# D2.3: System and User Requirements Definition

Work package	WP2: Requirements and Specifications
Task	Task 2.3: System, simulation and user requirements
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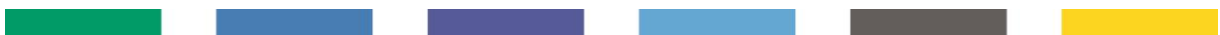
Control sheet

Version history			
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0.1	06/03/2017	Orhan B. Alankus	First Draft
0.2	13/03/2017	Orhan B. Alankus	Second Draft
0.3	22/03/2017	Orhan B. Alankus	Third Draft
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Glossary of terms

Term	Description
Transport mission	Defined transport route
Scenario	Definition of specific elements that characterize the test of a transport mission
Innovation Element	Core element of the optiTruck concept that explain how the project results contribute to fuel savings
Use Case	The use case is a set of possible sequences of interactions between systems and users related to a particular goal.
User	Stakeholders and project partners who uses the system for development and training
Cloud Optimizer	One component of the optiTruck Global Optimizer that supervises the optimization on the cloud
On-board Optimizer	One component of the optiTruck Global Optimizer that supervises the optimization on the on-board system
Dashboard	Dashboard used to collect transport mission data from the fleet management company
Mission User Interface	Interface used to communicate with the driver

Acronyms

Acronym	Description
WP	Workpackage
D	Deliverable
UC	Use Case
SoA	State of the Art
MUI	Mission User Interface
HMI	Human Machine Interface
IE	Innovation Elements
ETA	Estimated Time of Arrival
UML	Unified Modelling Language

Publishable Executive Summary

The optiTruck's global optimization system is composed of external data services, cloud computing system and on-board system. These three basic modules have together a high complexity and high level of interaction. This system will be used to optimize the powertrain control and calibration through ten innovation elements.

A model in the loop and software in the loop system is the first requirement for an effective development system and it is also required for the verification of different conditions during transport mission and also for the verification of the innovation elements.

The innovation elements that form the skeleton of the optiTruck project concept are explained in Section 2 together with the expected contributions to fuel saving. Each innovation element will be correlated with related stakeholders and also will have specific requirements from the simulation system for system development and verification.

Use cases are important to verify the overall functioning of the global optimization system and details of the design are explained in D2.1. The simulation system should be able to simulate ten use cases given in Table 2 to verify the development phase before the demonstration on the road.

The purpose of the deliverable is to define the stakeholders, user requirements, details of the simulation and verification system requirements in detail. Users are determined and details of a user's survey and workshop are presented in Section 3.1.

Requirement analysis for on-board system developers, cloud system developers, logistic companies and Truck Drivers are investigated in Section 3.2. To ensure the compatibility with other simulation tools (e.g. GT-Power) and provide a high flexibility during the development process, the used platform has to be based on Matlab/Simulink and enable the transfer of the optiTruck system from the simulation environment to the hardware of the demonstrator truck as on-board system developer requirements. The PTV xRoute and the additional package PTV Emissions calculation will determine the best routes providing fuel consumption and CO_2 emission forecast by HBEFA 3.1 (Handbook Emission Factors for Road Transport), CEN standards (European Committee for Standardisation) and the Eco-tax for France. In particular, the HBEFA 3.1 calculates the emission factors for all regulated and the most important non-regulated pollutants as well as fuel consumption and CO_2 considering truck category and a wide variety of traffic situations. Moreover, the Vehicle Longitudinal Model (VLM) simulation will provide accurate values of fuel consumption and CO_2 emission on the basis of road topography and velocity set-points adopted by the truck during its trip.

The global optimization system will be formed with integration of individual systems and functions which will be tested individually using different appropriate Use Cases. When the functionality of the individual functions is verified, the sub functions will be integrated into the overall system architecture and tested using the V-type approach through the project for verification and validation as described in Section 4.

The simulation system results are to be checked with the real time demonstrators that's why the optiTruck truck and a baseline truck will be prepared for the demonstration as described in Section 5.

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