

## *D13.23 – ICT framework on long-range rail transportation of sensitive goods - summary*

### **Executive summary**

The ICT Framework on long-range rail transportation of sensitive goods is the final deliverable within Task 13.2. It describes the IT solutions that are required to support our improved customs process and the operational setting for attesting the improved process.

In our previous deliverables, “Feasibility Report on long-range rail transportation of sensitive goods” (D13.21) and “Security framework on long-range rail transportation of sensitive goods” (D13.22), we learned that there is a possibility for further optimization of transit and export customs procedures in the case of rail transport over long distances outside of the European Union. These possibilities were brought forward by trade and industry and are further investigated. The focus is put on a coordinated border management by addressing the possibilities for further optimization of transit and export procedures.

The result of the activities under T13.2 is the definition and the validation by both customs and industry of an improved customs export procedure for both transit and export of goods.

While customs has been actively involved in the definition of the process, a practical insight on the operational process was found to be a key element for customs to initiate and validate the real feasibility of implementing the described process improvements in cross-border management. The IT solutions that are required to support our improved customs process can be provided by container tracking solutions and the visibility dashboard.

### ***Introduction***

#### *Purpose of the document*

The ICT Framework on long-range rail transportation of sensitive goods is the final deliverable within Task 13.2.

Both customs and industry partners can use this document as a guideline to kick-off a demonstration for attesting the improved process in an operational setting with commercial stakeholders and customs. Such demonstration contributes to initiate the implementation of a utility block in GNC.

A Utility Block is a specific part of the Customs business process, explained in simple yet comprehensive terms that everyone can understand. It describes strategic aims for policy makers, business processes for managers, legal issues for lawyers, functional approaches for operational officers, and technical specifications for IT staff. This definition has been followed as an approach for this document.

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While the process and supportive IT solutions have been validated and agreed with Belgian customs, certain assumptions have been taken for which it is also believed reasonable that these can be achieved in close collaboration with national and EU customs (e.g. acceptance of IT setup during initial phase)

### *Operational requirements versus IT solutions*

From the extensive risk analysis done in deliverable D13.22 Security Framework we learned that for Customs a detailed description of the operational characteristics, under which the process can be demonstrated and attested, is required. The IT solutions are supportive to attest the given “to be” process. They need to be compliant with customs regulations and a limited number of technical requirements are requested by Belgian Customs.

For the commercial partners, the acceptance by customs of the “to be” process is the driver. They are aware of the IT technologies in the market. Commercial stakeholders’ first needs are found in the acceptance of the process.

We therefore start this document by describing the operational process in more detail.

The technologies for bringing visibility into the supply chain and the integration of the less-intrusive security technologies further facilitate the optimised customs procedures and have been described in this document.

### *Objectives of the deliverable*

The objectives of this deliverable is defined by:

- 1) A definition of the ICT measures that can be used to support both logistics as well as security concerns. Such ICT measures need to be concrete and implementable making it possible for stakeholders to validate the ICT solutions described in an operational setting.
- 2) The SWOT for the IT solutions presented that gives the stakeholders the ability to better understand the current value of the IT proposition revealing both the potential as well as its limitations.
- 3) Specific handling of technology challenges that points to the challenges that we need to mitigate for a successful set-up of the ICT solution as to traceability, safety of goods, acceleration of custom processes.
- 4) The definition of an ICT solutions framework that describes high-level concepts for an IT solution framework that supports the “to be” process. This consists of an IT architecture and functional requirements.

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### 1.1 Reading instructions

The ICT framework elaborates how the “to be” process, described in the Security Framework (D13.22), can be executed in an operational setting. It describes the IT solutions that are needed to execute the simplified customs process that makes use of a visibility dashboard and Container Security Device (CSD) technology. The more detailed operational process description has been particularly requested by Belgian Customs in preparation of attesting the “to be” process. The specific technologies used are considered to be transparent.

The IT architecture depicts the required IT platform of which the required characteristics are described in more detail. The objective is to inform the reader which solutions are needed and how they can be used. Where found useful more detailed technical specifications have been added.

### **Operational process and ICT measures**

This section describes how the “to be” process can be operated and what ICT measures are relevant. It allows confirming the feasibility for attesting the process and the IT solutions.

The ICT measures need to give answer to traceability of the cargo and the safety of goods to support the simplified customs process and provide the user with consolidated information. Traceability is needed to locate the cargo and conclude when the cargo is departing, crossing the border or deviating from plan. The safety of goods is important for Customs to allow for a simplified, more automated process and it guarantees the shipper that goods are protected on route. To the main stakeholder being it Customs or the SCO, added value is provided when information is consolidated and meaningful conclusions can be provided.

The ICT measures that support the operational process consist of:

- Setup a CSD platform to track the position and the integrity of the containers
- Setup of a Visibility Dashboard to create situation awareness
- Definition of e-mail notifications to notify Customs and logistics parties of events and exceptions
- Configuration of geofences that are used as Passage Points confirming arrival and departure of the container
- Definition of physical handling, Customs compliance and transport compliance activities at the Passage Points
- Identification of potential process exceptions and contingency planning
- Definition of an IT Solution Framework that includes integration of CSD platform and Visibility Dashboard and their required functions as described in Chapter 5 IT solutions framework

An overview of the corridor that is identified by commercial partners, showing the relevant passage points on the route between the start location in Antwerp and the EU border in Malaszewicze/Brest, is presented, together with the operational benefits of the described “to be” process using CSDs and geofences, so that the container is tracked by reaching and leaving passage points, for which the user is informed through notifications.

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The report describes the setup of the Visibility Dashboard, where each transport leg between two passage points can be distinguished allowing reporting on departure, arrival and timeliness compared to plan. The Visibility Dashboard provides status information on the container such as the position and the integrity of the container.

The report describes the required preparatory activities, which are:

- Integration with CSD platform
- Geofence setup around Antwerp and all passage points (P1 to P4)
- Alert configuration
- User account setup

The report describes the activities for each passage point, consisting of:

- Physical handling of the container at the rail terminal, from creation of block train to the point the trains leaving the terminal.
- Document handling for customs compliance
- Document handling for transport compliance
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### **Process exceptions and contingency planning:**

In this section, examples are provided of exceptions that can happen during transport and which may have an effect on the execution of the “to be” process or its timing and thus also the risk analysis by customs. These include:

Case 1: The container cooling unit malfunctions

Case 2: Technical defect with wagon

Case 3: Container breach

Case 4: Re-routing because of network issues

### **Reference to AEO certification**

From Deliverable D13.22, we concluded:

- Certification of commercial parties is a dependency, although Authorised Economic Operator (AEO) certification is likely not a requirement in case an alternative
- The industrial parties involved in WP13 are not AEO certified
- There is no firm statement yet from Belgian Customs that additional certification is needed.
- In case the parties in the supply chain are certified, the use of CSDs for security purposes is less a requirement for Belgian Customs.

Even if not strictly required for attesting the “to be” process, AEO certification is still considered very relevant for BE Customs. AEO is a EU guideline so we cannot just say

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everything is fine without AEO certification, it is important to be certified where this is possible.

This point will be aligned again in the operational assessment meeting with all partners and Belgian Customs.

### **IT solutions framework**

The intention of this section is to provide a generic solutions overview. It describes high-level concepts for an IT solution framework that supports the “to be” process. Technical details of the solution are considered to be transparent for the purpose of the IT solutions framework, they are not described here.

The DoW mentions the IT solutions framework to be:

- 1) A definition of ICT measures that can be used to support both logistics as well as security concerns.
- 2) SWOT for individual solutions.
- 3) Specific handling of technology challenges in the context of long-range transportation by rail for sensitive goods
- 4) Cover the needs for traceability and safety of goods

### *IT architecture*

The IT Architecture consists of 2 systems:

- CSD platform: The system that has the function of making the CSD statuses available.
- Logit One Visibility Dashboard: The dashboard that provides the required functionality to the SCO and Customs. It generates the notifications.

### *Interoperability*

Interoperability between the CSD platform and the Visibility platform is handled via secured FTP or a web service that pushes the CSD status messages to its subscribers.

### *CSD Platform*

The CSD platform can visualise the CSD statuses and position on a map and also provides a message interface that makes the CSD statuses available for download. When the CSD device wants to provide status information, it connects to the CSD registration server. If the CSD device is accepted, the messages are queued and subsequently processed by the message engine. The statuses are stored in the database and are ready to be picked up.

Given the multitude of CSD technologies and different requirements shippers may have, it is required to have an intermediate layer that can standardise and communicate CSD status events in a technology agnostic way to the end user.

**SWOT analysis**

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One purpose of the SWOT analysis is to validate with the key stakeholders whether the solutions, either individually or integrated as described in the IT Solutions Framework, have sufficient potential to provide added value. Such SWOT is then linked to the added value these solutions can bring within the objective of the described “to be” process.

Another purpose of the SWOT analysis it to use a wider angle and see if real time visibility that is the main component within the IT infrastructure, is in line with the logistics business trends and thus also has future potential. What are the benefits and concerns when using real time data services by the logistics industry?

**Technology challenges**

In this section we list the technology challenges that need to be taken in to account for a successful set-up of the ICT Framework in an operational setting. They are specific for the technologies used within the given ICT framework. We list what technology related areas can become less obvious in an operational setting.

They are characteristics or dependencies identified by:

- Area: traceability, safety of goods, acceleration of custom processes, data
- Challenge: a short description of the challenge identified
- Mitigation: Activities to mitigate the given challenges.

Within a project demonstrator such challenges are equally valid as in a regular service schedule but less compelling as this runs under permanent monitoring and standby.

<b>Area</b>	<b>Challenge</b>	<b>Mitigation</b>
Traceability	CSD installation: Calibration of all track and trace sensors and equipment.	Maintenance plan for CSD sensors devices.
Traceability	CSD installation: Correct positioning of CSD’s in case they are not built-in	Operational trials can confirm the correct installation of the CSD
Traceability Safety of goods	CSD usage: Battery for self powered CSD has limited capacity.	Adjustable frequency for sending status messages.
Traceability	CSD & Visibility Dashboard: Operability of all devices during transport	CSD hart beat function and provision of alert notification to SCO in case of absence of CSD signal (flat line)

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Traceability	Integration: CSD manufacturer specific interfaces	Usage of a standardised message format (SDMF, FP7 SMART-CM)
Acceleration of custom processes	Customs communication: Requirements and standardisation for status communication with different EU Customs.	Acceptance of process and supportive technologies through Customs Utility Block
Safety of goods	Operational: Exclude all possibility of outside tampering of technical equipment	Physical security at passage points.
Acceleration of custom processes	Operational: Effective contingency planning	Monitoring protocols: * Forwarder * Intermodal operator * Technical partners
Data	Data velocity, variety, organizing, consolidating, data from various data sources	Use of multiple data sources and standardisation into events. It allows to easily replace unsatisfactory data sources with an alternative source.
Data	Data quality has to be sufficiently high to be useable for taking process conclusions on logistics chain status	Service Levels on data quality by uptime, frequency of status updates and latency of the data provided.
Data	Data volume can become increasingly high when using multiple data sources	The data storage cost per TB is still decreasing. Data retention policies to limit the bandwidth of historical data.

**Table: Technology challenges**

**Conclusions**

The stakeholders agree that the outcome of this SWOT analysis sufficiently confirms the ICT framework described.

There are certain threats and weakness found, which show that with existing CSD technologies there are additional logistics activities needed that form a level of overhead on top of existing operational processes. Such overhead activities will reduce when technologies further evolve towards built-in CSD devices.

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The Strengths and Opportunities confirm today's technology is suitable for supporting the "to be" process. For Customs this can lead to an increased level of trade facilitation, which is beneficial for commercial stakeholders. The possibility to use more data sources within a Visibility Dashboard will further increase the quality of situational awareness within the logistics transport chain.

The benefits and concerns of real time data service in visibility dashboards are also confirmed by trend reports. Supply chain visibility by making use of real time data sources provides benefits for both logistics provider and their customers. Trends show that visibility solutions can provide a sufficiently high impact on operating cost and service levels.

The technology challenges identified within the ICT framework can be overseen an more important can be mitigated. Technology has been sufficiently developed to support the operational process requirements.

### **Planning**

T13.2 is not a separate living lab with operational activities, but it uses a real-life case that can give input to CORE requirements and can validate CORE solutions. This has led to the definition of the "to be" process.

It is modelled as a best practice workshop from which problems or shortcomings in the present situation have been retrieved and in which the feasibility of CORE solutions addressing them have been evaluated

Commercial partners and Belgian Customs are interested and willing to demonstrate the "to be" process in an operational setting. In agreement with these partners a plan has been set up.

This deliverable document is due at M24 (1/05/16). Any demonstration activity falls outside the scope and timeline of this deliverable. Given the interest of the commercial stakeholders to further develop sustainable transport solutions and the close collaborations with Belgian Customs paying value to trade facilitation there is a willingness from both stakeholders to continue with an operational test case. Follow-up meetings with stakeholders have been planned in May 2016.

### **Conclusion**

Under Task 13.2 and its deliverables we have defined an improved customs export procedure for transit and export of goods using long-range transport. The process description has been developed together with the primary stakeholders, the Belgian Customs as well as representatives from the industry. The deliverable has paid specific attention to the Operational Process requirements. By the combination of process and operational knowledge by industry and customs a "to be" process has been developed that can be attested for further take up within a Customs Utility Block.

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We described how the “to be” process can be operated and what ICT measures are relevant. The IT solutions that are required to support our improved customs process can be provided by container tracking solutions and a Visibility Dashboard.

There are technical challenges recognised when running the simplified process in a regular service schedule. Such challenges are within the margins of a project demonstrator easier to mitigate due to limited scale and higher degree of supervision.

Realising such a set-up of processes however only makes sense when this will be implemented in a future concept with a balanced flow of goods. Such block train concept will enable the critical mass for a sustained economic viability as well as the mastery of all aspects be they operational, technical or technological.

A valuable add-on to this feasibility study is the ability to attest the “to be” process in real world, supported by industry partners and Belgian Customs. A plan has been agreed feasible by all stakeholders and has been included for reference.