



Intelligent Transport System for Innovative Intermodal Freight Transport

Deliverable No. D1.3

List of evaluation criteria

Work package no.:	1
Work package name:	Analysis Phase
Lead participant:	RWTH
Nature of Deliverable ¹ :	R
Dissemination level ²	PU
Due del. date from Annex I:	4
Actual delivery date:	November 27 th 2013
Version	V1.0
Status:	Final

¹R = Report; P = Prototype; O = Other

² PU = Public; RE = Restricted to a group specified by the consortium CO = Confidential, only for members of the consortium (including the Commission Services)

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	i
---	--	---

Overview	
Author(s):	Max Klingender (RWTH), Alexia Fenollar Solvay (RWTH)
Contact Person(s)	<p>Alexia Fenollar Solvay</p> <p>Organisation: ZLW/IMA & IfU der RWTH Aachen</p> <p>Address: Dennewartstrasse 27, 52070 Aachen, Germany</p> <p>Email: alexia.fenollar@zlw-ima-ifu.rwth-aachen.de</p> <p>Tel: +49 (0) 241 / 80911-41</p> <p>Fax: + 49 (0) 241 / 80911-22</p>

Review:		
Date	Version	Reviewed by:
22.10.13	V0.1	Alexia Fenollar Solvay
14.11.13	V0.2	Sebastian Thelen (RWTH)
27.11.13	V0.3	Henning Herz (Gefco)



History			
Version	Date	Person	Changes
0.1	14.08.13	Max Klingender	Document drafting
0.2	22.10.13	Alexia Fenollar Solvay	Executive summary; Chapter 2
0.3	15.11.13	Sebastian Thelen	Document review
1.0	27.11.13	Alexia Fenollar Solvay	Final document

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	iii
---	--	-----



Table of Contents

1. Executive summary	1
2. Description of Milestones.....	3
2.1 Milestones Overview	3
2.2 Milestone 1: Programme of Visions.....	4
2.3 Milestone 2: Solution Space	6
2.4 Milestone 3: Programme Description Book.....	7
2.5 Milestone 4: Approval for Production	8
2.6 Milestone 5: Proof of Concept.....	10
2.7 Milestone 6: Final Project Presentation	12
References.....	15
Annexes.....	16
Annex 1: Example Quality-Gate-Model.....	16

<p>2013 11 27 List_of_evaluation_criteria_D1.3_V1.0</p>	<p>© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission</p>	<p>iv</p>
---	---	-----------



List of Tables

Table 2.1: Milestones Overview	3
Table 2.2: Milestone 1	5
Table 2.3: Milestone 2	6
Table 2.4: Milestone 3	8
Table 2.5: Milestone 4	9
Table 2.6: Milestone 5	11
Table 2.7: Milestone 6	13

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	v
---	--	---



1. Executive summary

A quality gate model is established in TelliSys project to monitor the progress of milestones and deliverables. In order to ensure a successful and efficient project, evaluation criteria are developed and described in this document. The whole project includes 6 milestones and a total of 26 deliverables.

The first milestone, **Programme Vision**, contains general conditions of the project and the administrative management. General requirements are established and guidelines for further development processes are set. Next milestone, **Solution Space**, presents all technical feasible concepts of the TelliSys components. These concepts will be evaluated using different methods and approaches, in order to decide the concept to be further design. The **Programme Description Book** (milestone 3) describes in detail the solution to be designed and built. Each component will be designed following the Programme description book. The fourth milestone, **Approval for Production**, will be reached when the reports on the design of the MegaSwapBox (MSB), the trailer and the low deck tractor are finished. At this point the construction phase begins. Next step is the **Proof of Concept** (milestone 5) where the prototypes are built and tested on an intermodal freight corridor. After testing the first prototypes, an optimisation loop is integrated in order to allow additional improvements to the developed system. The **Final Project Presentation** (milestone 6) is the project's final act, where the results from the demonstration phase will be shown and the project in general will be presented publicly.

To successfully reach a milestone, all criteria set by the quality gate model have to be fulfilled. The criteria are related to time, costs and quality of the deliverables and are agreed by the Project Co-ordination Committee (PCC), the project management and the advisory board. This model uses the "traffic light principle" where red stands for not finished deliverables, yellow for a not sufficient quality of deliverables and green for accepted deliverables. An example of this model is shown in Annex I. Only if all deliverables of a milestone are "green", payments which are scheduled for the partners can be authorized.

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	1
---	---	---



Otherwise countermeasures (e.g. by correcting the time or the costs) have to be initiated to pass a quality gate. This document contains all criteria necessary to fulfill in order to reach a milestone.

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	2
---	--	---

2. Description of Milestones

2.1 Milestones Overview

The project is comprised of six milestones spread along the total project life-time (three years). Table 2.1 gives an overview of the project milestones. The table declares the responsible partner (lead beneficiary), the associated work packages and the delivery date for each milestone.

Table 2.1: Milestones Overview

Milestone number	Milestone name	WP number	Lead beneficiary number	Delivery date from Annex I	Comments
MS1	Programme of Visions	WP1, WP7, WP8	7	5	Dedicated list of lead-user requirements which is approved by the Advisory Board.
MS2	Solution Space	WP2, WP7, WP8	2	10	Collection of various concepts for design solutions: technical drawings, calculations and descriptions of concepts are completed.
MS3	Programme Description Book	WP2, WP3, WP7, WP8	1	13	Crucial point of the project (design freeze): based on an extensive evaluation and on the remarks of the Advisory Board the decision on the concepts to proceed with is mutually made.
MS4	Approval for Production	WP4, WP7, WP8	5	19	The manufacturing documents (e.g. drawings and part lists) are completed.
MS5	Proof of Concept	WP5, WP6, WP7, WP8	8	28	The prototypes of modular MegaSwapBox, adapted trailer and tractor are built and tested on an intermodal freight corridor.
MS6	Final Project Presentation	WP5, WP6, WP7, WP8	1	36	Presentation of optimised prototypes, results of the demonstration phase and the course of the project in general to the interested public.



2.2 Milestone 1: Programme of Visions

This milestone belongs to the analysis phase. The main tasks will be to establish general conditions of the project, gathering requirements and the administrative management. It should be delivered till the 5th month of the project. The deliverable has been delayed due to extensive lead user interviews which were held until end of July.

Following deliverables belong to this milestone:

- Web based virtual project platform (D9.1): A virtual platform has to be implemented, the accounts for the partners generated and a user manual should be available. This platform is established for an optimal dissemination of the project results between the partners. All information will be uploaded and directly available for the partners.
- Project management manual (D9.2): Contains the rules for the project execution regarding the consortium organisation and financial issues.
- Report on risk mitigation (D8.1): A risk analysis has to be completed and accepted and a risk mitigation plan has to be worked out.
- Report on Market Analysis (D1.1): Contains an as-is analysis on existing European standards and norms concerning the MegaSwapBox and the low deck tractor and a survey of the actual use of loading units in all transport modes.
- Report on lead-user requirements (D1.2): The “Interview Guideline” questionnaire has to be filled out to get information about the requirements for a future innovative MegaSwapBox, low deck tractor and chassis.
- List of evaluation criteria (D1.3): The requirements for the quality gates are defined and a quality-gate-model is established.
- Programme Vision (D1.4): Summary of the results of this milestone.

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	4
---	--	---

Table 2.2: Milestone 1

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Web based virtual project platform (D9.1)	Implementation of a virtual project platform	2	2.55	Virtual platform is implemented, accounts for partners generated, user manual available and first content uploaded.
Project management manual (D9.2)	Establishment of a project management manual	2	1.00	Project management manual is established and delivered to partners; the document contains rules for the project execution on consortium level and on financial issues.
Report on risk mitigation (D8.1)	Risk Analysis	3	6.00	Risk analysis completed and results accepted; risk mitigation plan worked out.
Report on Market Analysis (D1.1)	As-Is (Market) Analysis	3	7.80	Literature review on current intermodal market aspects and questionnaire "Interview Guideline" filled out by lead users.
Report on lead-user requirements (D1.2)	Lead user Interviews	4	8.00	Questionnaire "Interview Guideline" filled out by lead users and data is processed.
List of evaluation criteria (D1.3)	Identification of evaluation criteria	4	5.05	Requirements for the quality gates are defined and a quality-gate-model is established.
Programme Vision (D1.4)	Definition of Programme Vision	5	2.55	Summary of the results of this milestone.

¹Delivery date from Annex I of the Grant Agreement [1]

² Person Months

2.3 Milestone 2: Solution Space

In this milestone the solution space will be defined which summarizes all technical feasible concepts of the TelliSys project. Delivery date is the 10th month from project start but has been delayed to line up with milestone 3 because of interactions between both milestones which had not been addressed by the initial milestone planning.

Following deliverables belong to this milestone:

- Solution Space (D2.1): Conceptual designs of MSB, trailer, low deck tractor and tyres have to be created. For each concept the technical drawings of individual components are available and proved for feasibility. Also FEM calculations for the components have to be made and CAD models of the feasible components have to be created. In addition a description on the functionality of individual components and their interaction should be available.

Table 2.3: Milestone 2

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Solution Space (D2.1)	Conceptual Design of modular MegaSwapBox	10	34.85	Technical drawings of individual components are available and proved for feasibility.
	Conceptual Design of Trailer			FEM calculations of the main components are made.
	Conceptual Design of low deck tractor			CAD models of feasible components are available.
	Conceptual Design of Tyres			Description on the functionality of individual components and their interaction.
	Definition of Solution Space			List of established systems or/and concepts for new tracking/tracing systems are worked out. Summary of all feasible concepts



2.4 Milestone 3: Programme Description Book

This milestone describes the project's evaluation and decision phase, which ends with a mutual decision on which concept is to be used to build the prototype. The milestone is scheduled for month 13.

Following deliverables belong to this milestone:

- Report on Concept Evaluation (D3.1): Concepts have to be evaluated by profitability, usability, environmental impact and technical feasibility. A profitability evaluation includes static, dynamic and extended profitability analysis. After the criteria for handling, transportation, loading/unloading and theft safety are defined, the concepts have to be evaluated regarding their usability. In order to evaluate the environmental impact, criteria for production, use and recycling of the product have to be defined. The evaluation based on the lead user requirements and the availability of vendor parts and raw materials is reported.
- Programme Description Book (D3.2): The decision for one concept based on the results of the evaluation and the description of this concept, which is to be pursued to build the prototype.

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	7
---	--	---

Table 2.4: Milestone 3

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Report on Concept Evaluation (D3.1)	Evaluation of Profitability	12	23.40	Static, dynamic and extended profitability analysis are completed and evaluated.
	Evaluation of Usability			Criteria for handling, transportation, loading/unloading and theft safety are defined and evaluated.
	Evaluation Environmental Impact			Criteria for environmental impact during production, use and recycling of the product are defined and evaluated.
	Technical Feasibility Studies			Technical feasibility studies are made and evaluated.
				Evaluation based on the lead user requirements.
				Evaluation based on the availability of vendor parts and raw materials.
Programme Description Book (D3.2)	Definition of Programme Description Book	13	2.35	Decision based on the results of D3.1 for which concepts to pursue and description of this concept.

2.5 Milestone 4: Approval for Production

Based on the results of the previous milestones, this milestone describes the first design phase of the project, which has to be finished till the 19th month.

Following deliverables belong to this milestone:

- Report on design of modular MegaSwapBox (D4.1): Engineering design of a modular MegaSwapBox containing FEM calculations, technical drawings and CAD models of each component, the different modules and the entire, technically feasible, MegaSwapBox. An order-ready part list, which includes standard components, raw

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	8
---	---	---

materials and components to be manufactured, is included. The report addresses the integration of a tracking/tracing system.

- Report on design of trailer (D4.2): Engineering design of a trailer with FEM calculations, technical drawings and CAD models of each component, the different modules and the entire, technically feasible, trailer. An order-ready part list, which includes standard components, raw materials and components to be manufactured, is included.
- Report on design of low deck tractor (D4.3): Engineering design of a low deck tractor with FEM calculations, technical drawings and CAD models of each component, the different modules and the entire, technically feasible, low deck tractor. An order-ready part list, which includes standard components, raw materials and components to be manufactured, is included.

Table 2.5: Milestone 4

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Report on design of modular MegaSwapBox (D4.1)	Engineering Design of modular MegaSwapBox	19	31.00	FEM calculations for the selected MSB, trailer, low deck tractor and tyres are made.
Report on design of trailer (D4.2)	Engineering Design of trailer	19	13.75	Technical drawings of each component, the different modules and entire, technically feasible, MSB, trailer, low deck tractor and tyres are available.
Report on design of low deck tractor (D4.3)	Engineering Design of low deck tractor and tyres	19	32.75	CAD model of each component, the different modules and entire MSB, trailer, low deck tractor and tyres are created. Order-ready part list for the MSB, trailer, low deck tractor and tyres (standard components, raw materials and components to be manufactured). Integration design of a tracking/tracing system.



2.6 Milestone 5: Proof of Concept

This milestone deals with the first prototypes of the TelliSys components and their test runs under different conditions, it has to be delivered until the 28th month.

Following deliverables belong to this milestone:

- Prototype of a modular MegaSwapBox (D5.1): Manufacturing a prototype of a MegaSwapBox with certificates for an unrestricted use on all transport chains.
- Prototype of trailer (D5.2): Manufacturing a prototype of a trailer with certificates for an unrestricted use on all transport chains.
- Prototype of low deck tractor (D5.3): Manufacturing a prototype of a low deck tractor and tyres with certificates for an unrestricted use on all transport chains.
- Report on evaluation of first test runs (D6.1): First test runs have to be carry out on road, rail, short sea and inland shipping as well as on different test cases, which have to be identified, for terminal handling and loading/unloading processes. The results have to be documented and evaluated by operational and technical criteria.

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	10
---	--	----

Table 2.6: Milestone 5

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Prototype of modular MegaSwapBox (D5.1):	Prototyping of certified modular MSB	25	23.55	<p>Manufacturing of operational MSB, trailer, low deck tractor and tyres.</p> <p>Certificates for an unrestricted use of the MSB, trailer, low deck tractor and tyres are available.</p>
Prototype of trailer (D5.2):	Prototyping of certified trailer	25	6.55	
Prototype of low deck tractor (D5.3):	Prototyping of certified low deck tractor and tyres	25	19.30	
Report on evaluation of first test run (D6.1):	<p>First test runs</p> <p>Test run evaluation and recommendation</p>	28	14.00	<p>First prototype test run on the road, rail, short sea and inland shipping was conducted.</p> <p>Different test cases for terminal handling and loading/unloading process are identified and tested.</p> <p>Tracking/tracing system is tested during every test run.</p> <p>Tests are documented and evaluated by operational and technical criteria, which have to be defined.</p>



2.7 Milestone 6: Final Project Presentation

Milestone 6 marks the end of the TelliSys project to the 36th month. It includes the second test run with optimised prototypes, dissemination and exploitation plans and a final public presentation of the TelliSys components.

Following deliverables belong to this milestone:

- Report on optimised design of TelliSys components (D4.4): Optimised engineering designs of the TelliSys components revised by the recommendations after the evaluation. FEM calculations, technical drawings and CAD models of each component, the different modules and the entire, technically feasible system have to be created. An order-ready part list, which includes standard components, raw materials and components to be manufactured, is included.
- Optimised prototype of modular MegaSwapBox (D5.4): Manufacturing of the MegaSwapBox's optimised prototype with certificates for unrestricted use.
- Optimised prototype of trailer (D5.5): Manufacturing of the trailer's optimised prototype with certificates for unrestricted use.
- Optimised prototype of low deck tractor (D5.6): Manufacturing of the low deck tractor's and tyres' optimised prototype with certificates for unrestricted use.
- Report on second test run (D6.2): Carry out a second test run under the same conditions as the first test run.
- Report on technological implementation plan (D7.1): A continuous documentation of all exploitable project results during the whole project runtime.
- Report on strategy of market launch (D7.2): A strategy for the market launch has to be developed and established and promising results are validated continuously.

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	12
---	--	----

- Public presentation workshop (D7.3): Publicly presenting the TelliSys prototypes in a real-life terminal process.
- Report on Milestones (D8.2): A continuous control of the deliverables using the quality-gate-model.

Table 2.7: Milestone 6

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Report on optimised design of TelliSys components (D4.4):	Optimisation of modular MegaSwapBox, trailer, low deck tractor and tyres	32	20.05	<p>FEM calculations for the optimised MSB, trailer, low deck tractor and tyres are made.</p> <p>Optimised technical drawings of each component, the different modules and the entire, technically feasible MSB, trailer, low deck tractor and tyres are available.</p> <p>Optimised CAD model of each component, the different modules and the entire MSB, trailer, low deck tractor and tyres are created.</p> <p>Optimised order-ready part list for the MSB, trailer, low deck tractor and tyres (standard components, raw materials and components to be manufactured).</p>
Optimised prototype of modular MegaSwapBox (D5.4):	Constructive optimisation of modular MSB	33	3.20	<p>Manufacturing of optimised operational MSB, trailer, low deck tractor and tyres.</p> <p>Certificates for an unrestricted use of the MSB, trailer, low deck tractor and tyres are available.</p>
Optimised prototype of trailer (D5.5):	Constructive optimisation of trailer		2.20	
Optimised prototype of low deck tractor (D5.6):	Constructive optimisation of low deck tractor and tyres		2.90	

Deliverables	Tasks	Delivery Date ¹	Costs PM ²	Quality
Report on second test run (D6.2):	Second Test Runs	36	4.75	Test run on the road, rail, short sea and inland shipping with the optimised prototypes was conducted. Terminal handling and loading/unloading process was tested with the prototypes.
Report on technological implementation plan (D7.1):	Technological Implementation Plan	36	5.80	Continuous documentation of all exploitable project results.
Report on strategy of market launch (D7.2):	Strategy of Market Launch	36	3.90	Strategy for the market launch is developed and established; continuous validation of promising results.
Public presentation workshop (D7.3):	Public Presentation	36	3.20	TelliSys prototypes are presented in a real-life terminal process.
Report on Mile Stones (D8.2):	Performance Management	36	5.75	Continuous control of the deliverables by the quality-gate-model.



References

- [1] The European Commission, Rheinisch Westfälische Technische Hochschule Aachen:
Grant Agreement No. 314310. 2012

2013 11 27 List_of_evaluation_criteria_D1.3_V1.0	© TelliSys consortium TelliSys is funded within the Seventh Framework Programme (FP7) of the European Commission	15
---	--	----

Annexes

Annex 1: Example Quality-Gate-Model

MS4: Approval for Production		Status:	Deliverables	Tasks	Time	Costs (PW)	Quality	Problems	Countermeasures
B	O	B	Report on design of modular MegaSwapBox (D4.1):	Engineering Design of modular MegaSwapBox	19	31.00	FEM calculations for the selected MSB are made		
O	O	technical drawings of each component, the different modules and entire, technical feasible MSB are available							
N	O	CAD model of each component, the different modules and an entire MSBs are created							
B	O	order-ready part list for of the MSB (standard components, raw materials and components to be manufactured)							
O	O	implement a tracking/tracing system							