Tracking and management of vehicles and containers

OPTIMISATION and VISUALISATION of Material Flow and Logistics Processes through Application of ACTIVE RFID Technology

Agenda

- IDENTEC SOLUTIONS AG
- Logistics Requirements
- Active RFID Technology
- Applications
IDENTEC SOLUTIONS

Background

Main Office:
- Founded in 1999
- Number of Employees: 35
- Spin off of GANTNER Electronics

Locations:
Head Office:
Lustenau / Austria

Sales & Service:
Kelowna, BC / Canada

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The goal of AUTO-ID systems is to deliver:

- reliable
- automatic
- error-free

**real data** about material flow and logistics processes.

**Reliable** data are the prerequisite for **successful planning and control** in logistics.
RFID System Requirements

Automatic identification of assets in "uncontrolled" processes
⇒ "Long Range" communication with high data rate

Resistance against outside influences (i.e. production plants, WLAN)
⇒ Selection of UHF as suitable operating frequency

Guaranteed product integrity
⇒ Integrated sensor/memory for temperature logging

Process data available on asset: "Intelligent Transport Containers"
⇒ Integrated memory in the tag (R/W)

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Selection Criteria
RFID Technology

- **Barcode, Passive RFID**
  - level 1
  - **Item**
    - cell phones
    - other merchandise
  - **Packaging**
    - plastic trays
    - cartons

- **Passive RFID “Smart Label”**
  - level 2
  - **Unit Load**
    - pallets
    - roller cages

- **Active RFID**
  - level 3
  - **Transport Unit**
    - trucks
    - containers

- **Active RFID, GPS**
  - level n

“Consolidation of data“

Technology

- **Broadcast system – Tag talks first – intervall 0.5 to 60 sec’s.**
  - 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m

- **Reader talks first system**
  - 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m
Active RFID Technology
READER-talks-FIRST (RTF) Products

- **ILR® Read/ Write Tags (i-Q/ i-D series)**
  - Read/Write range of up to
    - 100 m with i-Q series
    - 6 m with i-D series
  - Non-line-of-sight communication
  - User-definable memory of up to
    - 32 kBytes in i-Q series
    - 56 Bytes with i-D series
  - Identification of 2.000 tags in the field
  - **OPTIONAL**
    - integrated temperature logger
    - integrated LED (“Pick by Light”)
    - Battery lifetime of up to 10 years
Active RFID Technology
Products

• ILR® Read/Write Devices
  - Fixed reader with up to 4 antennas
  - Inputs/outputs for process synchronization
  - Ethernet/serial interface
  - Remote access and configuration
  - Mobile reader with full ILR® functionality in PC-Card and CF format
  - Easy integration in devices with free PCMCIA slot (Notebook, Handhelds)

Aktive RFID Technologie
Integration - eg. via ORACLE

Diagram showing the integration of RFID Reader, Oracle Sensor Data Repository, and Application layers.
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ILR® Applications
Container Management

Smarten up your assets.

Container Management
**Customer Requirements**

- 600,000 specialised containers
- 60,000 specialised containers per vehicle type
- Costs of up to € 1,000 per container
- Manufacturing plants in various countries
- Localization of containers in the Supply Chain
- Control of container inventory
- „Real-time“ intervention into process cycle

**“Intelligent” Gate:**

ILR® Reader

ILR® Tag

ILR® Antenna
Principle of Identification

RFID-Infrastructure (so-called Gates)

Building/Area

Inventory:

No. 1
No. 7
No. 325

Process Visualisation

• Application-specific fragmentation
• Simple Expansion with uniform Infrastructure
• Benefit
  - Total cycle-time
  - Dwell time per area
  - Numbers per category and location.
  - Overvalued or too less stocks
  - Number of moving goods per category and area

Areal 5
Areal 4
Areal 3
Areal 2
Areal 6
Areal 1
Container Management
Automobile Industry
Bestandsführung

Tracking of empties

Tracking of filled

difference (empties)
Calculation of circulation days

- Current location
- Traffic between factories
- Manufacturing flow-path Wolfsburg
- Traffic between factories
- Fabrication flow-path Brüssel
Container Management

Savings Potential

- Loss
- Security
- Maintenance
- Circulation
- Production

with Container Management

Savings of 15% to 35%

Container Management

Automobile Industry

Customer BENEFITS through the use of ILR®

- Increased usage rate of containers
- Reduction of losses due to procurement costs
- Fewer “lost” containers
- Decrease in search times
- Reduction of alternative packaging
- Reduction of delivery errors
- Decrease in production down times

ROI < 8 months (tags AND infrastructure)
Localisation of Engines in Manufacturing Process

**Implementation**
- 6,000 engines temporarily equipped with tags
- Production area equipped with position-tags
- Forklift equipped with Reader

**Customer Benefits**
- Localisation of each engine within 15m
- Reduction of costs >80%
- Delivery on time
- No wrong deliveries
- Installation within 2 weeks
- Return on Investment within 6 weeks

Acquisition and Localisation of Assets

**Implementation**
- > 150,000 assets are equipped with tags
- Fixed readers installed in production and delivery department
- Mobile readers on construction site

**Customer Benefits**
- Fast localisations of specific parts
- Prevention of additional delivery
- Online inventory
- Delivery on time
ILR® Applications
Vehicle Tracking

Optimization through visualization.

Vehicle Tracking

Automotive Management Process
- Problem Definition “Dat Autohus AG”

• Initial Situation
  - Used car dealers
  - Customers search for cars on the internet
  - Customers arrive at the dealer shop, takes the keys of the cars, inspects the cars and decide if they buy it or not. There is no assistance.
  - 30% of visitors become customers.

• Challenge
  - Optimisation of vehicle acceptance.
    • 80 new vehicles arrive every day
  - Optimisation of vehicle sales process
    • Localisation of vehicles in 2 areas
    • 3,000 vehicles in 2 sales areas (55,000/10,000 m²).
Automotive Management Process
- Process Specification

Customer
- optimal locating of vehicles
- Reduction of waiting time

Dealer
- appreciated sales figure
- higher flow path

Mechanic
- adequate payment
- higher quality

Automotive Management Process
- Solution 1/4

Customer Mgmt
Key Mgmt
Search & Find
Book

[Diagram showing the process flow and departments]
Automotive Management Process
- Solutions 2/4 - mobile Inventory

GPS-coordinates of inventory-car + Transponder-ID of vehicle

Inventory car with GPS-receiver
Vehicles with transponder

Automotive Management Process
- Solutions 3/4 - Implementation of mobile inventory

MDE-Console with
- Windows CE
- GPS-Receiver
- RFID-Reader
- Software „Mobile Inventory“
Automotive Management Process - Solution 4/4: Examples

- Vehicles are equipped with aktive 868 MHz transponders.
- Use of factory terminal indoor and externally.
- Personalized plans for visitors.
- Car key management.
- Workshop-management.

One Solution - several Auto-ID-Technologies
Vehicle Tracking
Automotive — Distribution

Locating Vehicles at “Autostadt Wolfsburg”

- Implementation
  - 12,000 cars equipped with ILR® tags mounted on the rear-view mirror
  - 6 „Search Cabs“ / 30 fixed gates

- Customer BENEFITS
  - Shortened process cycle: 4x faster localisation
  - Increased process quality: Control of process steps
  - Better process control: Early recognition of bottlenecks

Identification and Localisation of Vehicles

- Implementation
  - 15,000 vehicles temporarily equipped with tags
  - 5 „Search Cabs“ / 8 fixed gates

- Customer BENEFITS
  - Shortened process cycle: 4x faster localisation
  - Increased process quality: Control of process steps
  - Better process control: Early recognition of bottlenecks
Vehicle Tracking
Automotive — Production

Vehicle Tracking in the Finishing Process

• Implementation
  - 5,000 cars temporarily equipped with tags
  - 50 fixed readers for 114,000 m²
  - 10 handheld readers

• Customer BENEFITS
  - Timely processing (FIFO)
  - Optimised production flow
  - Increase in process throughput
  - Better product quality

SOLARIS Level II -
Truck control based on transponders

GOI-1/5
dedicated computer system, manufacturing & logistics; Volkswagen AG, Wolfsburg

Volkswagen Transport affiliation Poland, logistic systems, logistics planing
SOLARIS - general

SOLARIS: Truck data base for plant internal control

- Tracking of trucks at the entrance as well as at the dock areas
- Information about number and location of trucks
- Visualisation of truck location and movement
- Statistic analyses:
  - Loading- and dwell time of trucks
  - Use of single loading/unloading area
- Assistance for the control of material flow

Architecture of „VisuM“

VisuM stands for Visualisation and Map-Matching. Visum saves information about location, time and condition of objects equipped with active Transponders.
Truck control in Poznan - Initial situation

- Merely JIS- and JIT-deliveries
- extended modul-fabrication
- Minimal storage area in the plant area
- Shuttle and external suppliers
- Manual registration and release of unloading areas

Truck control in Poznan - Implementation

- Transponder situated in driver’s cab
  - Identification 1: circulation for external suppliers
  - Identification 2: fixed for Shuttle
- Identification of process relevant detection point in the plants
- Definition of areas by means of unloading areas
- Visualisation in the truck control system
**Process of „external traffic“**

- Registration and detection „Entry“ in GODYO AM/ SOLARIS
- MIH-detection in goods - receiving area with VWP
- List of unloaded products, write on transponder and hand over to driver
- Automatic detection of the truck while moving
- Return of transponder at the gate

**Process „Shuttle“**
Truck control – Screenshot

Data acquisition plant 4/ ELZ/ Panopa

- Acquisition point (I-Port)

Panopa - P.1
Truck control – areas

Truck control – Benefits

- Automatic recognition of trucks
- Automatic detection and release of unloading areas
- Efficient handling of truck traffic
- Shorter waiting period
- Faster JIS- and JIT- material flow path through optimized truck-traffic
SOLARIS - summary

Successful implementation
• reduced risk of traffic jam and optimisation of shuttle processes due to dedicated control
• increased transparency of incoming deliveries for material disposition
• reduction of waiting time for trucks an better arguments with forwarding agents
• Ease of accounting control
• automatic generation of batch cards
• implementation of traffic concept – less trucks required through the SOLARIS System

Vehicle Tracking
Transportation Industry

Tracking and Tracing of Trucks and Trailers
• Implementation
  - Vehicles and trailers equipped with tags
  - Gates equipped with fixed readers
  - Mobile readers carried by site staff
• Customer BENEFITS
  - Automated access control
  - Online status of all vehicles
  - Better usage of vehicles
Proven Solutions.

Beyond the Limits of RFID

Thank you.