European Inter-Disciplinary Research on Intelligent Cargo for Efficient, Safe and Environment-friendly Logistics

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Singular Logic

Ljubljana, 28 November 2011
EURIDICE at a glance

- Overall budget: 14.1 m EUR
- Overall funding: 8.25m EUR
- Start – end date: 1/2/2008-30/11/2011
- Coordinator: Insiel
Agenda

- The Intelligent Cargo concept
- Demo

- EURIDICE technical implementation
  - Service-oriented approach
  - Architectural approach
  - Intelligent Cargo and Cargo Intelligence

- Pilot operation and initial results
- Market orientation
Business and ICT challenges for Logistics industry

- Fragmented logistics and distributed manufacturing leading to huge traffic of goods inside EU and abroad
  - Need for efficient monitoring of transport process
  - Better utilization of trucks, warehousing and parking areas

- Efficient transport
  - Customer responsiveness
  - Estimated Time of Arrival
  - Exception management – anomaly detection

- Safety and security
  - Sensitive goods
  - Security during transport

- From centralized information systems to more distributed and “cargo” oriented information services
"by 2013, most of the goods flowing through European freight corridors will be ‘intelligent’, i.e.: self-aware, context-aware and connected through a global telecommunication network to support a wide range of information services for logistic operators, industrial users and public authorities"

Source: Euridice project
The intelligent cargo concept

Cargo

I am container (or package, or trailer, or...) X, I belong to Y

Owner service: content info, 3PL service: shipping info, Authority service: clearance info...

I am presently at location L, being handled by Z

Status monitoring

Where are our goods, who is dealing with them?

What's happening to our cargo?

What do you contain? Are you authorized? Cleared? Paid for?...

Act independently

I am not where I was supposed to be, please take action

I am not where I was supposed to be, pick me up

Autonomous decisions

User

Self-identification

What's this?

Source: Euridice white paper
## Intelligent Cargo capabilities

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<th>Basic</th>
<th>Self-identification</th>
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<td>- Global identification provided by public domain services.</td>
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<td>- <strong>Cargo is able to self-identify through a common infrastructure, accessible to field users, vehicles and back-office.</strong></td>
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<td>- Dynamically selected level of detail (package, pallet, container, ..).</td>
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| Context detection          | **Context determination** provided by public domain services.                        |
|                           | - Common infrastructure, providing context data (identification details, location, time) to authorized users. |

| Access to services        | **Common infrastructure, providing access to services** to authorized users or systems interacting with the cargo. |

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<th>Advanced</th>
<th>Status monitoring and registering</th>
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<td>- <strong>Status data are available in real time</strong> through the service infrastructure.</td>
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<td>- Status data are contextualized and integrated with the other cargo information services.</td>
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| Independent behavior       | **Cargo is able to invoke services** and start processes autonomously in response to predefined events. |

| Autonomous decisions      | **Cargo has decisions making capabilities** and is able to choose services to invoke according to circumstances. |

*Source: Euridice white paper*
Demo

Let’s see how it works...
Euridice Integrated Platform

**Fixed Platform:**
Distributed set of nodes where services, user applications, S/W agents and system components are deployed.

**Mobile Devices:**
Different types of devices are connected where mobile services are executed.

Source: Margherita Forcolin, ECITL Conference 2011
Local and Central Intelligence

EURIDICE CI Infrastructure

Cargo Intelligence
- Trend detection
- Anomaly detection
- Prediction
- Reasoning

Context calculation

Intelligent Cargo Network

Cargo + cargo centric Info + Agents = "Intelligent Cargo"

Global
- Trends
- Anomalies
- Data

Local
- Sensor access
- Business logic
- Local reasoning

End User Application
- External DSS
- Option
- Directions

The Intelligent Cargo concept

EURIDICE Technical Implementation

Pilot Operation and initial results

Market Orientation

Demo
Domain taxonomy for context awareness

- Cargo Domain
  - Per Item
  - Per Parcel
  - Per Palette
  - Per Container
  - ...

- Transportation Domain
  - Air / Airplane
  - Sea / Ships
  - Road / Trucks
  - Rail / Trains
  - ...

- Environment Domain
  - Logistics / 3PL
  - Intermodal Travelling
  - Location
  - Conditions (i.e. legal, etc.)
  - Insurance
  - Transportation Obligations

EURIDICE

Existing Solutions

Ortologies

Standards

Projects

Services

Processes
Euridice Context model structure

- Industry & Distributors
  - EURIDICE Services
  - Processes
  - Information
  - Rules
- Intermodal Transport
  - EURIDICE Services
  - Processes
  - Information
  - Rules
- Logistic Operators
  - EURIDICE Services
  - Processes
  - Information
  - Rules
- Authorities & Infrastructures
  - EURIDICE Services
  - Processes
  - Information
  - Rules

Cargo Domain
Transportation Domain
Environment Domain

Intelligent cargo & cargo intelligence
Pilot Operation and initial results
Market Orientation

Demo
Euridice Context model function

Allows access to cargo-related information (and services) from different domains and actors.

Information is organized around a core structure identifying physical cargo, vehicle and location.
Pilot Scenarios

Transport process

S1 Connected manufacturing and transport execution
S2 Active cold-chain control
S3 Cargo controlling transportation in 3PL services to final customer
S4 Cooperative warehousing through cargo-centric information services
S5 Self-returning empty pallets and boxes
S6 Cargo-assisted intermodal transport
S7 Intelligent routing through cargo-infrastructure cooperation
S8 Automated clearance and billing of transiting goods

Source: Euridice white paper
Initial trial results

- % of error-free identifications reduced to

- Average time for notification in case of deviation from normal conditions reduced from hours to minutes

- Estimated time of arrival: % of accuracy increased from 90% to almost 100%
EURIDICE Services Platform

Source: Euridice white paper
EURIDICE added value

- Infrastructure for **Micro Services** (simple and targeted) development,

- in an **easy, flexible and open way**, 

- from **entrepreneurs and existing service providers**

*Source: Exploitation Workshop, Munich, May 2011*
Services - Examples

- Route optimization.
- Track & Tracing.
- Automated proof of delivery.
- Automated clearance.

Source: Exploitation Workshop, Munich, May 2011
Future business

- Business applications to secure mobility cloud
- Business Services to mobile users
- Rich Logistic services to logistic parties
- Software deployment for Business clients
- Operational and Billing services for clients
- Data collection and information distribution
- Full or partial outsourcing mobile services

Source: Exploitation Workshop, Munich, May 2011
Join us

www.euridice-project.eu

http://www.intelligentcargo.eu/

Intelligent Cargo Forum
Thank you for your attention

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