Real Time Monitoring and Control for the Cold Chain Market

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Agenda

• Motorola Solutions for the M2M market
  – M2M Overview
  – Real Time Traffic Monitoring Systems

• Motorola Real Time Cold Chain Solutions
  – Application Needs
  – Chill-On Communication Concept
What is M2M?

“...there are 6 billion people in the world and more than 50 billion machines. Many of these machines perform critical functions that businesses rely on as part of their operations". (Opto 22)

"Wireless M2M is about managing things we would never have thought to manage, in ways we would have never previously thought practical" (Datacomm)
Why M2M Matter

**PCs.** Hundreds of millions **in use.** 50% Connected

**Cellphones.** Billions in use. 100% Connected

**Machines.** Tens of Billions in use. <1% Connected

Controlling machines will help control our environment.
The M2M market is expected to reach close to 30 billion dollars by the end of the decade. 50% of the revenues will be from service providers, and the rest will divided among modules and other equipment.
The M2M Vertical Market:

1. Utilities (AMR/AMI)
2. Transportation/Logistics (Fleet/Asset tracking)
3. Retail (Vending machines)
4. Property Management (Office Equipment)
5. Healthcare (Patient monitoring)
M2M revenue breakdown for mobile operators in Europe, in 2004, by application

- Vending machines
- Security
- Monitoring (industry, meters, ...)
- Transportation (professional)
- POS (Point of Sale)
- Transport (consumer)

Source: DATE
M2M end to end complexity
M2M World-Wide Network

- One system to support the safe, efficient, secure and environmental friendly mobility
Seamless Mobility
M2M Wireless Modules - Vision

To Seamlessly Connect all technologies

- ZIGBEE
- MESH
- CDMA
- WCDMA
- GPRS/GSM
- Bluetooth
- UWB
- LTE
- HSxPA
- 802.11
- RFID
- WiMAX
Use Case:
C2R Transportation End-To-End Solution
Traffic Mobile Sensor

Mobile Probe/Sensors:
- Visibility sensors
- Traffic sensors
- Road friction sensors

GPRS NETWORKS
C2R Project: use V2C & V2V to:
Enhance traffic safety and efficiency
Cold Chain is

A temperature-controlled supply chain.

An integrated system of partners and activities involved in processing, transporting and storing temperature sensitive products from the supplier to the consumer.

Your home refrigerator is part of the cold chain!
What products flow through the Cold Chain?

- Produce (fruit and vegetables)
- Meat
- Seafood
- Dairy
- Baked Goods
- Floral
- Cosmetics
- Pharmaceuticals/Biologics
Challenges of Managing Perishables in the Grocery/Supermarket Industry

$35 billion in annual global waste from perishable goods¹

56% of all shrink in the US comes from the perishables department²

Total value of temperature related perishable shrink per supermarket is $79,808

Across a 500 store chain... $40 million

¹Forbes Magazine, April 24, 2006
²2003/2004 Supermarket Shrink Survey
### Improved Cold Chain Reduce Losses

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Time in Transit from Supplier to DC</th>
<th>Remaining Shelf Life if Transit Temperature Is Held at 34°F</th>
<th>Remaining Shelf Life if Transit Temperature Is Held at 38°F</th>
<th>Remaining Shelf Life if Transit Temperature Is Held at 42°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bagged Salads</td>
<td>2.5 days</td>
<td>12.5 days</td>
<td>10.5 days</td>
<td>7.5 days</td>
</tr>
</tbody>
</table>

Over **32% of shoppers** cite **Dissatisfaction with the shelf life** or freshness of produce as the **Primary reason they avoid shopping** at a particular supermarket \(^1\)

- Similar Results for other Vegetables, Meats & Seafood
- \(^1\) Fresh Trends
Types of Temperature Sensors & Data Loggers
Adding Real Time Temp. Monitoring …

Early Temperature Change Alert Determines Future Shelf Life!
Cold Chain Real Time Visibility …

… means having the **right product** in the **right place**, at the **right time**, in the **right condition** — the integration of monitoring and tracking with an emphasis on driving measurable process improvement.
Real Time End to End Solution ...
Multiple Communication Channels
MMU Functionality

Data Capturing

Local Data Processing

Analysis

Alarming

Status Reporting

Data Transferring

Remote Configuration
Temperature Sensor Solution

- Battery Assisted Passive RFID tags based on the EPCglobal Gen 2 and ISO 180006C Class 3 standards which integrate both data and temperature sensing capabilities.

- Full suite of mobile and fixed EPCglobal Gen 2 RFID readers.

- Currently testing prototype tags based on discrete components (shown top right), collecting technical, use case and business case data.

- Product solution will integrate Gen 2 and sensing capabilities at the chip level to minimize cost.
MMU-Motorola Monitoring and Control Solution

Motorola Solution - stand alone wireless communication controller managed by a downloadable J2ME application

All in one solution:
1. GSM/GPRS/EDGE/WiFi/GPS Hardware
2. Motorola RF coexistence design
3. Configurable multiple interface connectors
4. OTA for remote HW configuration and settings
5. OTA for SW configuration and updates
6. Remote control and diagnostics
7. Standard SW development platform
8. Easy installation KIT
Operation M2M Value Chain per vertical

Motorola End-2-End Service Offering
Commercial Challenge

1. Business Model ...

2. EU Regulation ...
THANK YOU

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