Intelligent Cargo in Efficient and Sustainable Global Logistics Operations

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Thessaloniki, 14th October 2011
Agenda

• Background
• Vision
• Objectives
• Approach
• Technical concept
• Pilot cases
• Implementation
• Consortium description
Background

Freight transport and logistics will have a central role in EU’s transformation into a smart, sustainable and inclusive economy. The Europe 2020 Strategy sets specific objectives in terms of:

» Energy efficiency and decarbonisation
» Economic growth

It is commonly acknowledged that Information and Communication Technologies will play a fundamental role in overcoming the above issues
Vision

- Cargo will be intelligent and part of a **network of interoperable** vehicles, infrastructures and logistics management systems
- An **open platform** of freight management services providing access to information systems
- The flow of goods will be managed **cooperatively**
- **Real-time data collection and event management** to become part of logistics practices
The iCargo project aims at advancing and extending the use of ICT to support new logistics services that:

- synchronize vehicle movements and logistics operations to lower CO2 emissions,
- provide dynamic planning methods involving intelligent cargo, vehicle and infrastructure systems
- combine services, resources and information from different stakeholders, taking part in an open freight management ecosystem.
Approach (1)

- New low-CO2 services offer
- Better utilization of resources
- Less GHG emissions
- Less traffic

Logistics Companies

Community

Optimized solutions for environmental efficiency

Higher penetration of ICT-based services in the logistics market

ICT for Transport Research & Industry
iCargo involves representatives of the main stakeholders in three main areas of activity:

- **leading ICT companies and institutes** to integrate in iCargo the necessary technology components to develop innovative approaches and business models for co-modal transport environmental optimization and dynamic planning;

- implementation, demonstration and validation of **three extensive pilots** in end-to-end multi-actor intermodal chains

- extensive **dissemination** of research results, demonstration and pilot cases validation activities, **aimed at transferring iCargo results to the international transport logistics community** and supporting take-up and extensive exploitation immediately after the project
The idea visualised

- Cooperative freight business ecosystem
- Dynamic multi-actor plans
- Interoperable cargo, vehicle and infrastructure
- Real-time automated event management

Logistic Services
- Shipper
- Authority
- Cargo
- Field user
- Infrastructure
- Vehicle

Origin
- Shipment from factory
- Long haul transport
- Road transport
- In-city delivery

Destination
Technical concept (1)

Freight Management Objects
- TEP
- Transport Service
- TES

Traffic Management Objects
- Network
- Vehicle Route
- Flow

Other Domains Objects
- Order
- CO2 footprint

Generic Service Objects
- Obj. Discovery
- Settlement
- Payment
- Interaction Protocols

Intelligent Cargo Objects
- Container Device
- Sensor
- Pallet Tag

Intelligent Vehicle Objects
- Sensor
- Comm. unit
- GPS

Infrastructure Objects
- Roads. unit
- Gate
- Sensor

Semantic Web Objects
- Ontology
- Composition Services
- Smart gateways

Engage, cooperate, disengage
Cross-domain service
Semantic mediation

Other Domains
- Order
- CO2 footprint

Search

.obj. Discovery
- Settlement
- Payment
- Interaction Protocols

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Engage, cooperate, disengage
Cross-domain service
Semantic mediation
Technical concept (2)

a. Planning Service

b. CO2 Calculation

c. itineraries

d. Load unit (TEU)

e. Transport service (sea)

f. Transport service (truck)

g. Location (Ningbo)

h. Location (Antwerp)

i. Location (Duisburg)

j. Network flow (on river Scheldt)

k. Updated ETA

l. Delayed TEU

m. Road carrier

n. Vehicle (Truck)

o. Sea carrier

p. Vehicle (Vessel)

q. Infrastr. Manager

r. Booking

s. Transport service (barge)

t. Booking

u. Booking

v. Booking
Pilot cases

The iCargo approach and technologies will be applied in **three open, large-scale pilots** to demonstrate and validate viable industrial implementations of low-carbon logistics services, *going beyond technological proofs of concept*. Each pilot will:

- **Take a systemic approach**, encompassing the **entire transport chain** and involving different transport modes as well as the main actors (shippers, transport operators, authorities and infrastructures) necessary to implement the service.

- **Build a logistics information value chain**, where services, resources and information from different stakeholders are exposed and combined in an open freight management ecosystem.

- **Carry out supply-chain wide tests**, covering the entire route of goods from source to destination, including logistic operations across modes. This will allow estimating impact on a systemic level as well as assessing feasibility from the viewpoint of multiple involved stakeholders.
The SCAR pilot will show simplified and more energy-efficient management of freight flows in transnational Rail/Multimodal corridors, by:

- replacing complex business process interactions of the partners with bottom-up adaptive interoperability of the first/last mile urban/interurban smart distribution with Rail, Air, Sea and Road freight traffic;
- introducing on-going dynamic control for energy/emissions reduction based on independent intelligent units (“iUnit”) on both the cargo and vehicle.
- supplying a corridor oriented ICT infrastructure for logistics/transport service providers allowing the dynamic cargo/means management.

Pilot 1: Sea-City-Air-Rail (SCAR) door-to-door service
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The “Green Corridor” pilot will demonstrate e-services to integrate motorways of the sea with competitive hinterland co-modal offerings, making these an attractive alternative to rail in terms of resources utilization and hence “greenness”, by:

- integrating information about, e.g., available services, booking, status reporting, and electronic mandatory reporting to authorities, to cover the combination of rail, sea, road;
- using on-cargo devices for communication between train and infrastructure, for real-time monitoring of key performance indicators, e.g. the CO2-footprint.
Pilot 2: Green Corridor between Sweden and the European Continent
The Logistics Services Providers – Shippers cooperation pilot will show how to improve the sustainability profile of an entire, complex supply chain through cooperative planning and execution solutions, by:

- providing new capabilities and standards for information exchange between all actors in transport as well as logistics operations, like warehousing, including the use of environmental attributes in supply chain optimization;
- monitoring cargo environment and quality even in presence of extremely large volumes, by replacing back-office systems connections with decentralized computing based on smart tags and distributed intelligence.
Implementation
Consortium description (1)

- Austria
- Belgium
- Finland
- France
- Germany
- Italy
- Norway
- Poland
- Spain
- Sweden
- The Netherlands
- United Kingdom
Consortium description (2)
THANK YOU!

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