D11.13 CORE Final report on phase one developments of the Security demonstrator - summary

Executive Summary

This deliverable D11.13 is the M24 report and describes the progress on Phase One developments of our Asia- Europe demonstrator made after the M18 report (D11.12). With this demonstrator we want to realize solutions for the challenges that our clients are facing to secure their trade lanes between continents efficiently and effectively on the physical level of goods, the level of information sharing and the level of financial flows. We have worked with our client Canon-OCE, which wants to have better insight, reliability and predictability of inspections concerning their trade lane. In this particular trade lane, they ship a mix of medium/high value products, both semi- and finished products. The transport end-to-end is completely organised by Seacon Logistics and uses multiple modes of transport in the following order: road, deep-sea, rail, barge, road.

We have recently prepared a Pilot on import containers from Malaysia to the Netherlands. Together with this client we selected around 100 containers a year within the scope of the Pilot. Since the transport time between Malaysia and Europe is often 3-4 weeks, it was decided to start with one test container with each order for measuring periods of 8 weeks. Within this Pilot, we want to test improvements with data integrity and goods integrity. Therefore, we have built a data pipeline as the Trusted Trade Lane solution with our partners. This Trusted Trade Lane contains standardized IT, procedures and data security which we can implement for a large group of customers. With this solution, we are able to support safe and secured trade lanes with a mitigation of security and operational risks and reducing costs by applying a more efficient supply chain for both commercial and public stakeholders.

In the M24 period, we have realized multiple tasks that can be divided, as follows:

- The final development of the tool
- Test phase of the data pipeline and data collection
- Continuous feedback, engagement and acceptance of stakeholders
- Evaluation and decisions taken
- Dissemination activities and next steps

The development of the tool and procedures contains four modules. Module 1, the Compliance tool and procedures, module 2 the Booking portal, module 3 the Tracking-tool and module 4 the Customs Dashboard.

For the final development of the tool and procedures, we adapted two modules out of the four modules of the data pipeline solution. First of all, we improved the look and feel of module 2, the Booking module, to make it more user friendly when entering data at the source. We also created a new functionality for module 3, the Tracking module. This add-on enables uploading/downloading documents and additional information, such as packing lists, B/L document, invoice by e.g. our agent in Malaysia. Using this functionality and the connection of the data pipeline with the Customs Dashboard (module 4), Dutch Customs Administration is able to perform their risk assessments earlier and in a more effective manner. Another benefit for our clients is that these documents are now always available online and therefore, they do not have to wait for a response which increases

efficiency in their logistics processes. Furthermore, we also developed additional KPI's (for example, documentation time, lead time, missed vessels and operational costs) to measure the logistics operation.

After the final development of the tool, we tested the data pipeline. For instance, we tested the upload functionality. The test showed that we now can monitor which of the assigned stakeholders in the Trusted Trade Lane uploaded documents, when and where. This provides additional control for customs and Seacon. We also tested the interface with the Customs Dashboard. These tests were successful. Each piece of information changed or added is visible for customs. For implementation, we also collected data in cooperation with the client in order to define cut-off values for the KPI. Since we just started the first Pilot and the lead time of the transport is up to 3-4 weeks, most of the operational KPI's could not yet be monitored. But we have monitored the KPI's on our different IT modules of the data pipeline that can be measured immediately. Module 1, the compliance tool and procedures showed, that in the last six months, two parties were identified as not trustworthy. The Seacon compliance team followed up their procedures, took counter measures and stopped this order. Module 2, the booking portal to track data, received from the source at origin (the real buyer and real seller or real consolidator) showed an increase in number of bookings. During the M18 report, we had approximately 22 bookings a week and in week 12 of 2016, we doubled the amount of bookings to 45.

By organizing multiple meetings with external and internal stakeholders, we managed to get a strong engagement and acceptance from these stakeholders of our solution. Internal Management is very positive of the operational benefits, like re-use of data and the connection with the Customs Dashboard. Customs was also impressed by the different modules of the data pipeline. Our agents and deep-sea carriers are willing to cooperate in the Pilot. But of most importance was that our client Canon-OCE was positive and resulted in full cooperation in the Pilot. As the Procurement Account Manager Logistic Services of Canon-OCE stated "The developed data-pipeline and -compliance procedures of Seacon strengthens both data- and goods-integrity of our inbound supply chain from Asia. It can provide Océ more visibility and transparency of the trade lane which, in return, enables us to execute this trade lane to Europe more efficiently and cost-effective." Finally, we consulted the other WP leaders. WP10 leader shared advantages of both data pipeline solutions, e.g. ours would be more flexible if data formats and requirements might change in future; WP10 has the advantage that if these data formats stay applicable for a long term the solution could be more efficient for re-use of data. With WP11.2 leader, Flora Holland, we exchanged ideas for Container Security Devices e-seals to improve the integrity of goods in the Pilots.

These meetings with the stakeholders provided us with feedback and helped us to evaluate the realized solutions. Based on these evaluations, we decided to introduce additional actions up until M48, some of which are currently in progress. For instance, based on the discussions with customs, we decided to focus not only on data integrity and integrity of partners, but also on goods integrity. Therefore, we selected two possible suppliers of CSD's/e-seals that improve the security of goods by tracking if something happens during transport. In the coming months, the final e-seal will be selected. We also decided to elaborate additional procedures on operational risks e.g. what actions are taken in case of delays. Finally, we selected multiple trade lanes of existing clients and deep sea carriers to create a bigger impact of this CORE Demonstrator. By also identifying multiple deep sea carriers, we can strengthen the roll out and avoid depending on a limited number. In case a carrier has limited IT capacity for instance to realize an interface for the pilot, we can cooperate with another carrier on the trade lanes. We also identified more clients on import trade lanes between United States-Europe, Asia-Europe and export trade lanes Europe-Africa. In total, we organized for these clients on these specific lanes around 1000 containers to consider which that could be applicable for Pilots. For one of the identified clients, we recently presented the data pipeline solution. This is a new client of Seacon

and their trade lane is focused on import of gardening products. This client has shown interest in the solution. With Canon-Oce and this new client, Seacon wants to aim at implementing a Trusted Trade Lane solution for between 150 and 250 containers per year to measure the effect and optimize their logistics processes.

We disseminated the results and progress of our CORE demonstrator in the M24 period via an article in a magazine of Dutch Customs and via a public TV-Channel. For the coming period till M48 we want to realise the following next steps.

- Finalize Pilot and measure results on a monthly base. By measuring we collect data for continuous feedback of the Pilot.
- Evaluation of the first Pilot and roll it out on other trade lanes of the same client
- Organize the return logistics process for the CSD's/e-seals for re-use on new incoming test containers
- Increase the impact of the Trusted Trade Lane solution by identifying six more clients which enable to increase the pilot shipments within CORE
- Fine-tuning already aligned procedures with all stakeholders locally at origin within the Trusted Trade Lane e.g. local agents and suppliers for every additional trade lane in the demonstrator
- Elaborating additional risk assessment processes for own operational processes
- Disseminate results CORE and our Pilots at conferences, articles

Problem, ambition and goal of demonstrator

The ambition of the Living Lab 'Design for Security' is to overcome challenges such as (unplanned) inspections whch clients are likely to face in their operations, causing uncertainty, which in turn impacts the lead time, the logistics processes and costs of the client. For this ambition, we want to realize in this demonstrator a Trusted Trade Lane solution. This solution should support safe and secured trade lanes with mitigation of security and operational risks and reducing costs by more efficient supply chain for both commercial (clients, agents etc.) and public stakeholders (customs, port authorities etc.).

With this ambition, the demonstrator enables and strengthens:

- Data re-use, automated data-exchange and data security between parties (e.g. client, transporter, customs) involved in the transport
- Door-to door track & trace to deliver supply chain visibility
- Decision support to risks assessment of parties, products, country, end-use and delays
- Aligned/common risk assessment and supervision for the total trade lane
- Integrated data pipeline between involved trusted parties in a supply chain to create seamless information sharing.

Short description of scope of the demonstrator

In this demonstrator, the focus is on end-to-end supply chains in order to provide insight in e.g. real seller, real buyer and to be able to gain data from the source. This provides possibilities for customs to optimize their risk assessment and gives shippers, logistics service providers the opportunities to control and optimize their logistics processes and performances. This is a win-win situation for all

partners involved. The end-to-end supply chains of different clients are selected for the Trusted Trade Lane.

Living Lab methodology

To realize results with this demonstrator, a Living Lab methodology is applied, which follows a cyclical approach. Through this cyclical approach, several solutions can be tested and re-adjusted/improved to fit the needs of the real-life environment.

Summary of Set-up phase

Till M18 of this security demonstrator the set-up phase is elaborated. All the elements in the set-up phase combined are the design for the Trusted Trade Lane solution. The following elements are elaborated in the set-up phase:

- A desk Research regarding the possibilities and effects of disruption in the trade lane between EU and Asia is executed during the first 12 months. The outcome is a cause and effect diagram based on a case study which is matched with the literature. This outcome resulted in a cause and effect tool which indicated where and which disruptions in the supply chain are possible to happen.

- To support the Trusted Trade Lane solution, we designed a modular IT system. Four modules are defined which can be used as a stand alone to create flexibility in the tooling. The purpose of the modular IT system is to secure the data quality, enable data sharing, and the re-use of data.

- Based on the design of the modular IT system, we created the data pipeline which integrates all modules to create seamless information sharing. Based on the built modules, we combined modules in the data pipeline into one solution within this Security demonstrator to realize the Trusted Trade Lane which is available for the parties in the Trusted Trade Lane. The data pipeline transfers information, documents triggers and timestamps which will be shared to those who are authorized. This data pipeline enables a better risk assessment for the Dutch customs and earlier involvement in the Trusted Trade Lane for the customs as well as our Trusted Trade Lane partners. Data flows between partners and the pipeline: Figure 1-3 shows the overall flow of the data pipeline, which provides more data and at an earlier stage to stakeholders, such as customs. This data pipeline is part of the CORE Ecosystem which is necessary to enable the CORE Capability for this demonstrator.

- Module 1, the Compliance module, is created to have an effective decision support tool to mitigate risks regarding parties, products, country, end-use, and delays.

- Module 2, the Booking module, enables the re-use of data and data exchange. The booking module can be used for different clients due to the fact that it is built universally and not customer specific. The tool is tested with different types of clients to make it more robust for the Trusted Trade Lane solution.

- Module 3, the Tracking module, creates the possibility for data re-use, automated data exchange and data security between parties (e.g. client, transporter, and customs) involved in the transport. The Tracking module is tested on several clients to make it robust enough for the Trusted Trade Lane solution.

- In the set-up phase, the connection is made between the data Pipeline and the Customs Dashboard. This connection is made in order to provide customs more transparency of the transport which enable them to check the integrity of the data, goods and stakeholders of the trade lane.

- During the set-up phase, we had regular contact with Intrasoft and the Dutch Customs Administration to align on the common risk assessment and supervision for the total trade. Without this alignment it would be impossible to create a Trusted Trade Lane Solution. The outcome is embedded into the Customs Dashboard and into the modular IT system.

After the alignment with our security demonstrator partners regarding the Trusted Trade Lane solution, we presented the final concept of the solution to the Dutch Customs Administration and to our potential clients for the trade lane.

Current status of the demonstrator in the **Living Lab methodology**

In this M24 report, the modules of the IT system which support the Trusted Trade Lane were realized and tested. We also obtained the full commitment of our client Canon-OCE and started the pilot with them. Some of the result in the M18 were adapted or further optimized in M24. These actions are elaborated in paragraph 2.2.

We finalised the first cycle of the Living Lab methodology in the M24 period. In the current situation, we are working on Living Lab steps 11-14, which are:

- Good Integrity (step 11): Currently we are identifying the possibilities and feasibility of Container Security Devices (CSD)/e-seals in order to not only realize improved data integrity in the demonstrator but also the integrity of goods. In this way, the right goods, numbers, packages, volumes etc. are in the container and we can control this during transport in order to ensure that nothing happens to the goods.
- We contacted the Living Lab leader of WP11.2 due to the fact that they use a CSD/e-seal. There are regular contact moments with the Dutch Customs authorities regarding this topic to make sure that the CSD/e-seal we will implement is approved by them as well.
- Regarding the CSD/e-seal (step 11) we contacted Itude as a provider of e-seals regarding their smart seal which is also used in the Flora Holland demonstrator. The smart seal of Itude is accepted by the Dutch customs to be used in a Trusted Trade Lane. We will contact another smart seal producer as comparison in Q2 2016.
- Securing operational procedures (step 12): Per Pilot client and depending on the lane, (additional) stakeholders e.g. at origin will have to be aligned with their procedures. We are discussing this with customs as well to secure and enlarge the impact of the Pilot.
- Risk assessment for during actual transport (step 13): Not only are the compliance checks of our trade lanes and risk assessments by customs important, but also operational risks (e.g. delays) have to be signalled. This already is a standard working procedure within the company; however, red flag procedures can be improved and are currently being elaborated and will be finalised in the coming months.
- Roll out (step 14): The trade lane of Client A, Canon-OCE is described. From Canon-OCE, we received positive support and they are participating in the “GO” for the Malaysian trade lane to the Netherlands. The pilot started in April 2016 and preparatory steps have been taken and are almost finalised. The carrier and agent who are involved in the Canon-OCE trade lane

have been contacted regarding the Trusted Trade Lane Pilot. The agent and carrier are both positive to cooperate in this Pilot.

Actions performed since last report

To ensure this demonstrator is a success, we tested until M24 thoroughly before implementing all modules. In M18, we described the modular IT system which supports the Trusted Trade Lane. The experience of previous projects like Cassandra and the ideas of the CORE Eco system have been of added value for our design and realized data pipeline. The build, testing, and implementation were split up into four modules: M1, M2, M3, and M4. During the past six months between M18 and M24 the modules were developed further with the help of the test results. Below, the actions realized after the last report are described.

- Defining KPI's: After the M18 report, we defined additional KPI's to measure the logistics operation. The following additional KPI's were defined: Documentation time, Headcount involved, Lead time, Missed vessels, Operational Costs. These KPI's, what is the unit, how they are measured, what is the impact etc. are described in more detail in paragraph 3.2.

- Module 2 – Booking: Since the last report, the only changes made to the booking module were those related to improving the lay out and user friendliness of the interface, in other words, the look and feel. We also changed the tool from test-environment to operational environment. Due to our efforts in implementing the tool, we have an error-free tool which we can implement for our Trusted Trade Lane. The following KPI's are involved in this module: Data quality, Usage booking portal.

- Module 3 – Tracking: Between M18 and M24, we updated the tracking module to create the possibility to upload/download documents and additional information, such as packing lists, B/L document, invoice. This is of great importance within the Trusted Trade Lane concept because it creates the possibility of data sharing between trusted parties without a party in between. By using this added functionality and the connection with the Customs Dashboard (module 4), Dutch Customs Administration gained insight with this additional information and having it at an earlier stage, which enabled them to perform their risk assessments earlier and more effectively. Another benefit, according to our clients, is the fact that documents are always available without having to wait for a response which increases efficiency in their logistics processes. Next, in this option, there is a possibility to track the shipment status and upload the status due to the timestamps which are made when an action is taken. The following KPI's are involved in this module: Data quality, Documentation time, Lead time, Operational costs.

- Module 4 - Customs dashboard: After our last report, multiple tests with the Customs Dashboard were executed. The first shipments of WP11.2 have already gone through the Customs Dashboard and some test files from Seacon. These tests resulted in a positive check if data is shared from the modules through the data pipeline to the Customs Dashboard. To boost the usage of the Customs Dashboard, the Dutch Customs Administration have trained a team which is ready to start using the tool for the Pilot. The following KPI's are involved in this module: Usage Customs Dashboard, Data quality, Documentation time, Customs inspections, Operational costs.

- Presentation Trusted Trade Lane Solution to stakeholders: Besides adding additional KPI's and modifications to the tools as described above, we presented within the M24 the final solution to our clients and agents. These stakeholders were all interested in this innovation in their supply chain. In paragraph 2.4, the engagement of the partners is further elaborated.

Decisions made since last report

After the M18 report, the development phase of our data pipeline solution, we have taken multiple decisions within M24 as a result of brainstorming sessions and discussions with our project partners and with project leaders in the past six months. The goal of these meetings was to modify and optimize our solutions, if required, based on their views, experiences and lessons learned in other demonstrators, or based on recent developments in trade facilitation. Based on these meetings, we took the following decisions to increase the impact of the Pilot:

- After testing of the interface with the Customs Dashboard, we discussed our set-up with Dutch Customs for the data pipeline and the way to implement it in our Pilots. Since working with the Customs Dashboard is relatively new for customs staff, identifying when a shipment is part of a trusted trade lane, it is understandable that the mind set in this direction still has to grow. Therefore, the decision with customs was taken with their trained CORE team to use data of previous shipments of clients as well before starting with live shipments.
- The Trusted Trade solution was welcomed by customs as a very big step forward and in line with their enforcement visions for supervision. Based on the discussion with customs, we evaluated that the solution is very well suited for data integrity, but good integrity can be further improved. Therefore, it was decided to use a two-step approach in the Pilot. The first step was to focus on data integrity and then roll out further in a second step to product integrity (by the use of e-seals or other methods for container security devices).
- With Living Lab leader of WP10, we also discussed opportunities and exchanged lessons learned. For instance, we discussed the importance of what is feasible for each stakeholder, such as when data is trusted enough on top of the AEO certification and mutually recognised programs of the stakeholders. One of the findings was that our solution with additional data and documents, and identifying who of the trusted partners adds this data or documents were sufficient, whereas WP10 chose to focus more on the data formats and align the data fields in their pipeline to WCO data fields standardization. Both procedures could have advantages e.g. ours would be more flexible if data formats and requirements might change in future, WP10 has the advantage that if these data formats stay applicable for a long term the solution could me more efficient for the re-use of data. We also discussed which commercial benefits can be reached for the customers based on both types of data pipeline developed in both demonstrators. We decided to keep each other informed.
- With WP 3.11 leader, we discussed if the tracing of vessels out of their solution can be used in our demonstrator. We decided to first start the Pilot with the currently developed tracking module and monitor this and see if this solution would be sufficient.
- Finally, we also exchanged ideas with Living lab leader of WP11.2. We decided to analyse and exchange the e-sealing solution for containers with one another and with Dutch Customs after we selected the possible supplier of these seals and following discussions with our clients.
- With the first client, Canon-OCE, it was agreed that we would start the Pilot and we decided on the scope of the trade lane. The pilot has now started with the trade lane between Malaysia and the Netherlands. Since the transport time between Malaysia and Europe is often 3-4 weeks, it was decided to start with one test container with each order for measuring periods of 8 weeks. This means that with a normal order forecast each week a container will be

monitored on the KPI's. The possible e-seals that will be used can then also be collected and be read before sending back to Malaysia for re-use in new batches of test containers.

Qualitative description of the demonstrator results

The set up phase for our design for the security demonstrator reached its goals and is ready to roll out in actual trade lanes. As mentioned in chapter 2, we decided to roll out the Pilots and use cases of our clients in two implementation phases:

- Implementation phase one (Q2/Q3/Q4-2016): Focus on data integrity
- Implementation phase two (Q1/Q2/Q3-2017): Implementation phase one + Focus on product integrity (by the use of e-seals or other methods)

During phase one, we focused on the integration and integrity of the data within the Trusted Trade Lane Pilot. This is the backbone for the re-use of data and data sharing. This provides a more efficient organised supply chain and improves the supply chain visibility. For our first Pilot, client CANON-Oce and its use case, we can predict and monitor the status of the shipment and the status of the documents added during the supply chain. This will help the client in an optimized operational execution of inbound flows. During the Pilot which started in April 2016, data is being monitored. The additional data (e.g. packing list, invoice, B/L etc.) will be shared earlier and thereby provide faster insight for customs due to the integrated data pipeline solution.

On the trade lane between Asia and Europe (Malaysia to the Netherlands) Seacon organizes the full chain for CANON-Oce. This lane contains different types of products both semi- and finished products (spare parts and copiers). The products are medium to high value products. Multiple partners are involved. Transport is organised via different modes of transport. For this lane, pre haulage of the containers is done by road. Between the ports the transport is organised by deep-sea carriers. From Port of Unloading to the client in the hinterland, mainly intermodal transport via barge or rail is used, but in some cases this is done by road. From the terminal in the hinterland the transport is always done by road.

On this trade lane, we will be checking the compliance (trusted partners, products), the operational risks (delays etc.) and we will be tracking and monitoring different milestones. For this lane, we will monitor the shipment status on various points (loading of container, activation of CSD's/e-seals, receiving documents, loading at port, receiving the B/L, upload moments of documents and others including the moment of unloading and deactivation of the CSD's/e-seals) in order to gain more insight and to be able to act faster when needed. The monitoring on the CSD's/e-seals will be organized later this year after we have made the final selection of the e-seals. The use of CSD's/e-seals enables us to monitor and register the integrity of goods better since this seals captures for instance if a container was opened by an approved person or not.

In cooperation with the client, we want to follow around 100 containers a year within the scope of the pilot. We will start with batches measuring one or two containers per batch of containers that is shipped to Europe. Mostly, this is a constant flow of containers per week. Since the transit time between Malaysia and Europe is often 3-4 weeks, we decided to start by one test container with each order for a period of 8 weeks. Meaning that with normal order forecast each week one container will be monitored on the KPI's. We started with the preparation of this pilot in April 2016 by defining the KPI's on this specific lane. Canon-OCE has ordered their supplier to cooperate. Currently, we are describing working procedures and instructions regarding what additional data our agent and the supplier has to deliver, at what precise time in the process, how fast it has to be put into the data pipeline, who the contact persons and details are for the pilot shipment. We monitor the current

delays, no delays occurred so far. Within the next month the first trail shipments will start and will be monitored completely. We have already started with measuring the KPI's that can be measured like the booking portal and the non-compliance registration. In paragraph 3.2, these results are described.

After the Pilot Trade Lane from Malaysia to Netherlands is finished, together with CANON-Oce it will be decided if we will also test their Trade Lane between US and Europe in the Pilot in the period M24-M48. The products on this lane are only finished products with high values. The transport on this lane is organized by multiple modes (road, deep-sea,-rail, road). The lane, the milestones and moments of using the CSD's/e-seals will described in full details when it's decided to test this lane in the next Pilot.

KPI values on (technical) solutions tested in the demonstrator

For the implementation of the Pilots, we have discussed and described relevant KPI's in the project period. As stated in paragraph 2.2 we also added new KPI's after we had more in depth discussions with our stakeholders. The KPI Documentation time, Headcount involved, Lead time, Missed vessels and the KPI Operational Costs have all been added.

Since we finalized the first cycle of the Living Lab and started the first Pilot very recently, most of the operational KPI's could not be monitored yet. Hence, we have monitored the KPI's on our different IT modules of the data pipeline that can be monitored immediately. The past six months, the compliance tool and desk identified two parties that were not trustworthy. The compliance team followed their procedures, took counter measures and cancelled this order.

Next, the KPI's for the booking portal was monitored. During the M18 report, we had approximately 22 bookings a week and in week 12 of 2016, we doubled the amount of bookings to 45. This increase of bookings is the result of a strong focus of Seacon on the implementation of the Trusted Trade Lane and due to the acceptance of the solution by our clients. Through these bookings we collect data to analyse and which can be shared via the data pipeline.

We expect an increasing trend due to the implementation of the Trusted Trade Lane with our partners and because we are still implementing the solution with other partners. Due to this increasing scale of the test-phase, we have created a solid tool for our Trusted Trade Lane concept.

Next steps

In the second cycle of the Living Lab, we have planned several additional actions. These actions (results 15-18) as summarized in figure 1-1 and the table in chapter 1.) are foreseen for the coming period M24-M48 Phase Two:

- Finalize the Pilot and measure on a monthly bases. By measuring we collect data for continuous feedback of the Pilot.
- Evaluation of the first Pilot and roll out on other trade lane of the same client
- Organize the return logistics process for the CSD's/e-seals for re-use on new incoming test containers
- Increase the impact of Trusted Trade Lane solution by identifying six more clients on top of the current two use cases to increase the pilot shipments within CORE (maybe up to 1000 containers a year). (result 15).

- Fine-tuning already aligned procedures with all stakeholders locally at origin within the Trusted Trade Lane e.g. local agents and suppliers for each additional trade lane in the demonstrator (result 16)
- Elaborating additional risk assessment processes for our own operational processes (result 17)
- Disseminate results CORE and our Pilots at conferences, articles (result 18)