

**INFORMATION SOCIETY TECHNOLOGIES (IST)
PROGRAMME**



Dangerous **Goods** Transportation **Routing**, Monitoring and
Enforcement

GOOD ROUTE
IST-4-027873-STREP

| Control Centre and Logistic chain support modules (limited public version) | | | |
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List of abbreviations

| Abbreviation | Description |
|----------------------|--|
| ADR | Agreement concerning the international carriage of Dangerous Goods by Road |
| DG | Dangerous Goods |
| DSS | Decision Support System |
| HMI | Human Machine Interaction/Interface |
| IP | Internet Protocol |
| LSS | Logistics Support System |
| OBU | On-board Unit |
| OEM | Original Equipment Manufacturer |
| PC | Personal Computer |
| PDA | Personal Digital Assistant |
| POI | Point of Interest |
| TMC | Traffic Management Centre |
| Instruction | The written and or spoken direction given with regard to what is to be done, including the information given in training. |
| Process | The method of operation in any particular stage of development of the material part, component or assembly involved. |
| Prototype | The result of project activities or processes. It may include service, hardware, processed materials, software or a combination thereof. |
| Reliability | The ability of an item to perform a required function under stated conditions for a stated period of time. |
| Specification | The document that prescribes in detail the requirements with which the prototype or service has to comply. |
| Logistics | The process of planning, implementing, and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of meeting customer requirements |

Executive Summary

This Deliverable D4.2 “Control Centre and Logistics chain support modules” is the outcome of activities 4.4, 4.5 and parts of 4.3 and aims at reporting the software and hardware specifications developed. It may be considered as the sequel of D4.1 where the provisional specifications of the Control Centre and the Logistics Support System (LSS) are already described. This deliverable contains the description of the final product of GOOD ROUTE as far as the Control Centre is concerned and the LSS functionalities, as well as a detailed presentation of the HMI and its applications. It is accompanied by the CD with the basic screen files and the web server for the Control Centre.

The introductory chapter puts forward the scope of deliverable, the overall approach and priorities set, while there is a concrete description of the providers of each section and the contributions of the partners. It is stressed that a deliverable is the main outcome coming mostly from the 3 partners involved in the respective activities that have as an output the final hardware and software integrated regarding the logistics chains support.

Subsequently, the second chapter provides the bridge from the definition of the Logistics support system to the development and integration in the HMI and interface of the portal as well as the Control Centre. The basic principles followed for the design and development as well as the architecture and the justification of the approach selected are briefly explained.

The third chapter is the result of the HMI activity A4.4 concerning the Portal design and development considering also the logistics data required for the GOOD ROUTE System. This part is limited in this short version while in the original version, a detailed presentation of all the screens is provided.

The fourth chapter provides a brief description on the screen files of the Control Centre. This section is more correlated to the CD accompanying the report where the structure and interaction of the interfaces is presented, while there is also an outline of the core database of the core GOOD ROUTE system also containing the logistical information stored.

Finally, the conclusions encompass the basic results as these are drawn from the report. Even if the report is an overview and acts as a supplement to the hardware and software to be delivered and is difficult for this chapter to be the summary of the outputs of each chapter of the deliverable, nonetheless the conclusions present the added values emerged from the development of the systems, the objectives achieved through the activities conducted and the views for the future regarding the logistics modules of GOOD ROUTE.

1 Introduction

This deliverable comprises the final outcome of the WP4 and describes the entire output, systems and modules designed and developed under its context. The activities envisaged in the WP may be summarized to the following:

1. Definition and establishment the Vehicle to Control Centre Communication (A4.1) (reported in D4.1)
2. Define the logistical interfaces that would be created in the context of GOODROUTE (A4.2)(reported in D4.1)
3. Develop the necessary modules to be integrated into the Control Centre (A4.3)
4. Design and develop the HMI of the system with the users (A4.4)
5. Define and develop the logistics module of the system (A4.5)

The report concerning D4.2 is segmented in 3 mains sections concerning the activities 3-4-5 mentioned above and provide a description of the software and hardware developed in the context of these activities.

This report is accompanied with the respective, hardware and software of these activities integrated namely the Control Centre, the Portal and the integrated logistics modules of GOODROUTE. A CD version with the screen files concerning the logistics transactions and interface with the Control centre is also provided for the better complementarity with the report.

The report has been jointly prepared by the partners that were involved in the activities A4.3-A4.4-A4.5, namely CARTH-HIT, PTV and USTUTT. Each partner responsible for each activity has provided the respective input for the deliverable which is the following:

- The LSS module: Initial description of the functionalities and role of the LSS has been provided in previous deliverables (D1.1&D4.1) by CARTH-HIT as the responsible partner for the A4.2 “Semantics service network” and A4.5 “Logistics chain support System”. In this deliverables, a short review is provided on how the LSS has been configured, while its development has been split into the HMI and Control Centre parts.
- The HMI Story book: This part of the deliverable has been produced by USTUTT that developed the portal of GOOD ROUTE and provides the functionalities and screenshots of the module. Special emphasis in this report has been placed in the description of the HMI written in a manual format for the better understanding of the portal of GOOD ROUTE and the integration of the logistics and operational features of the system. In the current revised version of the Deliverable, this section includes the HMI usability tests results conducted in the 3rd year of the project, while the interfaces provided for all actors of the logistic chain are updated according to them.
- Control Centre modules: PTV, was responsible for the Control Centre development activity and integrating the modules (DSS, CR, LSS). A detailed description on the configuration and architecture of the Control Center has been described in D4.1. In this chapter, which is accompanied by the html screenshots, a short description of the structure of the databases and the logistics companies HMIs is provided for the depiction of the technical integration that has followed regarding the LSS and the HMIs.

Finally, the conclusions of the deliverable reflect the basic substantial elements of system developed and how this complies with the specifications and expectations from GOOD ROUTE, taking under consideration the targets set by the workteam. This part of the report has been elaborated by CERTH-HIT with the suggestions from the other core partners of the WP.

2 Logistics Chain Support System (LSS) Overview

Logistics, beside all technological activities and achievements of the project, is a critical field concerning the development of the GOOD ROUTE system. The aim to make the GOOD ROUTE system an important tool for the market with enhanced usability from the dangerous goods transportation companies was set from the beginning and significant driver for the design of the system. Therefore, special emphasis has been placed in several deliverables (D1.1, D4.1, D9.2, D6.1) depicting the importance and considerations for the logistics features of the project from design, development to exploitation. This chapter provides a brief description of the role of the logistics chain support system (LSS) and how this has been integrated in the Control Centre and Portal (HMI) of GOOD ROUTE.

2.1 The Logistics Support system objective

The objective of the GOOD ROUTE project as a whole was to develop a system that would in service not only of the Infrastructure traffic management operators that would need to monitor the DGVs inside their infrastructure but also to allow to the dangerous goods companies have a new perspective when calculating routes and assign their fleets in the minimum risk paths. Thus one of the goals of the system was that this could be functional as a logistics system-interdependent with the entire GOOD ROUTE system- for the DGV fleets regardless the infrastructure (tunnels, bridges, etc) that would possess the system. Thus the GOOD ROUTE would need a module that would follow the principles of typical logistics systems however with the following advantages:

1. The system would provide options for safer routes (minimum risk)
2. The system would be an open internet based neutral tool available for all companies regardless their profile
3. Permission for easier access through critical infrastructures possessing the system
4. Route planning and real time monitoring of the vehicles
5. Optimised incident management and real time re-routing in special cases

Therefore, from the design level of the LSS, the basic specifications of the available logistics systems in the market should be followed, adjusted in the needs of the GOOD ROUTE system as a whole. Concrete market survey has been implemented in D9.2 in order to assess the existing situation concerning the navigation and route planning tools available.

Thus based on these initial needs the basic for the operation of the GOOD ROUTE system also as a route planning tool, the LSS role has been recognised as the tool that would:

- Collect the logistics information required for the routing
- Allocate the information required to the respective GOOD ROUTE Modules (DSS, CR etc) for the further processing
- Store the data for future retrieval and monitoring

All the details concerning these activities have already been reported in the previous deliverables and mainly in D4.1 and thus it is not necessary to go into detail in this section of part D4.2.

2.2 The LSS Architecture overview

The two main components of the LSS are:

- The LSS interface which is divided in the several pages for the users to insert all necessary data
- The LSS database, which is used for the storage of the logistical data such as the routes details, vehicles etc.

The entire LSS is integrated in the Control Centre and is linked to the DSS and CR. The interface of the module is considered part of the portal of GOOD ROUTE dedicated to the forms of acquisition of logistical information. An overview of the architecture of the LSS is provided in the following figure:

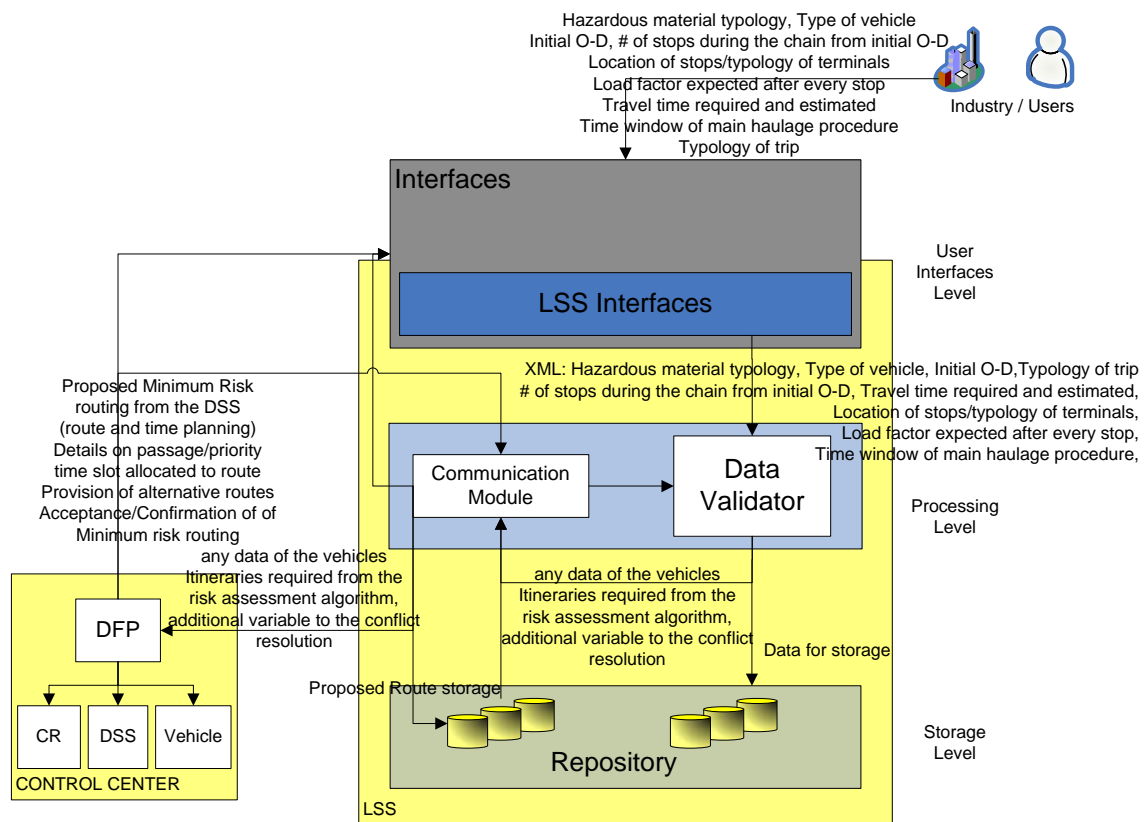


Figure 1: The LSS architecture

In the above figure the common interface with the GOOD ROUTE portal where the external users may get into the system and provide any necessary information for monitor the condition of their routes and itineraries is depicted as well as the LSS repository (database) where the logistical information are stored. The links with the DSS and CFR are also indicated through the Data Fusion Platform of the Control Centre. The communication level is nothing more than the exchange of the data in the Control Centre, while the Data validator is a first level of cross checking the information inserted at a tactical level with the one actually (in real time) inserted into the vehicles and the start of the itinerary. In case there is a discrepancy identified there is an alarm message triggered to the company and a new route will be calculated with the actual information at a real time.

In order to make the GOOD ROUTE system a user friendly open logistics system alternative it was decided to be integrated entirely into the Control Centre without any additional

modules implanted in the systems or the premises of a company. This was considered to the most appropriate solution due to the following aspects:

- Easier access to all users and companies through the internet
- Logistical services for companies that do not possess any facilities, or with limited service network
- User friendliness over internet applications
- Easier market penetration due to open access to any company
- Fewer development, management and maintenance costs at the exploitation level of the system
- Central Monitoring and improvement of the system at any given time in the present and future

In the following chapters and in the CD accompanied with this report, the two main components of the LSS (interface and database) are described and provided. Special emphasis has been placed in the storybook of the HMI for the external users as this part of the deliverable can be used as the user manual for the better understanding of the screens, operations and possibilities of the module. On the other hand the technical description of the database is more limited but available with the final hardware to be delivered.

3 Storybook Portal HMI

3.1 Introduction

3.1.1 Basic principles

In this part of the report the basic functionality of the Good Route Online Portal for logistics companies and infrastructure operators is outlined.

The Good Route system achieves its goal of providing routing, re-routing, monitoring, enforcement and emergency support for dangerous goods vehicles by the reception, processing output of information. Good Route online portal is the Human-Machine Interface to be used by all actors involved in the logistics chain. It is meant to provide an easy access to those system functions which are dedicated to the information exchange between any user and the technical system.

The development of a Human-Machine-Interface is only possible if certain facts about the technical system are known. In the case of the interfaces described in this storybook, the basic input consisted in:

1. The aims of the Good Route system. These aims include the tasks that all different users or user groups will need to complete using the interface. This most basic information was taken from the Good Route use cases (D1.1). Additionally, the test scenarios were reviewed (D7.1) in order to ensure that the portal covered all functionalities needed during the project phase.
2. User needs. Different users or user groups may require different information strategies, according to their personal characteristics or the circumstances of their work (e.g. availability of various resources such as time). Those differences are found in “user needs”, in this case taken from D1.1.
3. The technical restrictions of the system. This kind of information was retrieved from technical documents, such as the internal parameters list. Special questions about planned functionalities were discussed between the respective project partners.

The main user group to be using the system are provided in the following figure.

3.1.2 User Groups

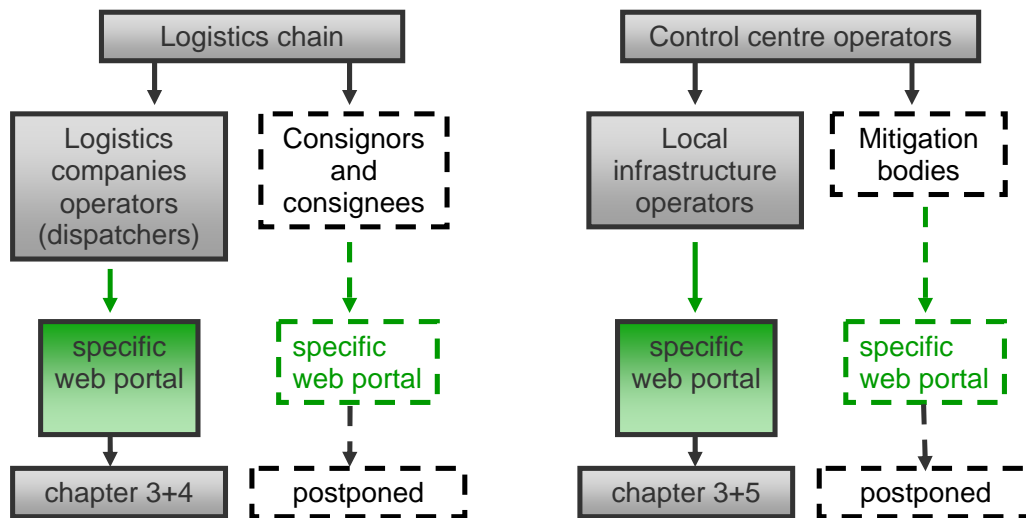


Figure 2: User groups - overview

Activity A4.4 demands that HMIs are developed for two different user groups: The logistics chain and the control centre operators. Both of these user groups split up into two different subgroups, each of which will need a unique HMI solution. Logistics companies will basically need an HMI that allows the insertion of the logistical data into the system for calculating routes for their fleet (part of the LSS), as well as for route-planning, for getting an overview on all planned routes and for monitoring single trucks. Additionally, a rather complex warning and information strategy is needed as the dispatchers (the users at the logistics companies) will be responsible for their itineraries. The consignors and consignees of those dispatchers on the other hand will not need to plan routes and as they are not directly responsible for the transports in case of an emergency, different warnings are to be given to them.

Local infrastructure operators are the first subgroup of users that belong to the category of “control centre operators”. Their task consists of the monitoring the traffic in an infrastructure segment, such as a bridge or a tunnel and in granting or denying the access to it. Mitigation bodies such as the police or fire-brigades do not need to receive passage requests. They will need nothing but a monitoring function and good warning strategies, so they are informed about any critical incident as quickly as possible.

This chapter deals with the Human-Machine-Interfaces for all logistic chain actors. In this revised version of the Deliverable, the usability test results conducted in the 3rd Year are reported along with the updated interfaces emerging for all actors.

3.2 General Storybook (Pages available for all user groups)

The general storybook storybook contains all the details regarding the following applications:

1. Login

The basic flow of the login information is depicted in the following figure 3 and comprises of

the the following pages:

- a. Request company account
- b. Password forgotten

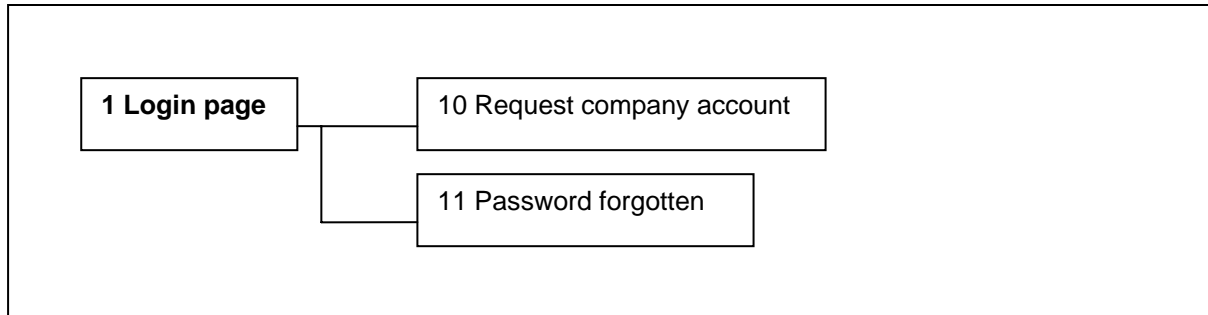


Figure 3: Openly available pages – structure

This page is common for both the companies and infrastructure operators. The division of the pages in these two user categories is provided in the following paragraphs.

3.3 Specific Storybook (Logistics Companies)

3.3.1 Logistics – Companies website Overview

The main pages foreseen for the logistics operators are the following:

- New route
- Planned routes
- Route confirmation page
- Map and status
 - Status tab
 - Events tab
 - Route tab
- New accounts / registrations
- Create dispatcher account
 - Create driver account
 - Register vehicle
 - Unregister / delete accounts
- My account
 - My account settings
 - Delete this account

The sequence after the login information provided is as follows in the following graph.

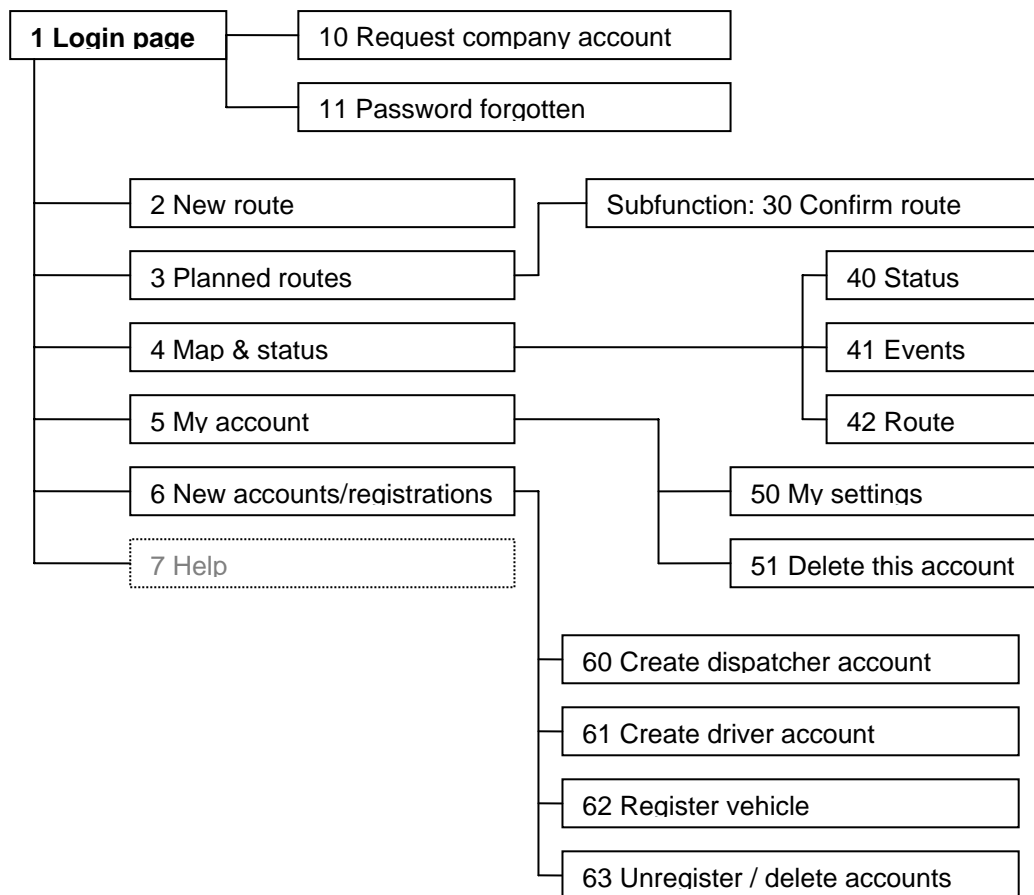


Figure 4: Logistics companies website structure

Through this procedure the pages of the LSS would give the possibility to the users to create a new route, have access to accepted routes, have access to the maps with the real time displays of the itineraries, register in the system and have access to its inventory with all the details needed for the routing of the processes.

3.4 Logistics companies HMI - final evaluation

After the 2nd Annual Review, final feedback on the existing drafts of the dispatchers' HMI had been collected from the project consortium and changes in the interface were done accordingly. The resulting HMI was then tested with representative users in order to **identify final optimisation potentials** and in order to receive a **global feedback on the actual implementability** of the interface. The main results from these tests and the solutions integrated are summarized in the following table

3.4.1 Problems encountered

The occurrence is given in percentage. Example: An occurrence of 100 % means that every participant had the respective problem.

Table 3.1: Problems encountered

| | Problem description | Occurrence (%) | Solution |
|----|---|-----------------------|--|
| 1 | The participant did not know what "POI" meant. | 100 | POI – entry fields have been eliminated (they were not useful anyway). |
| 2 | The participant did not anticipate what priority passages could be. An explanation needed to be given. | 100 | (this was to be expected and not a primary interface problem). A help text was developed. |
| 3 | The participant did not click on "new accounts / registrations" during task 2. | 63 | Additional hyperlinks for the registration of new drivers / vehicles were placed on the new route page |
| 4 | The participant did not understand function of uploading table on the new route page (e.g. thought, it was a status table). | 63 | A status table was added to the new route page. |
| 5 | The participant was not able to correctly interpret the unloading table on the page "map&status". | 63 | This is probably due to language problems. A clearer concept could not be defined. |
| 6 | The participant could not book a priority passage although he wanted to do so during task 4. In most cases, the checkboxes were not found. | 50 | The priority passage booking function received a new layout. |
| 7 | The participant did not understand 3 or 4 icons on the page "planned routes" | 50 | The icons received tooltips (this had been considered before anyway. There were no tooltips in the tested prototype, hence the problem). |
| 8 | The participant did not realise that there was a submenu in "new accounts / registrations". | 50 | Hyperlinks that lead more easily to the subordinate pages were placed on the page "new accounts / registrations". |
| 9 | The participant did not know how to get the password and user name needed for the creation of a driver account (Both needed to be invented but the participant did not realise that). | 50 | The account creation function was re-conceptualised: user names and passwords for new accounts will now be generated automatically. The website was adapted accordingly. |
| 10 | The participant encountered difficulties using the link "confirm route" because of clicking the icon, not the hyperlink. | 13 | The icon was converted to a hyperlink. |

3.5 Specific storybook (Infrastructure operators)

Concerning the infrastructure operators, the sequence after the login page integrates the following applications:

- Overview
- Passage requests

- Map & status
 - Basic components
 - Status – tab
 - Vehicle
 - Rules
- Rules & restrictions
 - Set passage rules
 - Set restrictions
- Account administration
 - Create infrastructure operator account
 - Account settings
 - Delete this account

This structure would make a user friendly application that would allow the infrastructure operators to monitor the vehicles inserting the infrastructure, grant passage to vehicles, set specific restrictions to the vehicles and modify all account details.

The structure is depicted in a flow chart format in the following figure 5

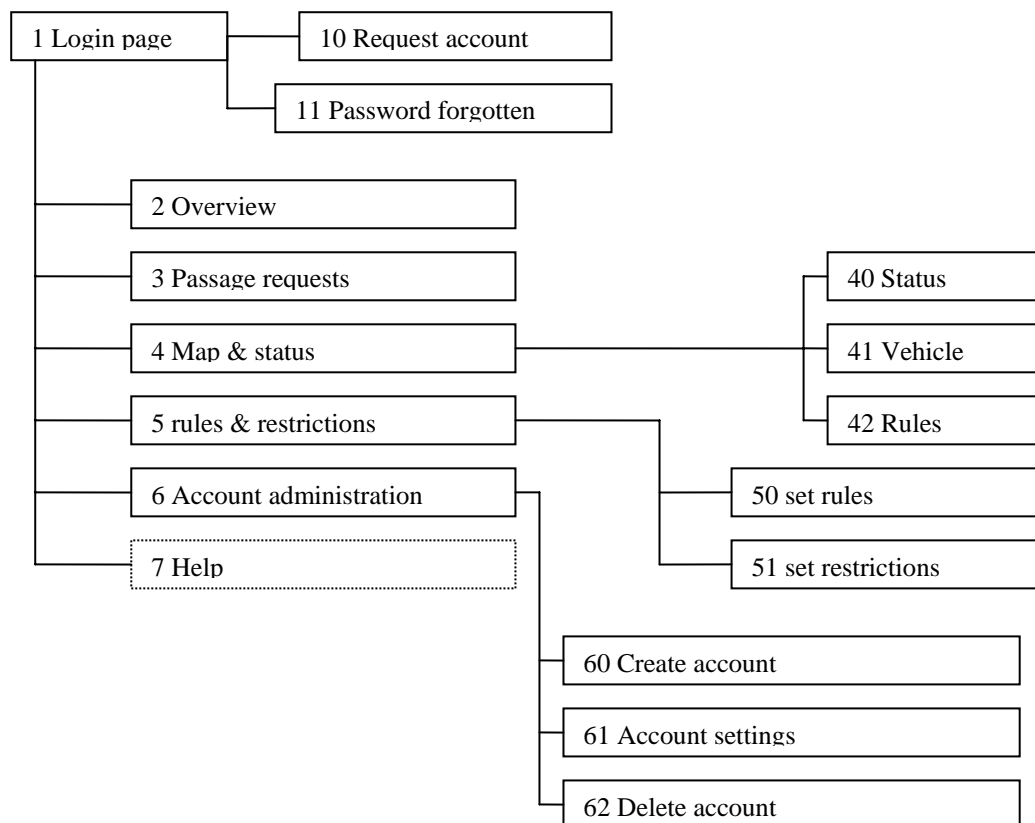


Figure 5: Infrastructure operators website structure

More information on all pages for both the logistics companies and the infrastructure operators are provided in the original report with screenshot and details on the buttons and messages integrated.

In the original report the specific functionalities for the fire brigade and the police are available.

3.6 Infrastructure operators' HMI / Fire brigades' HMI - final evaluation

During the M24 plenary meeting, final feedback on the existing drafts of the infrastructure operators' HMI and the fire brigades' HMI had been collected from the project consortium and changes in the interface were done accordingly. The resulting HMI was then tested with representative users in order to identify final optimisation potentials and in order to receive a global feedback on the actual implementability of the interface.

In the following, the tests and its results will be depicted in brief.

3.6.1 Problems encountered

The occurrence is given in percentage. Example: An occurrence of 100 % means that every participant had the respective problem

Table 3.2: Problems encountered

| | Problem description | Occurrence (%) | Solution |
|---|---|-----------------------|--|
| 1 | The participant did not realise that "vehicle ID" was the number plate. | 78 | The wording was changed to "number plate". |
| 2 | The participant did not understand what "nearby incidents" meant. | 78 | A new icon and a help text were introduced. |
| 3 | The participant could not deny passage (task 5) without the help of the test instructor, because status field and button were confused. | 44 | The buttons were redesigned, indicating the possible interactions more clearly now. |
| 4 | The participant did not find the submenu in "rules & restrictions" | 33 | Internal hyperlinks were placed on this page in order to facilitate the navigation to the subordinate functions. |
| 5 | The participant was unable to tell what the green hooks / red Xs meant on the page "passage requests". | 33 | The table headings were re-worded. |
| 6 | The participant looked for something else but "rules and restrictions" when doing task 2. | 33 | The meaning of the "rules" subfunction was made clearer. |

3.7 Specific Storybook Customers

The features included in the customer were the following that required important for the management of the system.

- Receiving Cargo
- Sending Cargo

The following illustration gives an overview of the interface for customers.

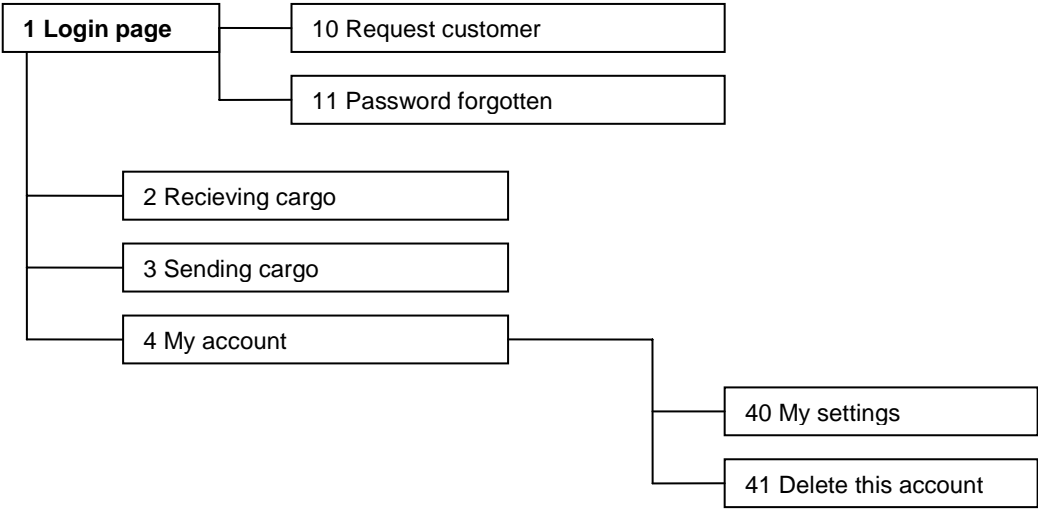


Figure 6: Customers website structure

4 Control Centre Integration

The following two paragraphs provide a short overview over the software attached to this report. For more details please refer to the respective deliverables D4.1 "GOODROUTE-TID-D4.1-V3.1-SemanticServiceNetworkAndDataFusionAlgorithms.doc" and D2.2 "GOODROUTE-PTV-D-WP2-R1-v06-D2.2_MinimumRiskRouteGuidanceSystem_final181207.doc".

4.1 HMI screens for user "Logistics Company"

The attached folder with HTML screens represents the main functions of the Logistics Company as user of the GoodRoute portal. Since the screens are made available off-line, not all functions may work or error messages may occur. Maps are also not included since this functionality needs a map server. For the time being the screens have been tested with Firefox browsers. Other browsers will be included and tested later on (some times the pages are not correctly displayed by Internet Explorer).

With the screens it is possible to register a vehicle and to plan and monitor a route. Other users such as the Traffic Management Centre (TMC) have similar screens but get different information displayed, depending on their access rights and the use cases. The same is valid for any other user accessing the portal.

Regarding the installation procedure, please read the following steps:

- Unzip the file "goodroute.7z" on a computer hard drive. The new folder "goodroute" (total size about 294MB) should comprise the following sub-folders "jdk1.6.0_03", "logs" and "Tomcat.v.5.5.23".
- Start the Tomcat Webserver by double clicking on the file "startup.cmd". A DOS window should come up with the name Tomcat written in the top left corner. Do not close this window since this leads also to the termination of the webserver.
- Open a Firefox browser and enter the following URL: <http://localhost:8080/goodroute/>

Since it is a local application, the loading of the screens takes some time. Once the screens are visible in the browser, they can be tested by using mouse and keyboard. Please have in mind that the available data within the screens is not dynamic.

4.2 The Control Centre business logic and data base

The following figure shows the Control Centre database layout (including the logistics information) with most of the needed parameters in the GoodRoute Control Centre. It is separated into the following sections:

- **Route:** All parameters necessary to plan and visually present a route
- **SuperUser:** The users allowed to access the GoodRoute portal
- **Restrictions:** The restrictions for each user. For example, company A is not allowed to monitor the trucks from company B
- **Cargo:** All parameters needed to describe the cargo of the vehicle
- **Profiles:** The user profiles, including user management and account management

- **Vehicle:** All parameters needed to register a vehicle
- **Parameters:** All parameters that need to be exchanged between the different GoodRoute modules
- **Events:** Events that may happen on the route and which may lead to a change of the route, for example road blocks or extreme weather conditions

| ROUTE | SUPERUSER | PFM_PROFILES | PARAMETER |
|--|--|--|---|
| <ul style="list-style-type: none"> IDROUTE: INTEGER IDVEHICLE: INTEGER IDSUPERUSER: INTEGER BOOKINGSTATUS: INTEGER DRIVER1: VARCHAR(50) DRIVER2: VARCHAR(50) DATE: DATE TIME: TIME DEPARR: BOOL DATE_ESTIMATED: DATE TIME_ESTIMATED: TIME NRSTOPS: INTEGER S1_COUNTRY: VARCHAR(50) S1_POSTCODE: INTEGER S1_STREET: VARCHAR(50) S1_CITY: INTEGER S1_HOUSENUMBER: VARCHAR(50) S1_POI: INTEGER S1_CONSIGNOR: VARCHAR(50) S1_CONSIGNEE: VARCHAR(50) S1_COORX: INTEGER S1_COORY: INTEGER S2_CONSIGNOR: VARCHAR(50) S2_CONSIGNEE: VARCHAR(50) S2_COORX: INTEGER S2_COORY: INTEGER S3_CONSIGNOR: VARCHAR(50) S3_CONSIGNEE: VARCHAR(50) S3_COORX: INTEGER S3_COORY: INTEGER S4_CONSIGNOR: VARCHAR(50) S4_CONSIGNEE: VARCHAR(50) S4_COORX: INTEGER S4_COORY: INTEGER S5_COUNTRY: VARCHAR(50) S5_POSTCODE: INTEGER S5_STREET: VARCHAR(50) S5_CITY: INTEGER S5_HOUSENUMBER: VARCHAR(50) S5_POI: VARCHAR(50) S5_CONSIGNOR: INTEGER S5_CONSIGNEE: INTEGER | <ul style="list-style-type: none"> IDSUPERUSER: INTEGER IDUSER: INTEGER PASS: VARCHAR(50) ROLE: VARCHAR(20) LASTACCESS: TIMESTAMP | <ul style="list-style-type: none"> IDUSER: VARCHAR(36) LOGINNAME: VARCHAR(50) COMPANYNAME: VARCHAR(50) COMPANYTYPE: VARCHAR(20) COMMERCIALREGISTER: INTEGER SURNAME: VARCHAR(50) TITLE: VARCHAR(20) NAME: VARCHAR(50) STREET: VARCHAR(50) HOUSENUMBER: INTEGER POSTCODE: INTEGER CITY: VARCHAR(50) DISTRICT: VARCHAR(50) COUNTRY: VARCHAR(50) TELEPHONE: VARCHAR(50) EMAIL: VARCHAR(50) ADDITIONAL: VARCHAR(255) MOTHER_TONGUE: VARCHAR(50) SECOND_LANGUAGE: VARCHAR(50) DISPLAY_EMAIL: BOOL INFOTEXT: VARCHAR(255) LICENSENUMBER: VARCHAR(50) | <ul style="list-style-type: none"> IDPARAMETER: INTEGER IDROUTE: INTEGER D_ACTUALDAY: DATE D_DRIVINGTIME: INTEGER D_OVERSPEED: INTEGER D_BEHAVIOR: VARCHAR(50) V_COLOUR: VARCHAR(50) V_COUNTRYOFORIGIN: VARCHAR(50) V_IDENTIFIER: VARCHAR(50) V_MANUFACTURER: VARCHAR(50) V_MODEL: VARCHAR(50) V_REGISTRATIONPLATE: VARCHAR(50) V_STATUS: VARCHAR(50) V_AXLESPACING: FLOAT V_AXLEWEIGHT: FLOAT V_INDIVISPEED: FLOAT C_CHEMICALNAME: VARCHAR(50) C_DGFLASHPOINT: FLOAT C_DGREGULATIONS: VARCHAR(50) C_HCODEIDENT: VARCHAR(50) C_HVERSIONNUMBER: INTEGER C_HSITTEMPAGENUM: VARCHAR(50) C_TREMCARDNUM: VARCHAR(50) C_UNDGNUM: VARCHAR(50) C_VOLUMEDG: FLOAT C_WEIGHTDG: FLOAT VC_FUELTYPE: VARCHAR(50) VC_LOADTYPE: VARCHAR(50) VC_VEQUIPMENT: VARCHAR(50) VC_VTYPE: VARCHAR(50) VC_VUSAGE: VARCHAR(50) VC_GROSSVWEIGHT: FLOAT VC_VHEIGHT: FLOAT VC_VLENGTH: FLOAT VC_VWIDTH: FLOAT VC_HEAVAXLEWEIGHT: FLOAT VC_NUMAXLES: INTEGER |
| | <ul style="list-style-type: none"> RESTRICTION IDRESTRICTION: INTEGER IDSUPERUSER: INTEGER MAXSPEED: INTEGER STOP: BOOL V_LENGTH: INTEGER V_WIDTH: INTEGER V_HEIGHT: INTEGER V_NRAXLES: INTEGER V_CROSSWEIGHT: INTEGER V_HEAVAXLEWEIGHT: INTEGER C_ADRUN: BOOL C_ADRUNNO: VARCHAR(50) C_STATE: VARCHAR(20) | | |
| | <ul style="list-style-type: none"> CARGO IDCARGO: INTEGER IDROUTE: INTEGER WAYPOINT: INTEGER UNUPLOAD: BOOL ADRNO: INTEGER KEMLERNO: VARCHAR(50) UNNO: INTEGER SUBSTANCE: VARCHAR(50) QUANTITY: INTEGER QUANTITYATC: INTEGER UNIT: VARCHAR(20) | <ul style="list-style-type: none"> VEHICLE IDVEHICLE: INTEGER COMPANYNAME: VARCHAR(50) IDSUPERUSER: VARCHAR(36) LICENSEPLATE: VARCHAR(50) VEHICLETYPE: VARCHAR(20) INFOTEXT: VARCHAR(255) V_LENGTH: INTEGER V_WIDTH: INTEGER V_HEIGHT: INTEGER V_NRAXLES: INTEGER V_CROSSWEIGHT: INTEGER V_HEAVIESTAXLE: INTEGER POSX: INTEGER POSY: INTEGER LASTUPDATE: TIMESTAMP PASSAGESTATE: INTEGER | |
| | | | <ul style="list-style-type: none"> EVENTS IDEVENTS: INTEGER |

Figure 7: GoodRoute Control Center data base schema (preliminary)

The database represents one of the most important parts of the business logic of the Control Centre. It links all parameters which are transferred between the single modules of GoodRoute, including those modules that are hosted on external servers such as the DSS and the OBU. Most of the parameters used are also displayed in one way or the other in the GoodRoute portal. For example, sensor data coming from the OBU is displayed in the respective portal screen, and event information such as traffic accidents are visualised on the one hand on the portal and on the other hand transferred to the Conflict Resolution module for the calculation of the safest route by the DSS. To make things more complicated, this information has to be first collected from the different test sites.

But not only the storage of the data in the data base is of high importance for the business logic, also the different access rights of the different users affect the layout of the data base. For example, the host of the Control Centre has to make sure, that a logistics company can

only access the data that it owns. One company is not allowed to view the data of another company. After all security and protection of sensitive commercial information is a crucial factor that needs to be respected in order to enhance the usability of the system from a wide variety of different actors. In contrary, the Traffic Management Centre in the test site has the right to view all data that is relevant to guarantee the security within its territory, independent from the data owner

5 Conclusions

The present deliverable is an overview of the tasks regarding the logistics components of the GOOD ROUTE system through the LSS, the HMI and the Control Centre. The final output is mostly hardware and software which main description has been already described also in previous deliverables namely (D1.1, D4.1, D6.1, D9.2 etc). Therefore, in a report format the issue that was considered crucial to describe was the HMI screen shots where concrete explanations are provided for the users that would be involved in the operational level of GOOD ROUTE.

The report outlines in all terms the gravity and special importance of the logistics part-beside the technological development of tools- and views to develop a user friendly tool in the service of the industry. There are 4 different levels of users (logistics companies-infrastructure operators-drivers-external bodies (police, fire brigade), each one with a different aims and expectations from the system, but all with a common goal, to ensure safe, efficient transportation of dangerous goods. Thus all of these actors are directly or indirectly linked with the logistics of dangerous goods. All the pages, screen shots, operations and applications vis-à-vis the logistics information exchange and process has been planned and developed according to the needs of the industry and in compliance with the most frequently used transport management systems which nonetheless are scarcely focused on a specific category of cargo, including dangerous goods. This is an additional added value of the project and of the interface HMI that has been built, since there options focused and oriented for DGV fleets.

At a more practical level, the HMI and CC developed contain options, screens, pop-up windows, alarm messages and databases that are sufficient to support the data flow requirements towards not only of the logistics but of the entire system of the GOOD ROUTE, since a considerable amount of information for the run of the system come from the either the companies or the TMCs and this is why the HMI for these two user groups have been carefully designed and developed taking under consideration also their needs and expectations from the system.

In addition, it should be stressed that the development of the HMI-Control Centre and LSS has been made with a view to operate in conjunction to the DSS and CR integrated in the CC as a route planning tool using as basic principle the safest route with options of tactical planning, real time, re-routing, monitoring, alerting etc and based on this vision the HMI and Control Centre are clearly described and provided.

This document constitutes the revised version of the Deliverable submitted for the 2nd Annual Review and reports all usability tests held in the context of the 3rd Year, the emerging results and finally the final versions of all interfaces. Besides the HMI's for Control Centre operators (infrastructure operators and Logistic Company), interfaces for Fire Brigades and Police were developed and evaluated, whereas the basic outline for the customers interfaces is also added.

Finally, it is stressed that for the better understanding of the report and the specific descriptions, the deliverable is accompanied with a CD, while the hardware and software incorporated are considered the main achievement of the activities A4.3-A4.4-A4.5 implemented. It is underlined that the development is also in line with all the use cases of the project and has been considered seriously under account for the final product delivered.

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