Agriculture and Food Safety & Security through Intelligent Asset Management

Homaira Akbari, SkyBitz CEO
Vulnerability Throughout the Food Chain

There are a number of vulnerabilities in food chain transportation:

1. High risk of contamination
   - Intentional contamination
   - Un-intentional contamination

2. Low Visibility in transportation, transshipment, and warehousing of food

3. Lack of Control in the Supply Chain Management
Vulnerability Throughout the Food Chain
a few example statistics

1. $35 billion (2006 industry estimates) of annual food waste in the supply chain in the U.S. alone
   - Human error accounts for up to 80% of cargo losses during transport

2. 33% of all perishable freight is wasted during transport
   - 1/5 of a fruits and vegetables spoil before reaching the market

3. Temperature is the 2nd most important factor leading to food borne illness
   - surpassed only by contamination as a casual factor

Sources: Deloitte Consulting LLP and the University of Arkansas, HACCP Studies – USFDA, University of Bremen, Newsletter of Food chain Intelligence
With globalization, the supply chain, food transportation and transshipment is becoming complex and vulnerable

- Many factors in the food chain
- Many modes of transportation: rail, marine, truck, resulting in several loading and unloading
- Many and varied quality control critical points: temperature within a shipping container can vary up to 35 percent!
Why does the Cold Chain Fail?

- High initial product temperature
- Warm loading conditions
- Lack of supply chain visibility and control
- Leaky door seals, damaged insulation and old insulation
- Operators and drivers
Food Safety & Security Post 9/11

- **Legislation**
  - The Bioterrorism Act Of 2002 | June 2002

- **Implementation Programs**
  - Food Safety & Inspection Service (USDA) | May 2003
  - Center For Food Safety & Applied Nutrition (FDA) | Under Way
  - FSIS Food safety and Inspection Service (USDA) | current

The food industry in 2007 will spend **$25+ billion dollars** to support various compliance programs such as the U.S. Bioterrorism Act, the Can-Trace Initiative in Canada, the European Global Food Law, and the Japanese Agricultural Standards in Japan.
Other Considerations for Food Transportation, Transshipment and Warehousing

- **Shelf Life**
  - Not just for cold chain and perishable goods but for almost all products
- **Inventory management from production to shelf**
  - What products to send where and when
- **Transportation asset utilization and competitiveness**
  - Low operating and capital expenses
- **Customer satisfaction**
- **Theft prevention**
Remote Asset Management Solution Leadership to address Food Transportation Requirements

Technology has advanced dramatically over the last 12-14 months; the best solutions combine three types of technologies:

1. Sensing technologies of the load or the container

2. Real-time remote tracking and monitoring technologies of the load and the container

3. Real-time control technologies to reset parameters of the container or re-direct the container and the load
Suite of Intelligent Sensors Required

- **Temperature sensor**
  - Log the information about temperature of the load
- **Reefer Monitor and Control Module**
  - Monitor, control and send notifications for temperature conditions
- **Door Sensor and RFID Seal**
  - Door open or close and tampering notifications
- **Smart Sensor**
  - Automatic and geo-fenced departure and arrival notifications
- **Cargo Sensor**
  - Accurate load data
- **Tractor/Trailer I.D. and RFID-Tag I.D.**
  - Asset and hauler identifications through several technologies
- **Mileage, Pressure, Tire Pressure, and Humidity Sensors**
  - Available for various configurations
Real-time Tracking, Monitoring and Control Solution Required

- Ubiquitous global coverage through multiple communications providers
  - Satellite coverage is essential to ensure continuity and availability of food transportation during crisis and natural disaster recovery

- Long autonomous location and communications hardware on each food container
  - Long battery lifetimes of 4 to 7 years without recharging (no solar panels)

- Full capability of remote monitoring, control and configuration of sensors and food container parameters
  - Easy to use and manage system

- Single application platform and asset management tools to set operating procedures and to achieve an integrated supply chain
  - Ability to interface with all sensors across different vendors and players in the supply chain
Advancements in Remote Asset Management

- High Security
- Low Security

- Real-Time High-Level Information
- Post-Effect Low-Level Information

- Time to Respond to Incidents and Variations
- Percent Recovery from Incidents
- Intelligent Asset Management
- Data-Loggers and Human Intervention

SkyBitz®
Your business. In sight.
Sharing SkyBitz Experience
Benefits to Food Hauling Trucking Companies

Average Trailer to Tractor Ratio

<table>
<thead>
<tr>
<th>Solution</th>
<th>Average Trailer to Tractor Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-SkyBitz</td>
<td>2.9</td>
</tr>
<tr>
<td>Post-SkyBitz</td>
<td>2.5</td>
</tr>
<tr>
<td>Industry Average</td>
<td>2.7</td>
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</tbody>
</table>

Average Fuel Savings per Tractor and Trailer

<table>
<thead>
<tr>
<th>Complexity of Remote Asset Management Solution</th>
<th>Basic</th>
<th>Intermediate</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-SkyBitz Solution</td>
<td>$688</td>
<td>$1,015</td>
<td>$1,447</td>
</tr>
<tr>
<td>Post-SkyBitz Solution</td>
<td>$265</td>
<td>$392</td>
<td>$558</td>
</tr>
</tbody>
</table>

Sources: 50 interviews with Trucking Transporters and industry experts, Transport Topics, CSMG Analysis
Benefits to Food Hauling Trucking Companies

Annual Savings by Category of ROI: $27.3 Million Total Savings over 5 Years
(Cumulative ROI of 686% per $ Invested)
Benefits to (Food) Shippers

<table>
<thead>
<tr>
<th>Category</th>
<th>Benefit</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INVENTORY MANAGEMENT</strong></td>
<td>Reduced theft in inventory management</td>
<td>↓ 38%</td>
</tr>
<tr>
<td></td>
<td>Reduced excess inventory</td>
<td>↓ 14%</td>
</tr>
<tr>
<td><strong>CUSTOMER SERVICE AND RELATIONS</strong></td>
<td>Improved on-time shipping to customers</td>
<td>↑ 30%</td>
</tr>
<tr>
<td></td>
<td>Reduced customer attrition</td>
<td>↓ 26%</td>
</tr>
<tr>
<td><strong>EFFICIENCY</strong></td>
<td>Reduced customer inspections</td>
<td>↓ 48%</td>
</tr>
<tr>
<td></td>
<td>Increased automated handling of imports</td>
<td>↑ 43%</td>
</tr>
<tr>
<td></td>
<td>Reduction in transit times</td>
<td>↓ 29%</td>
</tr>
<tr>
<td><strong>VISIBILITY</strong></td>
<td>Improved asset visibility in the supply chain</td>
<td>↑ 50%</td>
</tr>
<tr>
<td></td>
<td>Reduced time taken to identify problems</td>
<td>↓ 21%</td>
</tr>
</tbody>
</table>

Stanford University study released by The Manufacturing Institute, the research and education arm of the National Association of Manufacturers (NAM), Stanford University, August 2006