necessary.

Whatever smart card is issued, it must be durable, reliable and secure.

Magnetic, Memory/Logic and µP cards will co-exist for years to come.

Leading Card Manufacturers

- Schlumberger
- Gieseke & Devrient
- GemPlus
- Orga
- Oberthur
- ASK
- Toppan
Leading Operating System Developers

- IBM
- Keycorp
- Schlumberger
- Gieseke & Devrient
- GemPlus
- Mobile Mind
Out-of-system sales

NBMS

3rd Party Kiosk
Internet User
Customer Service Operations
Consumer
Transit Kiosk (MRM)
Web Server
WAP Phone ("coming soon")
Transit Store
Retail POS
ATM
financial services

- Cash Collection & Reconciliation
- General Accounting
- Funds Pool Management
- EFTPOS Acquiring
- Settlement & Reconciliation
- Electronic Funds Transfer

CUBIC
The “contactless” Smart Card eliminates the need for correct change and significantly reduces boarding time.
Why Regional Transit?

Experience permits us to meet transport-security needs with a turn-key solution at a regional level

- Smart card technologies at all transit ports
- High-volume access control systems and biometrics at transit buildings
- Central systems updated to support regional access
ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

The ability to locally encode and distribute cards is necessary.

Whatever smart card is issued, it must be durable, reliable and secure.

Magnetic, Memory/Logic and µP cards will co-exist for years to come.

Regional Integration Process…

- The “End Game” of Fare Policy Evolution.
- A Common Fare media and Fare Product set across Multiple Operators.
- Allows for Seamless Travel and Regional Transportation Planning.
- Provides Consolidated Regional Ridership and Revenue Reporting.
- Allows Linked service Promotional Strategies across Operators.
US Security Market Exploding...

- Federal Buildings
- US Visit / Borders
- Seaports and Airports
ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

The ability to locally encode and distribute cards is necessary.

Whatever smart card is issued, it must be durable, reliable and secure.

Magnetic, Memory/Logic and µP cards will co-exist for years to come.

Security Applications

• Transit
• Borders
• Ports
• Hotels
• Office Buildings
• ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.
• µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.
• Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.
• The ability to locally encode and distribute cards is necessary.
• Whatever smart card is issued, it must be durable, reliable and secure.
• Magnetic, Memory/Logic and µP cards will co-exist for years to come.

U.S. Entry Exit “Enhanced” Credentials
For Pedestrians and Vehicles
Faster Security Checks

Smart Card enabled biometrics provide multiple “layers of personal identification” for the trusted passenger reducing the need for more time-consuming inspections.
Access Security

Hotel reservations, payment, and office access are all facilitated by fast, secure, reliable contactless cards.
Intermodal Port of the Future

Briefing to the
Ship Operations Cooperative Program

Presented by the
Puerto Rico Ports Authority
ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

The ability to locally encode and distribute cards is necessary.

Whatever smart card is issued, it must be durable, reliable and secure.

Magnetic, Memory/Logic and µP cards will co-exist for years to come.

Passport Concept

Embedded Contact-less Technology

- Millions in production for transit
- Fast (70 ms)
Next Twelve Months…

- TWIC specifying Port standards for compliance…add contact less to demos
- Border programs consideration of contact less for fast, secure access
- Gov’t RFP’s exist for contact less “Hybrid” cards
- Both finger and face biometrics verified with contact less memory cards
- Transit / USDOT paved the way…continuing with transit extensions for financial and security