SYNCHRO-NET: Synchro-modal Supply Chain Eco-net

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SYNCHRO-NET - Overview

- SYNCHRO-NET “Synchro-modal supply chain eco-net”:
  - Demonstrate how the concepts of *synchro-modality* and *smart steaming* can be applied to real supply chain operations – NOT just a theoretical exercise
  - Optimisation of international, multimodal supply chains – real-time & strategic
  - Develop highly innovative *logistics optimisation software systems*, supported by *interoperable communication & data exchange* mechanisms, and applying new *cooperative business models*

- Funded by the European Commission – Horizon 2020:
  1. 8 Meuro
  2. 42 months

- Industry-led consortium of 20 partners:
  1. Major logistics and transport operators
  2. Leading universities and research institutions
  3. Innovative technology and software companies
Information! Freight data is often delivered to Customs late and may be incomplete and inaccurate. For example:

- Vessel manifest information is often unfit for regulatory pre-arrival risk assessment purposes.
- Misclassification of import entry lines alone costs government treasuries worldwide $billions every year.

Lack of information leads to delays in processing legitimate goods which hinders the goal of facilitating trade.

Often key information needed for risk analysis is missing or misleading (e.g. the consolidator is shown instead of the true originating Consignor).

SYNCHRO-NET will drive a massive improvement in freight data quality and availability.
Many initiatives exist to address data availability - WCO is actively involved.

One important example is the CORE project:
- Active participation by WCO and MJC²
- 10 demonstration trade lanes: global supply chains

CORE highlights:
- Set up Secure Data Pipelines
- Better risk analysis & better risk management
- Improved efficiency in deployment of resources
- Possibility of green lanes
- Many other technology innovations: threat analysis, detection, tracking, optimisation.
4 data pipelines
- 5,000 files
- 97 companies
- 3 modes of transport
- intra-EU
Savings

1% - 5%
SYNCHRO-NET – What is different?

- **SYNCHRO-NET uses** this data for **real-time** optimisation of multi-modal logistics:
  - By implementing secure, accurate data capture & exchange mechanisms logistics operators and shippers make **very large cost savings**
  - Cost savings are much larger than simply reducing administration effort
  - **ROI in months** – very strong business case
  - Incentive for accurate, complete data -> much more efficient end-to-end transport: lower costs, increased reliability
  - Better data available (electronically) for Customs
  - Data includes all details about consignment (end-to-end)

- **Message to logistics operators - synergy:**
  “Collecting and processing electronically the data that Customs needs saves you $millions (and we can prove it).”
MJC² – world-leading real-time optimisation software

- Global supply chain & multi-modal logistics
- Resource planning and scheduling – personnel & equipment
- Real-time optimisation of transport and manufacturing

Led the successful SYNCHRO-NET bid

Related projects:

- CORE – Supply chain security and resilience
- EUROSKY – air freight handling & security (inc. e-AWB)
- eMAR – Single Windows initiative
- SAFEPOST – postal & e-commerce security
SYNCHRO-NET - What does it do?

Synchro-modal Booking Optimiser:

- “I want to move a container from Location A to Location B – find the best options”
- ALL combinations of modes considered e.g.:
  - Truck -> Train -> Ship -> Train -> Truck – millions of possible options/routes
- Consider cost, duration, environment, reliability/risk
- DE-STRESS and DE-RISK the choices made

Real-time Synchro-modal Booking Optimiser:

- e.g. “The truck has been delayed by 5hrs on the way to the port – help!”
- SYNCHRO-NET finds a new route to solve the problem e.g. redirect to a different port/service or use a rail link instead, etc.
- Early visibility of potential problems
- Powerful tools to find a solution to keep the customer happy!
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SYNCHRO-NET - What does it do?

Smart Steaming Ship Module:
- “My ship is going from port X to port Y. Determine the optimal voyage duration and corresponding fuel usage, emissions and cost.”
- Analyse different scenarios
- Impact of changing voyage schedules
- De-risk routes to achieve better adherence to schedule

Real-time Smart Steaming:
- E.g. “The ship is ~3 days away from port. Calculate the optimal arrival time taking into account expected berth availability, etc.”
- i.e. don’t go full speed to the port and then wait 2 days for a berth
- Take account of weather, tides, sea state
- Model true costs (not just fuel but also personnel, maintenance, etc.)
- Take account of expected berth availability (port congestion)
- Port <-> Ship interaction reduces risk of delays
Motivation

- Mutual benefits for all stakeholders:
  - Transport operators save money and deliver better service to their customers
  - Customers benefit from more reliable service
  - Reduced greenhouse gas emissions in the global supply chain
  - Increased use of “greener” transport modes
  - Reduced congestion in ports and terminals
  - Increased visibility for authorities
  - “DE-STRESSING THE SUPPLY CHAIN”

- A win-win offering to guarantee industry uptake:
  - SYNCHRO-NET tools deliver benefits to each stakeholder even if used in standalone mode
  - BUT increased cooperation and sharing of information between SYNCHRO-NET-enabled users delivers additional mutual benefits
Summary of Main Innovations

- **Integrated Multimodal Optimisation**: Most optimisers consider truck OR rail OR ship. SYNCHRO-NET considers all surface modes. (From a technical perspective this makes the optimisation problem hugely more complicated.)

- **Sophisticated “Scoring” Mechanism**: Instead of just using a simple number like cost or time, SYNCHRO-NET considers CO2, risk, reliability, service level .... (and cost of course).

- **Innovative Risk and De-stressing Optimisation**: The components needed for this are technical challenging and beyond current state-of-the-art

- **Real-time Optimisation**: Fast algorithms that can respond quickly and effectively to real world events – don’t leave the user unsupported when things go wrong

- **Real-world solutions**: model the real operational factors and constraints that need to be considered to achieve feasible results.
SYNCHRO-NET encourages shippers and logistics companies to share information electronically:

- The benefits are much larger than simply reducing administration costs. By sharing information the physical transport costs will be greatly reduced:
  ~10% = $billions annually
- Leverage ongoing initiatives and standards

=> Much improved quality & availability of data for Customs

Increased visibility, predictability and reliability:

- **Operational**: increased visibility of demand => ability to further enhance the planning and optimisation of resources
- **Strategic**: forward planning and modelling of freight flows in major terminals and ports
- **Security**: enhanced capability to detect unusual freight movements
Summary of Opportunities

- **Digital Customs**: support (and benefit from) the WCO’s initiative
- **Secure Trade Lanes**: SYNCHRO-NET models risk and security factors. Use of secure trade lanes would be preferred, especially if transit times are favourable also.
- **Cargo Targeting**: Not only increased availability of data but also the ability to detect “strange” freight flows and routes.
- **Disaster Response**: SYNCHRO-NET facilitates speedy response to major disruptive events => work with Customs to identify lanes that can be used efficiently without compromising security.
- **Time Release Studies**: more accurate real-time information about arriving freight => plan resources and identify capacity issues
- **e-commerce**: Potential synergy – simultaneous use of Big Data for logistics optimisation and cargo targeting
- **Single Windows**: Maximise the benefit of investment in technologies