

## D14.3 CORE Final report on phase one developments of the FALACUS demonstrator - summary

### Executive summary

The present document represents the final report on the first implementation phase of the Work Package 14 demonstrator.

The FALACUS demonstrator aims at demonstrating the integration of best of breed technology and risk mitigation measures proposed by the CORE project as part of the door-to-door services to reduce bottlenecks at the border and improve the overall supply chain performances.

The first implementation phase, reported in this deliverable, has focused on the first part of the demonstrator business scenario, from Ceramiche Caesar (consignor) warehouse (Modena area) up to the port of loading (La Spezia). The entire of the demonstrator includes also the maritime transport to USA and the last mile delivery from the port of destination (in USA) to the final client. This part of the scenario requires further investigation and analysis before being implemented; it will be part of the next period activities and tasks to complete the analysis and undertake the related implementation. In particular, the implemented scenario focused on three applications supporting the different transport phases:

- *ST2SP - Secure Terminal & Transport Service Publisher*, supporting the preparation phase, by allowing the publishing of the logistics and transport services to be used for the planning phase through SCOSD module (see below). Each logistics node (i.e. Interporto Bologna and La Spezia port) or LSPs can, through this module, exploit the visibility of its services offered as well as the level of security offered (given by security index); the latter, recorded based on historical data and updated after each service performed or based on new security measure introduced, can function as a powerful commercial leverage for the stakeholder offering services.
- *SCOSD - Secure Corridors Operational and Strategic Dashboard*, supporting the planning phase through secure transport planning services thanks to the introduction of a security risk index as criteria in the planning decision process. The SCOSD module consists of an advanced DSS (Decision Support System) offering the possibility of a dynamic planning based on different criteria, such as time, costs, CO2, but also security standards reported for each single leg, node and service composing the transport chain, supporting the design of the “green” trade lane.
- *SMCOM - Secure Multimodal COrridor Monitoring*, supporting the execution phase by monitoring of the cargo along the chain both in terms of security and logistics statuses, enhancing the complete visibility on the cargo along the chain. Being integrated with the other modules of the FALACUS solution and with the different security/monitoring technology it can help the cargo owner in preventing security risks or disruptive events damaging the cargo.

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System operation is supported by 'horizontal' tools that support integration and human interaction. The SC2S - Supply Community System facilitates the B2B/ B2G communication between business stakeholders and/ or authorities and the interfacing of FALACUS stakeholders MIS with CORE. The GSCVT - Global Supply Chain Visibility Tool supports the user experience through a set of Human to Machine Interfaces (HMI) to present on demand static (nodal, modal, multimodal operational and security features) and dynamic information concerning logistics and security monitoring reports (status, threat events, alarms) to involved business stakeholders and authorities.

In order to test and simulate the operation of the surveillance technology and of the FALACUS solutions, a threat events scenario has been created and applied during the testing, returning security statuses and alerts.

The main details, activities and outputs of this implementation phase have been reported in chapters 3 and 4 of the full report for this deliverable, where three applications of the FALACUS system are described and presented in relation to the processes of the supply chain. In addition, the relevant outputs of the implementation activities are reported; the initial list of identified KPIs have been improved and enriched after the implementation phase, both from a qualitative and quantitative point of view; the baseline value collection has been refined for the implementation phase, by involving the users on the designed threats scenario and asking for their contribution and feedback.

### **Problem, ambition and goal of demonstrator**

In order to address the need for integration of security into logistics and also the specific needs related to the selected supply chain, FALACUS aims at creating a secure corridor/channel, a "green lane", from Interporto Bologna (node of Origin) to the port of destination or the inland terminal in USA (node of Destination), supported by:

- security devices spotting security risks along the supply chain;
- the FALACUS solution integrated with the CORE platform ensuring the end-to-end visibility and the secure information flow between the stakeholders involved.

The FALACUS demonstrator founded its origin in a ceramic tiles supply chain, consisting of an export flow from Emilia Romagna region (Italy) to USA. USA represents one of the top three export markets for Emilia Romagna region, thus there are significant export flows towards USA. Currently, the export activities in USA are ruled by strict procedures, formalities and controls in terms of security which generate significant lead times at all steps of the transport with corresponding costs and reduced end customer satisfaction. Furthermore, regulatory authorities undertake increased number of inspections due to the lack of a continuous D2D tracking profile with corresponding efficiency impacts. From the business point of view, the cargo control and the accessibility to related information along the chain by the shipper is limited, achieved through ad-hoc communications with the forwarders involved. These elements imply interoperability and interconnectivity problems among the involved parties,

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both at nodal and modal LSPs, generating risks and threats of information integrity and security.

FALACUS aims at encompassing current and emerging security regulatory, policies and standardization recommendations, new business models, fostering increased visibility and operational collaboration, as well as relevant advanced security management capabilities, as specified and developed in CORE, to increase the prompt tracking, detection and mitigation of security threats all along the supply-chain. Specific ambitions of the demonstrator are described in the next sections.

In this direction, the demonstrator focused on the spotting of the most critical security threats along the chain (presented in D14.2) and each threat has been associated with a risk factor calculated based on historical data. The demonstrator solution has been developed based on these outcomes, with the scope of tackling all the identified threats and risks and contributing to secure the trade lane by enhancing the security controls and the end-to-end visibility of the cargo along the chain.

Then, every supply chain using this “green lane” can upgrade its level of security and be considered as secure.

The main supply chain steps relevant for security are:

- Design and planning of the Transport chain.
- Cargo visibility along the supply chain.
- Control of the cargo security along the supply chain.
- Cargo data and information availability along the supply chain.

In this respect, the FALACUS demonstrator undertakes targeted actions to support:

- a) the Public Authorities like Customs and Inspection Authorities in their Risk Management strategy and the actions to be taken towards illegal action elimination;
- b) the Business Sector to provide secure and efficient services;
- c) the supply chain planning considering the security performance of the transport corridors;
- d) the operational efficiency and security of the supply chain with visibility tools during execution.

The expected impacts and results from the approach and the solutions implemented within the FALACUS demonstrator are:

- Increased visibility along the supply chain.
- Enhanced end-to-end security level of the cargo.
- Collaborative approach promoted between the stakeholders and authorities involved.
- Provision of added value information on the cargo to the different stakeholders and authorities in relation to their role along the chain.

### **Summary of Set-up phase**

The Living Lab 14 activities performed during the first 18 months of the project were mainly driven by the Tasks and Sub Tasks listed in the Description of Work (for Work Package 14) and

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also by the schedule of the two reports and their methodology (Living Lab). All the activities have been coordinated by IBI and performed together with all the other partners of the Living Lab.

At the beginning of the activities, Living Lab 14 experienced a delay caused by a change of the shipper: the original company involved was faced with severe financial problems which obliged it to withdraw from the project. Fortunately, a new shipper joined the project, with a wider ambition and also a higher relevance in business terms, improving significantly the Living Lab value. Thus, the Living Lab, even with some months of delay, started its activities by pushing hard in order to recover this delay.

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

The FALACUS demonstrator, within the Living Lab 14 methodology, is currently in the implementation phase and, more precisely, in the first phase of its implementation. During this first implementation phase some of the IT components developed in both WP5 and WP8 have been implemented, in particular:

- ST2SP - Secure Terminal & Transport Service Publisher,
- SMCOM - Secure Multimodal Corridor Monitoring
- SCOSD - Secure Corridors Operational and Strategic Dashboard.

Furthermore, activities to upgrade the Multimodal Transport Chain Management System of IBI started and are currently taking place in the context of WP14. Some refinements and adaptations are currently ongoing, following the dynamic progress of the Living Lab.

A lab simulation of the demonstrator scenario has been performed and it has been reported and described in chapter 4 of the present report.

Concerning the activities related to the overseas authorities' involvement, as mentioned in the previous paragraph, they are ongoing but they need to be boosted in the incoming period. Other partners from CORE, following and managing the Customs working group, will be more involved to help and smooth out this process.

### **Actions performed since last report**

While FALACUS functions and use cases have been presented and described in the Living Lab report D14.2, at the submission date the function and use cases related to the Security for Business (Function 2) were the only ones not compiled to. In the last months, IBI worked closely with the shipper to define and detail Function 2 and the use cases; a full description of which will be integrated in D14.4.

### **Decisions made since last report**

The main discussions and decisions made during the last six months are described below:

- As the demonstrator corridor is important in terms of business and freight flows, an expansion of the demonstrator's scope and ambition was discussed. Furthermore,

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after analysing and studying the ceramics tiles supply chain scenario, it was found that the scanner technology could not be exploited properly. The reason for this was that scanning technology relies on the commodity typology and the maximum threshold of x-ray intensity imposed by the law: ceramic tiles have a high density and the portable scanning technology has a limit imposed by the law for the x-ray intensity to guarantee safety conditions for human operators. These aspects prevent any mobile/portable scanning technology from returning optimum results by scanning containers filled with palletized ceramic tiles cargo. The possible new scenarios extending the current one, involving other type of cargo and empty containers are currently under investigation by IBI, SMITHS and the Freight Forwarder.

- The involvement of the overseas authorities in the Living Lab activities is a demanding task: while the process of establishing contacts with them started since the beginning, the Living Lab partners decided to speed up first the definition of the demonstrator shape, in order to clearly present the case, its main objectives, the ideas and identify the needs to be discussed with the authorities. With the finalization of this report and the demonstrator TO BE scenario, the “political” actions and technical activities to be performed with the authorities will be boosted in order to bring them back on track. In order to pursue this objective, a task force was created with key selected partners: Ceramiche Caesar, IBI, Italian Customs, LSCT, Confindustria Ceramica.

The discussions and decisions listed above, are fully in line with the FALACUS demo key elements:

### **Dissemination activities performed during past months**

During the past months, the focus of the dissemination activities was given to external stakeholders strictly involved in FALACUS demonstrator (namely: Italian Customs, Kuehne Nagel, Ceramiche Caesar USA, Confindustria Ceramica). CORE and FALACUS achievements have been presented in order to gradually increase their involvement in the LL and especially with the eye on the piloting activities. Meetings in person, for example with Kuehne Nagel, but also telcos took place for collaboration. Communication with authorities is already started as well (as described in paragraph 2.4).

Indeed, there is the need to further boost the dissemination aspects, especially towards potential external stakeholder. This will be done by exploiting the LL partners’ business contacts and network. The focus will be placed mainly on the business sector than on an academic/research environment. In addition, following also CORE project dissemination activities, a list of potential public events, conferences and seminars, both at national and international level, will be selected for participation

## **Results of solutions tested in the demonstrator**

This section of the full report presents representative screenshots from the implementation activities described in section 3.2.3. For reading facilitation purposes, it follows the same structuring of the reference section, i.e. the main transport phases and the systems implemented per phase.

### **Stakeholder acceptance: Qualitative level of “adoption willingness” of internal and external stakeholders**

The definition of the general FALACUS solution has been shared and presented to the stakeholders involved, both internal and external, with a different level of details. Some of the partners, such as IBI, Ceramiche Caesar and La Spezia Container Terminal, were more involved in the first implementation phase, thus they reported also their level of acceptance specifically focused on the modules implemented. *(Note: the orange label is for the CORE partner; the blue label is for the external stakeholders)*

### **Next steps**

The following actions are planned to take place in the period till the end of the project at a demonstrator level:

- Collection of KPIs values from simulated and real demonstrator scenarios and comparison with the baseline values collected so far.
- Gradual involvement of other stakeholders to the implementation activities in accordance with the FALACUS solutions implementation
- Assessment and evaluation of the solutions implemented and tested through the KPIs evaluation and stakeholders’ feedback.
- Collection of historical data from the users regarding operational and security performances supporting qualitative and quantitative assessment.
- Completion of the development and implementation activities for the business scenario of Ceramiche Caesar; the activities will be refined in order to better respond to cover the requirements for the activities inside the CC warehouse till the cargo delivery to road operator.
- Involvement of overseas partners and supporters (consignee and LSPs in USA) in the implementation/piloting phase; mobilisation of the community in USA in order to complete the business case scenario and define the ways of implementing and demonstrating the FALACUS solution.
- Involvement of overseas authorities: the activities will be boosted and better structured; the two levels approach already adopted will help the LL14 team to strengthen the action related to this task.
- Define the new implementation scenario for the Next Generation Scanning technology; alternative transport chains (general cargo and empty containers) will be defined, analysed and reported.

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- Workshops and collaboration with FALACUS stakeholders and partners; more workshops either technical, on site visits and skype calls will be organised in order to ensure the involvement and evaluation of FALACUS progress.
- Dissemination activities of FALACUS first results; presentation of FALACUS first achievements in seminars, relevant events will be chased in order to improve the dissemination of CORE and FALACUS results.

The next steps concerning the development and implementation activities in the demonstrator include the following:

- Development of interfaces between ST2SP and static Risk Assessment tools (WP3) to incorporate threat analysis results (i.e. threats, and probabilities) concerning vulnerability points of the SC
- Development of interfaces between SMCOM and dynamic Risk Assessment tools (WP3) to detect threat events during transport execution
- Completion of SCOSD (WP8) development to provide Visibility for operational and security events on cargo flows along a multimodal corridor for different stakeholders (e.g. shippers, forwarders, authorities)
- Implementation of KPIs, security profiles and statistics in Assessment & Benchmarking to support the demonstrator's operation
- Development of TOASO tool and implementation of workflows and integration between terminal management systems in order to monitor the operations of the inland intermodal terminal of Bologna and port terminal of LaSpezia.
- Implementation of the messages for the collaboration between SC stakeholders and SC Stakeholders and Authorities (e.g. CT/PAT, Truck / Container preannouncement, etc)
- Completion of B2B Integration between SC stakeholders' systems and CORE to provide status and incident reporting (i.e. shipper, carriers (road, railway undertaking, maritime), Customs, Interporto Bologna, LaSpezia container terminal)
- Full scale integration and testing between surveillance technology solutions and CORE applications (i.e. eSeal for door integrity control, Container Security Device for internal environment control, Mobile terminals/ PDAs for checking physical status condition).